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PREFACE

The General Provisions and all portions of the Standard Construction Specifications, Standard Forms Specifications and Standard Drawings which place any duty or responsibility upon personnel or agencies of the City of Folsom or other public entities are intended for use in those contracts entered into by public entities and administered by the City of Folsom. Any use of these General Provisions and the Standard Construction Specifications, Standard Forms Specifications, and Standard Drawings by any other person, persons, or entity shall not create or imply the assumption of any liability or responsibility by the City of Folsom or any public entity authorized to use these specifications.

Unless otherwise excluded, the Standard Construction Specifications, Section 1 through Section 12, shall apply to all materials and construction methods for all construction work both under the direct inspection of the City of Folsom for contracts awarded by public entities and administered and inspected by the City of Folsom, and for those contracts under indirect inspection awarded by other parties for future dedication or incorporation into the public entities' facilities, and for construction of private improvements within public rights of way or easements.

In addition to public contracts, the Standard Construction Specifications of this document will also apply to private development both for publicly owned and privately owned facilities.

GENERAL PROVISIONS



ARTICLE 1. TERMS AND DEFINITIONS

Section 1.01. Whenever the following terms, titles, abbreviations or phrases are used in these Specifications, or in any document or instrument wherein these Specifications govern, the intent and meaning thereof shall be as defined in this Article.

Section 1.02. Abbreviations.

AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
AC	Asphalt Concrete
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
APA	American Plywood Association
ASA	American Standards Association
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWG	American Wire Gage
AWS	American Welding Society
AWWA	American Water Works Association
Cal-OSHA	California Occupational Safety and Health Administration
Caltrans	California Department of Transportation
CL	Centerline
CSI	Construction Specifications Institute
CY	Cubic Yards
DI	Drop Inlet
EA	Each
EP	Edge of Pavement
FS	Federal Specifications
In	Invert
ISA	Instrument Society of America
LB	Pound
LF	Linear Feet
LS	Lump Sum
NBFU	National Board of Fire Underwriters
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NSF	National Sanitation Foundation
OSHA	Occupational Safety and Health Act
PCC	Portland Cement Concrete
SD	Storm Drain
SF	Square Foot/Feet
SS	Sanitary Sewer
STA	Station
Title 8	Title 8 (Construction Safety Orders) of the California Code of Regulations
Title 19	(Public Safety) of the California Code of Regulations
Title 24	Title 24 (Building Standards) of the California Code of Regulations

TOC	Top of Curb
Typ.	Typical
UL	Underwriters' Laboratories, Inc.
UBC	Uniform Building Code (latest edition)
USBR	United States Bureau of Reclamation
UMC	Uniform Mechanical Code (latest edition)
UPC	Uniform Plumbing Code (latest edition)
WCLA	West Coast Lumbermen's Association
WIC	Woodwork Institute of California

All references to the specifications, standards or other publications of any of the above are understood to refer to the current issue as revised or amended at the date of receipt of bids.

Section 1.03. Addendum/Addenda.

“Addendum” or “Addenda” are written documents furnished by the City before award of the Contract, interpreting or modifying Plans and Specifications or answering questions of intended bidders, and shall be incorporated in and are a part of the Contract Documents.

Section 1.04. Allowance.

“Allowance” shall mean an amount of money set aside under the Contract for a special purpose identified in the Contract Documents.

Section 1.05. Architect and/or Consulting Engineer.

The “Architect” or “Consulting Engineer” is a person or persons, firm, partnership, joint venture corporation, or combination thereof or authorized representative thereof, employed by the City or acting in the capacity of consultant to the City. The Architect or Consulting Engineer is designated by the City as the City’s agent to perform all functions delegated to the Architect or Consulting Engineer by the Contract Documents. The Architect or Consulting Engineer shall issue directions to the Contractor only through the City. When the Contract Documents require that approval be obtained from the Architect or Consulting Engineer, such approval shall be requested from and be given by the City.

Section 1.06. As Shown Etc.

Where “as shown”, “as latest indicated”, “as detailed”, or words of similar import are used, the reference is to the Contract Drawings unless specifically stated otherwise. Where “as directed”, “as permitted”, “approved”, or words of similar import are used, they shall mean the direction, permission, or approval of the City.

Section 1.07. Bid.

When submitted on the prescribed bid form, properly executed and bonded, at the designated time and location, the “Bid” constitutes the offer of the Bidder to complete the Work for the price stated on the bid form.

Section 1.08. Bidder.

“Bidder” shall mean any person or persons, firm, partnership, joint venture, corporation, or combination thereof, submitting a Bid for the Work, acting directly or through a duly authorized representative.

Section 1.09. Calendar Day.

“Calendar Day” shall mean every day shown on the calendar. When the Contract Time is stated in

Calendar Days, every day will be charged toward the Contract Time, and every reference to Working Days in these Specifications shall be deemed to mean Calendar Days.

Section 1.10. Change Order.

“Change Order” shall mean a written order to the Contractor, issued after execution of the Contract, signed by the City and the Contractor, authorizing a change in the Work and/or an adjustment in the Contract Sum and/or the Contract Time.

Section 1.11. City.

“City” shall mean the municipal corporation known as the City of Folsom. The City is sometimes designated “Owner” in the Contract Documents.

Section 1.12. City Council.

“City Council” shall mean the City Council of the City of Folsom.

Section 1.13. Closeout Documents.

“Closeout Documents” are the documents that are required to meet the requirements of final completion.

Section 1.14. Construction Change Directive (CCD).

“Construction Change Directive”, or “CCD”, shall mean a written order to the Contractor, issued after execution of the Contract, signed by the City or the Owner’s Representative directing a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both, and which shall be used in the absence of total agreement with the Contractor on the terms of a Change Order or when time does not permit processing of a Change Order prior to implementation of the change.

Section 1.15. Contract Documents.

The “Contract Documents” shall include the Notice to Contractors, the Proposal Form, the Agreement for Construction, the Bid Bond, the Performance Bond, the Payment Bond, these Standard Construction Specifications, the Special Provisions, Exhibits, the Contract Drawings and Plans, the Technical Specifications, any project-specific specifications or documents, all duly issued Addenda, Interpretations, Field Instructions, Written Directives, Supplemental Drawings, the Contractor’s Guarantee and Bond, the Contract Schedule, Storm Water Pollution Prevention Plan (whether prepared by the City or the Contractor) and any and all supplemental agreements amending or extending the Work contemplated and which may be required to complete the Work in an acceptable manner. Supplemental agreements are written agreements covering alterations, amendments or extensions to the Contract Documents and include Change Orders

Section 1.16. Contract Drawings or Plans.

The “Contract Drawings” (sometimes referred to as “Drawings” or “Plans”) are the Project Plans, Standard Drawings, drawings, profiles, typical cross sections, general cross sections, Working Drawings and supplemental drawings, plates or reproductions thereof, approved by the City, which show the locations, character, dimensions and details of the Work to be performed. Once approved, all such drawings are incorporated into and become a part of the Contract Documents whether or not reproduced in the Special Provisions.

In the above definition, the following terms are defined as follows:

- A. Standard Drawings: The Standard Drawings of the City of Folsom.

B. Project Plans: The project plans and specific details and dimensions peculiar to the Work and as supplemented by the Standard Drawings insofar as the same may apply.

Section 1.17. Contract Schedule.

The “Contract Schedule” is the schedule produced by the Contractor in response to the requirements of the Contract Documents.

Section 1.18. Contract Sum.

“Contract Sum” is the total amount payable by the City to the Contractor for the performance of the Work under the Contract Documents. The Contract Sum is the amount stated in the Agreement for Construction, including authorized adjustments thereto.

Section 1.19. Contract Time.

“Contract Time” shall mean the period specified for completion of the Work, as set forth in the Agreement for Construction and adjusted by any Change Order issued pursuant to the Contract Documents. The Contract Time may be a single allotment of time, a group of times specific to portions of the Work, or a combination of the two.

Section 1.20. Contractor.

“The Contractor” shall mean the person or persons, firm, partnership, joint venture, corporation, or combination thereof, who (that) has (have) entered into the Agreement for Construction of the Work with the City or its (their) legal representatives, or successors, assigns, executors, or heirs. The Contractor is required by law to be licensed and will perform work or render services as a prime contractor in or about the construction of the Work.

Section 1.21. Date of Commencement

“Date of Commencement” is the date established in the Notice to Proceed. If there is no Notice to Proceed, it shall be the date of the executed Agreement for Construction or such other date as may be established therein.

Section 1.22. Date of Completion.

The “Date of Completion” for the purpose of determining when the Work is complete is the date certified by the Owner’s Representative when construction of the Work is 100% complete, including completion and acceptance of all punch list corrections. See Article 7, Section 7.30 and Article 8, Section 8.11 for the meaning of “completion” for the purpose of determining acceptance of the Work and when final payment is due.

Section 1.23. Director.

The “Director” is the person appointed by the City Manager for the City of Folsom for the department through which the Project will be procured.

Section 1.24. Engineer.

The “Engineer” is the Director of Public Works/City Engineer of the City of Folsom, acting personally or through agents or assistants duly authorized to manage the Project by the overseeing Department Director.

Section 1.25. Equal (as in “or equal”).

“Equal” shall mean a system, process, product or material which is similar in all respects to that shown or specified but produced by a manufacturer not listed in the specification. See also: Substitution.

Section 1.26. Estimated Quantities.

“Estimated Quantities” shall mean a list of items of work and the estimated quantities associated with the Work. The Estimated Quantities may provide the basis for the Bid

Section 1.27. Field Instructions/Written Directives.

“Field Instructions/Written Directives” are Supplemental Drawings or instructions which may be issued as necessary from time to time to make clear or define in greater detail the intent of the Contract Drawings and Specifications. There may be a change in Contract Sum or Contract Time involved with the work shown in the Field Instruction/Written Directive.

Section 1.28. First Line Supervision.

“First Line Supervision” shall mean a working foreman or lead craft worker other than the project superintendent.

Section 1.29. Inspector.

The “Inspector” is the person or persons authorized to act as agent(s) for the City in the inspection of the Work.

Section 1.30. Interpretations.

“Interpretations” are all clarifications, additional instructions, and explanations issued by the Architect or Consulting Engineer after award of the Contract.

Section 1.31. Materials.

“Materials” is a generic term which shall include all materials, articles, supplies, and equipment delivered to the project for incorporation in the Work. “Materials” includes everything incorporated into the Work except labor, unless otherwise noted. “Equipment” shall mean all pre-manufactured or partially preassembled products or components, assembled or partially assembled before delivery to the Site.

Section 1.32. Notice to Contractors.

“Notice to Contractors” is the written notice whereby interested parties are informed of the date, location, and time of the Bid opening of a proposed City Project and the terms and conditions of submitting Bids to perform the Work.

Section 1.33. Notice to Proceed.

“Notice to Proceed” is the notice given to the Contractor following execution of the Agreement for Construction and receipt of all required preconstruction submittals as itemized in the Contract Documents. The Notice to Proceed establishes the start of the Work and authorizes the Contractor to begin construction.

Section 1.34. Owner’s Representative.

“Owner’s Representative” shall mean the City’s designated agent engaged to perform all functions delegated to the Owner’s Representative by the Contract Documents. The Owner’s Representative may

or may not be a construction manager. The Owner's Representative will be the Contractor's primary contact during construction of the Project.

Section 1.35. Plans.

See "Contract Drawings".

Section 1.36. Product Data.

"Product Data" shall mean illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate a material, product or system for some portion of the Work.

Section 1.37. Project

"Project" shall mean the complete work of improvement referenced in the Contract Documents.

Section 1.38. Proposal.

"Proposal" shall mean "Bid".

Section 1.39. Proposed Change Order (PCO).

A "Proposed Change Order/Work Order" or "PCO" is the name given to a document issued by the Contractor proposing a change to the Work and stating a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. A PCO shall be used by the Contractor to respond to a Request for Proposal. A PCO is not effective to authorize the proposed change to the Work, to the Contract Sum or to the Contract Time unless it is accepted in writing by the City.

Section 1.40. Record Documents.

"Record Documents" (sometimes referred to as as-builts) are the drawings and specifications prepared by the Contractor that document changes to, additions to, or deductions from the Plans and Specifications, and which represent the Work as constructed.

Section 1.41. Reference to Codes.

Unless otherwise noted, all references to statutes are to the laws of the State of California and/or of the United States as codified in the various specified codes.

Section 1.42. Request for Information.

"Request for Information", or "RFI" is the name given to a document issued by the Contractor seeking clarification and/or additional information regarding an aspect of the Work. The response to the RFI does not constitute authorization or direction to proceed with any changed or additional work. Changed or additional work must be separately authorized by the City.

Section 1.43. Request for Proposal (RFP).

A "Request for Proposal", or "RFP" is the name given to a document issued by the Owner's Representative requesting pricing information and/or an adjustment in Contract Time for a described scope of work. An RFP is not a Change Order, a CCD or a direction to proceed with the scope of work described in the RFP. The Contractor's response to the RFP shall be in the form of a Proposed Change Order.

Section 1.44. Samples.

"Samples" shall mean physical examples which illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

Section 1.45. Schedule of Values.

The "Schedule of Values" is a statement furnished by the Contractor to the City reflecting the portions of the Contract Sum allotted for the various parts of the Work for each work activity contained on the Contract Schedule. Unless otherwise indicated in the Specifications, the total of the Schedule of Values shall equal the full cost of the Work, including all labor, material, equipment, overhead, and profit. For lump sum contracts, the Schedule of Values is the basis for reviewing the Contractor's application for progress payments.

Section 1.46. Shop Drawings.

"Shop Drawings" shall mean drawings, diagrams, schedules and other data specifically prepared by the Contractor or any Subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

Section 1.47. Site.

"Site" is the area within which the Project is to be constructed.

Section 1.48. Special Provisions.

The "Special Provisions" are specific clauses setting forth conditions or requirements peculiar to the Work and supplementary to these Standard Construction Specifications.

Section 1.49. Standard Construction Specifications.

The "Standard Construction Specifications" include the directions, provisions, and requirements contained herein. When the term "Standard Specifications", "Specifications", or "these Specifications" is used, it means the provisions as set forth herein, together with any amendments or revisions that may be set forth in the Special Provisions. The Standard Specifications are comprised of "General Provisions" and "Standard Technical Provisions".

Section 1.50. Standard Drawings.

The "Standard Drawings" are the Standard Drawings of the City, which are incorporated into the Standard Construction Specifications, and made a part of the Plans by reference to one or more specific Standard Drawings.

Section 1.51. State.

"State" shall mean the State of California.

Section 1.52. State Specifications.

"State Specifications" shall mean the version of the Standard Specifications of the State of California, Department of Transportation, in effect at the time of Notice to Contractors.

Section 1.53. State Plans.

"State Plans" shall mean the version of the Standard Plans of the State of California, Department of Transportation, in effect at the time of Notice to Contractors.

Section 1.54. Subcontractor.

"Subcontractor" shall mean each person or firm who is required by law to be and who is licensed to and will perform work, labor, or render services to the Contractor in or about the construction of the Work, or who, under subcontract to the Contractor, fabricates and installs a portion of the Work. Subcontractor

includes a properly licensed party under contract and responsible to a Subcontractor of the Contractor.

“Subcontractor” shall include all persons or firms within the authority of the Subletting and Subcontracting Fair Practices Act, Chapter 2 of Division 5, Title I of the Public Contract Code, commencing with section 4100.

Section 1.55. Submittal.

“Submittal” shall mean all product data, shop drawings, manufacturers’ instructions, samples, Equals, substitution requests and all other submissions that the Contractor is required to provide to the City and/or the Architect or Consulting Engineer.

Section 1.56. Substitution.

“Substitution” shall mean a system, process, product or material similar in form or function and equal in quality and performance to that shown or specified, but differing in some essential element, e.g., chemical composition, mechanism of action, surface finish, dimensions, durability, electrical or mechanical or plumbing requirements. See also: Equal.

Section 1.57. Supplemental Drawing.

“Supplemental Drawings” define the Plans or Specifications in greater detail by providing additional information that may have not been specifically or clearly shown or called out on the Plans or in the Specifications.

Section 1.58. Work.

The “Work” shall mean all actions which the Contractor is contractually required to do as specified, indicated, shown, contemplated, or implied in the Contract to construct the Work, including all alterations, amendments, or extensions made by Contract Change Order or other written orders or directives of the City. Unless specified otherwise in the Contract, the Work includes furnishing all materials, supplies, equipment, tools, labor, transportation, supervision, and all incidentals necessary to complete the Work. The Work generally is described in the Notice to Bidders and the Special Provisions.

Section 1.59. Working Day.

“Working Day” means any day except: (a) Saturdays, Sundays, and City holidays; (b) days in which the Contractor is specifically required by the Special Provisions or by law to suspend construction operations; or (c) days on which the Contractor is prevented from proceeding with the current controlling operation or operations of the Work for at least five (5) hours per day due to inclement weather, or conditions resulting immediately therefrom.

Section 1.60. Working Drawing.

“Working Drawings” detail a particular item of work and the manner in which it is to be accomplished or performed. Working Drawings are prepared by the Contractor as a submittal or a portion of a submittal and may be specifically requested by the City or required in the Contract or a Written Directive.

ARTICLE 2. BID REQUIREMENTS AND CONDITIONS

Section 2.01. Bid Form.

The City will furnish to each prospective Bidder a bid form which, when properly completed and executed, must be submitted as the Bidder's Bid for the Work. All Bids must be submitted on the City-furnished bid form to be valid and accepted. Bids that are not submitted on the City-furnished bid form will be rejected. The completed bid form shall be in English and legible, and shall be properly signed in longhand; by the Bidder, if an individual, by a member of a partnership, by an officer of a corporation authorized to sign contracts on behalf of the corporation, or by an agent of the Bidder. If submitted by a corporation, the Bid shall show the name of the state under the laws of which the corporation is chartered or organized. All spaces provided on the bid form shall be filled in. If any space provided is not utilized by the Bidder, that space shall be filled in with the notation "NA" (Not Applicable).

The bid form shall be filled in by typewriter or manually printed in ink.

Bidders shall not make unsolicited notations or statements on the bid form. Alteration of the bid form is not permitted and will result in the Bid being considered non-responsive. All changes to and erasures or crossing out of the Bidder's entries shall be initialed by the signer of the bid form.

The Bid shall be made on the bid form in clearly legible figures as follows:

A. Unit Price Bid.

Where the bid for an item of work is to be submitted on a unit price basis, the Bidder shall bid a unit price as total compensation for completion of one unit of the work described under that item. This price shall be multiplied by the Estimated Quantity included in the bid form to derive a total bid price for that item. In the case of a discrepancy between the total bid price for an item of work and the unit price for that item of work, the unit price will control. The total amount bid for a unit price contract shall be entered on the space provided on the bid form as a grand total of all individual items. In the case of a discrepancy between the total amount bid for the contract and the actual sum of the bid price for all of the individual items of work, the actual sum will control. The Estimated Quantities included on the bid form are approximate and are only included in the bid form as a basis for comparison of Bids. The City does not, expressly or by implication, represent or agree that the actual amount of work will equal the approximate Estimated Quantities. Payment will be made for the actual quantity of Work performed in accordance with the Contract, at the unit price stated in the bid form. The City 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 in the sole discretion of the City. For compensation for alterations in quantities of work, including deviations greater than twenty-five percent (25%), see Section 9.04B, "Pricing of Changes – Unit Prices", of these General Provisions.

B. Lump Sum Bid.

Where the bid for an item of work is to be submitted on a "Lump Sum" or "Job" basis, a single lump-sum price shall be submitted in the appropriate place on the bid form. Items bid on a lump-sum basis shall result in a complete structure, operating plant, or system, in satisfactory working condition with respect to the functional purposes of the installation, as described in the Contract, and no extra compensation will be paid for anything omitted but fairly implied.

C. Allowances.

Where specific allowance items have been entered on the bid form by the City, the total amount entered on the bid form shall be included in the Total Bid Price. However, the total amount to be paid for the Work included in the Allowance shall be the amount of the Allowance actually utilized in the course of completing the Work.

D. Alternates.

Alternate bids are sums which may be added to or deleted from the base bid amount for the performance of alternate work, as delineated in the Notice to Contractors. All requested Alternates shall be bid, or the Bid shall be considered incomplete.

See also Article 3, Section 3.01 regarding resolution of discrepancies in amount of bid items.

Section 2.02. Preparation and Submission of Bids.

By submission of a Bid, the Bidder acknowledges acceptance of the nature and location of the Work, the general and local conditions, conditions of the Site, the character, quality and scope of work to be performed, the availability of labor, electric power, water, the kind of surface and subsurface materials on the site, the materials and equipment to be furnished, and all requirements of the Contract or other matters which may affect the Work or the cost. Any failure of a Bidder to become acquainted with all of the available information concerning conditions will not relieve the Bidder from the responsibility for observing and considering those conditions that a contractor would have observed and considered during a site visit, estimating properly the difficulties or cost of the Work, or proceeding to perform the Work without additional cost to the City. Further, on the basis of the above information and any further examinations, investigations and studies that the Bidder has made in connection with the Work, the Bidder represents and agrees, by submission of a Bid, that the Plans, Specifications and reports are adequate to the best of the Bidder's knowledge and that the Work can be performed in strict accordance with the terms of the Contract Documents.

The Bidder declares by the submission of a Bid that the Bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that the Bid is genuine and not collusive or a sham; that the Bidder has not directly or indirectly induced or solicited any other Bidder to put in a false or sham Bid, and has not directly or indirectly colluded or agreed with any Bidder or anyone else to put in a sham Bid or to refrain from bidding; that the Bidder has not directly or indirectly sought by agreement, communication, or conference with anyone to fix the Bid price or the Bid price of any other Bidder, or to fix any overhead, profit, or cost element of such Bid price or that of any other Bidder, or to secure any advantage against the City, anyone interested in the Bid as principal, or those named within the Bid; that all statements contained in the Bid are true; that the Bidder has not directly or indirectly submitted a Bid price or any breakdown thereof or the contents thereof, or divulged information or data relative thereto, to any other person, partnership, corporation or association, except to person or persons as have a direct financial interest in the Bidder's general business.

Bid prices shall include everything necessary for the completion of the Work and fulfillment of the Contract, including but not limited to furnishing all materials, equipment, tools, excavation sheeting, bracing and supports, plant, labor and services, except as may be provided otherwise in the Contract. Bid prices shall include all Federal, State, and local taxes, and all other fees and costs not expressly paid for by the City as stated in the Special Provisions.

The Bid shall be submitted in a sealed envelope as directed in the Notice to Contractors. The Bidder shall plainly mark the exterior of the envelope in which the Bid is submitted to indicate that it contains a Bid for the project for which the Bid is submitted, and the date of the Bid opening therefor. Bids submitted in envelopes that are not properly marked will be rejected.

Bidders shall bear full responsibility for delivering Bids to the location for receipt of Bids by the time and date designated for receipt of Bids. No telephones, fax machines or copy machines will be provided by the City.

Section 2.03. Examination of Plans, Specifications and Site of Work.

The Bidder shall examine carefully the site of the proposed Work and the Plans, Specifications and Bid Documents, and shall be satisfied as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered. The submission of a Bid shall be conclusive evidence that the Bidder is satisfied through the Bidder's own investigation as to the conditions to be encountered; the character, quality, quantity and scope of work to be performed; and the materials and equipment to be furnished. If material discrepancies or apparent material errors are found in the Plans and Specifications prior to the date of bid opening, an Addendum may be issued (see Section 2-9, "Addenda", in this Section of these Specifications). Otherwise, in figuring the Work, Bidders shall consider that any discrepancies or conflict between Plans and Specifications will be governed by Article 4, "Scope and Intent of Contract Documents".

Section 2.04. Subsurface Conditions.

Where investigations of subsurface conditions have been made by the City with respect to subsurface conditions, utilities, foundation, or other structural designs, and that information is shown in the Plans, it represents only a statement by the City as to the character of materials which have actually been encountered by the City's investigation. This information is only included for the convenience of Bidders. Investigations of subsurface conditions are made for the purpose of design only. The City assumes no responsibility with respect to the sufficiency or accuracy of borings or of the log of test borings or other preliminary investigations or of the interpretation thereof. There is no guaranty, either expressed or implied, that the conditions indicated are representative of those existing throughout the Work, or any part of it, or that unanticipated conditions may not occur. When a log of test borings is included in the Plans, it is expressly understood and agreed that said log of test borings does not constitute a part of the Contract. The log of test borings represents only an opinion of the City as to the character of the materials to be encountered, and is included in the Plans only for the convenience of the Bidders. Making information available to Bidders is not to be construed in any way as a waiver of the provisions of the first paragraph of this Section, and Bidders must satisfy themselves through their own investigations as to conditions to be encountered.

Section 2.05. Contractors/Subcontractors Required to be Licensed.

The Bidder shall be licensed under the provisions of Chapter 9, Division 3, of the Business and Professions Code to do the type of work contemplated in the project, and shall be skilled and regularly engaged in the general class or type of work called for under the contract. The specific type of license required will be indicated in the Notice to Contractors. Unless specified otherwise in the Special Provisions, the Bidder shall indicate the license number and class in the space provided for that purpose on the bid form.

All Subcontractors engaged to perform portions of the Work shall be licensed under the provisions of Chapter 9, Division 3, of the Business and Professions Code to do the type of work for which they are

subcontracted, and shall be skilled and regularly engaged in the general class or type of work called for under their subcontracts.

Attention is also directed to the provisions of Public Contract Code section 20103.5, which addresses Contractor licensing requirements. The City may not award the Contract if it cannot be verified that the low Bidder is an appropriately licensed Contractor at the time of Contract award.

Section 2.06. Contractors/Subcontractors DIR Registration Requirement

Contractors and subcontractors on all public works projects are required to register with the Department of Industrial Relations (DIR) in accordance with Section 1725.5 of the Labor Code. Beginning March 1, 2015, only bids from contractors and subcontractors that are listed on the DIR website as registered will be accepted. All contracts awarded on or after April 1, 2015 are required to use only registered contractors and subcontractors. The DIR will keep an up to date listing of registered contractors at:

<https://efiling.dir.ca.gov/PWCR/Search.action>

Inadvertent listing of an unregistered subcontractor will not necessarily invalidate a bid. Unregistered contractors or subcontractors may be replaced with registered ones. A contract with an unregistered contractor or subcontractor is subject to cancellation but is not void as to past work. Contractors and subcontractors must register and pay the applicable fee; this may be done online at the DIR website:

<https://www.dir.ca.gov/permits-licenses-certifications.html>

Section 2.07. Competency of Bidders.

It is the intention of the City to award a Contract only to a Bidder who furnishes satisfactory evidence that the Bidder has the requisite experience and ability, and has sufficient capital, facilities, and plant to enable the Contractor to prosecute the Work successfully and promptly, and to complete the Work within the time stated in the Contract. If required by the Special Provisions, a statement of experience and business standing, together with that of particular Subcontractors that were designated in the Bid, shall be submitted on a City-provided form by the three (3) apparent low Bidders within seven (7) Calendar Days after the opening of Bids. Bidders in contention for contract awards may be asked to attend a post-bid interview. To determine the experience of a Bidder, the City will consider any relevant evidence that the Bidder, and/or its personnel, has satisfactorily performed on other contracts of similar nature and magnitude or difficulty.

Section 2.08. Joint Venture Bids.

If two or more prospective Bidders desire to bid jointly as a joint venture on a single project, the joint venture Bid must be accompanied by a notarized copy of a valid license issued to the joint venture by the Contractor's State License Board. If a copy of the joint venture license is not filed with the Bid, the Bid will be rejected.

Section 2.09. Subcontractors.

In accordance with the Subletting and Subcontracting Fair Practices Act of the Public Contract Code, section 4100 et seq. (the "Act"), each Bidder shall list in the bid form:

- A. The name and the location of the place of business of each Subcontractor whom the Bidder proposes to perform work or labor or render service to the prime Contractor in or about the construction of the Work, or a Subcontractor licensed by the State of California who, under subcontract to the prime Contractor, is proposed by the Bidder to specially fabricate and

install a portion of the Work according to detailed drawings contained in the Contract, in an amount in excess of one-half of one percent (0.5%) of the total bid, including additive Alternates, if any, or, in the case of a Bid for the construction of streets or highways, including bridges, in excess of one-half of one percent (0.5%) of the Bidder's total bid, including additive Alternates, or ten thousand dollars (\$10,000), whichever is greater.

- B. The portion of the Work that will be done by each Subcontractor. The Bidder shall list only one Subcontractor for each portion as is defined by the Bidder in the Bid. If a Bidder fails to specify a Subcontractor for any portion of the Work to be performed under the Contract (or specifies more than one Subcontractor for the same work) as required in Section 2.08(A) above, the Bidder agrees that the Bidder is fully qualified to perform that portion itself and that the Bidder shall perform that portion of the Work.

If after the award of the Contract, the Contractor subcontracts any portion of the Work, except as provided in Section 4107 or 4109 of the Act, the Contractor shall be subject to the penalties specified in Section 4111 of the Act.

The apparent low Bidder shall submit the license numbers of all Subcontractors to the City within ten (10) Calendar Days, not counting Saturdays, Sundays, and holidays, of Bid opening. If the low Bidder is not the apparent low Bidder, the low Bidder shall submit the license numbers of all Subcontractors to the City within ten (10) Calendar Days, not counting Saturdays, Sundays, and holidays, of the date notified.

Section 2.10. Addenda.

The correction of any material discrepancies in, or material additions to/omissions from, the Plans, Specifications, or other Contract, or any interpretation thereof, during the bidding period will be made only by an Addendum issued by the City. A copy of each Addendum issued by the City will be mailed or delivered to each planholder listed on the City planholder list and is a part of the Contract. Any interpretation or explanation not included in the Addenda will not be considered binding. Bids must include acknowledgment of all Addenda issued prior to the bid date.

Section 2.11. Assignment of Antitrust Actions.

The Bidder is required to comply with Public Contract Code section 7103.5(b), which addresses assignment of antitrust actions.

Section 2.12. Bid Guarantee.

The Bid shall be accompanied by a bid guarantee in the form of a bidder's bond, cash, a certified check or a cashier's check in an amount not less than ten percent (10%) of the bid amount, including additive Alternates, if any. A bid bond shall be executed in favor of the City by a surety company authorized to do business in California, and the attorney-in-fact who executes the bond on behalf of the surety shall attach to the bond a certified, current copy of its Power of Attorney. A certified or cashier's check must be made payable to the City. The bid guarantee shall pledge that the Bidder will enter into a contract with the City in accordance with the terms stated in the bid form and Agreement for Construction and will furnish required performance and payment bonds and insurance certificates. The City is authorized to forfeit the bid guarantee as necessary to reimburse the City for costs incurred for failure of the successful Bidder to enter into the contract and/or furnish the required performance and/or payment bond and/or insurance certificates. The amount of the bid guarantee shall not be deemed to constitute a penalty or liquidated damages. The City is not precluded by a bid guarantee from recovering from the defaulting Bidder

damages in excess of the amount of said bid guarantee incurred as a result of the failure of the successful Bidder to enter into the contract with the City for the Work or the failure of the successful Bidder to provide the required bonds and/or insurance certificates. Bid guarantees for the unsuccessful bidders will be released upon contract execution by the bidder awarded the contract or 60 days after the bid opening, whichever is earlier.

Section 2.13. Modification or Withdrawal of Bid.

A Bid may be modified or withdrawn at any time prior to the hour fixed in the Notice to Contractors for the submission of Bids by a written request of the Bidder filed with the City at the location where the Bid was submitted. Modifications and/or withdrawals shall be in writing. Telephone or fax modifications will not be accepted. The withdrawal of a Bid will not prejudice the right of a Bidder to file a new Bid within the time prescribed.

Section 2.14. Public Opening of Bids.

Bids will be opened and read publicly at the time and place indicated in the Notice to Contractors or in a subsequent Addendum. Bidders or their authorized representatives and other interested parties are invited to be present.

Section 2.15. Rejection of Bids.

The City reserves the right to reject any and all Bids. The City reserves the right to waive irregularities in a Bid and to make an award in the best interest of the City. Bids containing omissions, erasures, alterations, conditions, or additions not called for may be rejected.

Section 2.16. Disqualification of Bidders.

More than one Bid from any individual, firm, partnership, corporation or association, under the same or different names, will not be considered. Reasonable ground for believing that any Bidder is interested in more than one Bid for the Work will cause rejection of all Bids in which such Bidder is interested. If there is reason to believe that collusion exists among Bidders, none of the participants of such collusion will be considered.

Any Bid in which the prices obviously are unbalanced may be rejected.

Section 2.17. Relief of Bidders.

Attention is directed to Public Contract Code sections 5100 through 5107, concerning relief of Bidders and in particular to the requirement therein that if the Bidder claims a material mistake was made in its Bid, the Bidder shall give the City written notice within five (5) days after the opening of the Bids (excluding Saturdays, Sundays, or City holidays) of the alleged mistake, explaining in the notice in detail how the mistake occurred.

Section 2.18. Bid Protests

As set forth in the Resolution of Disputes Regarding the Bidding Process form to be included with the bids, any Bidder may file a protest against the award of the Contract to any other Bidder. All Bidders shall be provided with notice of the date and time of the City Council meeting at which the award of the Contract for the Project shall be considered. All Bidders will be provided with an opportunity to bring to the City Council's attention disputes and/or protests regarding the bidding process. No Bidder may bring any action or proceeding challenging the bidding process unless the alleged grounds for the dispute and/or protest are presented in a timely manner and consistent with this section. Any Bidder

complying with these procedures may bring an action within sixty (60) Calendar Days from the action of the City Council, in accordance with Section 860 et seq. of the California Code of Civil Procedure, to determine the validity of the City Council's action on the award of the Contract. See form for Resolution of Disputes Regarding the Bidding Process governing the procedures for disputes and/or protests regarding the bidding process.

- A. Any bid protest must be in writing and received by the City Clerk at 50 Natoma Street, Folsom, CA 95630 before 5:00 p.m. no later than five (5) working days following bid opening (the "Bid Protest Deadline") and must comply with the following requirements; however, if the date set for the City Council bid award is less than five (5) working days from the bid opening, the bid protest must be submitted to the City Clerk at least 24 hours prior to the time set for the City Council meeting:
- B. Only a bidder who has actually submitted a Bid Proposal is eligible to submit a bid protest against another bidder. Subcontractors are not eligible to submit bid protests. A bidder may not rely on the bid protest submitted by another bidder, but must timely pursue its own protest.
- C. The bid protest must contain a complete statement of the basis for the protest and all supporting documentation. Material submitted after the Bid Protest Deadline will not be considered. The protest must refer to the specific portion or portions of the Contract Documents upon which the protest is based. The protest must include the name, address, email address, and telephone number of the person representing the protesting bidder if different from the protesting bidder.
- D. A copy of the protest and all supporting documents must also be transmitted by fax or by email, by or before the Bid Protest Deadline, to the protested bidder and any other bidder who has a reasonable prospect of receiving an award depending upon the outcome of the protest.
- E. The protested bidder may submit a written response to the protest, provided the response is received by Owner before 5:00p.m., within two (2) working days after the Bid Protest Deadline or after receipt of the bid protest, whichever is sooner (the "Response Deadline"). If there are less than two working days remaining prior to the City Council meeting to award the bid, the response must be submitted to the City Clerk prior to the start of the City Council meeting. The response must include all supporting documentation. Material submitted after the Response Deadline will not be considered. The response must include the name, address, email address, and telephone number of the person representing the protested bidder if different from the protested bidder.
- F. A copy of the response and all supporting documents must also be transmitted by fax or by e-mail, by or before the Bid Protest Deadline, to the protesting bidder and any other bidder who has a reasonable prospect of receiving an award depending upon the outcome of the protest.
- G. The procedure and time limits set forth in this section are mandatory and are the bidder's sole and exclusive remedy in the event of bid protest. The bidder's failure to comply with these procedures will constitute a waiver of any right to further pursue a bid protest, including

filing a Government Code Claim or initiation of legal proceedings.

- H. Owner reserves the right to award the Contract to the bidder it has determined to be the responsible bidder submitting the lowest responsive bid, and to issue a notice to proceed with the work notwithstanding any pending or continuing challenge to its determination.

ARTICLE 3. AWARD AND EXECUTION OF CONTRACT; BONDS AND INSURANCE

Section 3.01. Consideration of Bids.

After the Bids have been opened and read, they will be checked for accuracy and compliance with the Notice to Contractors, these General Provisions and the Special Provisions.

In the event that the product of a unit price and an Estimated Quantity does not equal the extended amount quoted, the unit price shall govern, and the correct product of the unit price and the Estimated Quantity shall be deemed to be the amount bid. If the sum of two or more items in a bidding schedule, or the sum of two or more bidding schedules does not equal the total amounts quoted, the individual items or schedule amounts shall govern, and the correct total shall be deemed to be the amount bid. If the Bid is missing the unit price, then it may be deemed included and the Bid may be rejected. When a price is quoted in both words and figures, the words shall prevail in case of a discrepancy.

The City reserves the right to reject any and all proposals and to waive any irregularity in a Bid.

Section 3.02. Award of the Contract.

Award of the Contract will be to the lowest, responsive, responsible Bidder whose Bid complies with the specified requirements. The award, if made, will be made within 45 days after the opening of Bids, unless otherwise specified. If the lowest responsive, responsible Bidder refuses or fails to execute the Contract or to provide required bonds and/or insurance certificates, the City may award the Contract to the second lowest responsive, responsible Bidder. The specified period of time within which the award may be made may be subject to extension for further periods as agreed upon in writing by the City and the Bidder.

The City reserves the right to award the Contract based on any combination of base bid and Alternates as determined by the City. This process is conducted by the City in a "blind selection" format, i.e., without knowledge of the identity of any of the Bidders before ranking of all Bidders from lowest to highest has been determined. All awards will be made in the City's best interest.

The City will comply with state law requirements for submission of a PWC-100 form (contract award notice) to DIR for all public works projects.

Section 3.03. Performance and Payment Bonds.

The format of the Performance Bond and Payment Bond forms shall be those contained in these Specifications. As part of the execution of the Contract, the successful Bidder shall furnish the following corporate surety bonds to the benefit of the City. Bonds shall be executed by a surety company authorized to do business in the State of California. When the amount to be paid to the Contractor is based upon units of work to be performed or items to be provided, the term Contract Sum as used below for the purpose of posting Performance and Payment Bonds shall be computed on the basis of the unit price bid multiplied by the Estimated Quantities of work to be performed.

A. Performance Bond.

The Performance Bond, to guarantee the performance of all covenants and stipulations of the Contract, shall be on the form provided by the City and shall be in a sum not less than one hundred percent (100%) of the original Contract Sum as set forth in the Contract. The bond shall contain a provision that the surety thereon waives the provisions of California Civil Code sections 2819 and 2845.

B. Payment Bond.

The Payment Bond, to guarantee the payment of wages and of bills contracted for materials, supplies, or equipment used in the performance of the Contract, shall be on the form provided by the City and shall be in a sum not less than one hundred percent (100%) of the original Contract Sum as set forth in the Contract. The bond shall be in accordance with the provisions of California Civil Code section 8152, 8154, 9550, 9552, 9554, 9558, 9560, and 9564, and any acts mandatory thereof, and shall, by its terms, inure to the benefit of all persons, companies, or corporations entitled to file claims under California Civil Code section 9100 and California Unemployment Insurance Code section 13020. Said bond shall also contain a provision that the surety waives the provisions of California Code of Civil Procedure section 2819 and 2845.

Section 3.04. Additional Bonding Requirements.

All bonds submitted shall include the following:

- A. Full name and address of the Contractor, Surety, and the City;
- B. Contract Date;
- C. Exact Contract Sum;
- D. Project name and address;
- E. Signature of the Contractor;
- F. Corporate seal if applicable;
- G. Signature of authorized Surety representative;
- H. Notarization of the Contractor and Surety;
- I. Power of Attorney; and
- J. Local contact for surety, with name, phone number, and address to which legal notices may be sent.

Section 3.05. Bond Costs in Bids.

All costs for applicable Bid Bonds, Performance Bonds, Payment Bonds, and any other bonds specially required by the Contract shall be included in the Bid.

Section 3.06. Notification of Surety Companies.

The surety companies shall be familiar with all the provisions and conditions of the Contract. It is understood and agreed that the surety companies waive notice of change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder or to the specifications accompanying the same, or any other act or acts by the City or the City's authorized agents under the terms of the Contract; and failure to so notify the surety companies of changes shall in no way relieve the surety or sureties of their obligations under the Contract.

Section 3.07. Return of Bid Guarantees.

After Bids have been received and reviewed by the City, bid guarantees will be returned to the respective

Bidders except those submitted by the three lowest responsive, responsible Bidders.

Bid guarantees for Bids not to be further considered in executing the Contract will be returned within ten (10) days after the award of the Contract. The Bid Guarantees of the three lowest responsive, responsible Bidders will be returned within ten (10) Calendar Days after the successful Bidder has filed satisfactory bonds and proof of insurance as specified and the Bidder and the City have executed the Contract.

If all Bids are rejected and no award is made, all bid guarantees will be returned within ten (10) days of the decision of the City not to award the Contract.

Section 3.08. Execution of the Contract.

The Contract shall be executed by the successful Bidder in triplicate. All three copies of the Contract, together with the Performance Bond, Payment Bond, certificates of insurance and insurance endorsements shall be returned to the City within ten (10) Calendar Days of the Bidder's receipt of the documents. When required by the Special Provisions, Affirmative Action Certifications will also be provided. Insurance certificates shall be signed by a person authorized by the insurer to bind coverage on its behalf and shall be accompanied by copies of all endorsements required by these Specifications. When requested by the City, the successful bidder shall furnish complete, certified copies of all required insurance policies, including endorsements specifically required by these Specifications. After execution by the City, a full set of documents will be returned to the Contractor.

Section 3.09. Failure to Execute Contract.

If the Bidder to whom the Contract is awarded fails to execute the Contract and file acceptable bonds, insurance certificates and insurance endorsements as provided herein within ten (10) Calendar Days from the time the Contract forms are received by the Bidder, the award may be annulled and the Bidder's Bid Guarantee forfeited to the City. At the City's discretion, the Contract may then be awarded to the next lowest responsive, responsible Bidder.

If the City awards the Contract to the second lowest responsive, responsible Bidder, the amount of the lowest responsive, responsible Bidder's bid guarantee shall be applied by the City to the difference between the lowest Bid and the Bid of the second lowest responsive, responsible Bidder, and the surplus, if any, will be returned to the lowest responsive, responsible Bidder if a check or cash is used, or credited to the surety on the Bidder's Bond if a bond is used.

On refusal or failure of the second lowest responsive, responsible Bidder to execute the Contract, the City in its discretion may award it to the third lowest responsive, responsible Bidder. If the City awards the Contract to the third lowest responsive, responsible Bidder, in addition to application of the lowest Bidder's bid guarantee as aforesaid, the amount of the second lowest responsive, responsible Bidder's bid guarantee shall be applied by the City to the difference between the Bid of the second lowest responsive, responsible Bidder and the Bid of the third lowest responsive, responsible Bidder, and the surplus, if any, shall be returned to the second lowest responsive, responsible Bidder if a check or cash is used, or credited to the surety on the second lowest Bidder's Bid Bond if a bond is used.

Section 3.10. Insurance

The Contractor shall procure, maintain and keep in force at all times during the term of the Contract, at its sole cost and expense, the following insurance. Failure by the Contractor to maintain all required insurance during the entire Contract Time shall constitute a default entitling the City to all rights and

remedies that exist in the Contract Documents and/or by law.

A. General Liability.

General Liability insurance including, but not limited to, protection for claims of bodily injury and property damage liability; personal and advertising injury liability; products and completed operations liability; premises, operations and mobile equipment liability; and explosion, collapse and underground property damages. Coverage shall be at least as broad as “Insurance Services Office Commercial General Liability Coverage Form CG 0001” (occurrence”). Claims made coverage is not acceptable. The limits of liability shall be not less than:

Each Occurrence	One Million Dollars (\$1,000,000)
Personal & Advertising Injury	One Million Dollars (\$1,000,000)
Products and Completed Operations Aggregate	Two Million Dollars (\$2,000,000)
General Aggregate	Two Million Dollars (\$2,000,000)
Fire Damage	One Hundred Thousand Dollars (\$100,000)

The insurance shall cover all operations of the Contractor and its Subcontractors, including, but not limited to, contractual liability insuring the obligations assumed by the Contractor and its Subcontractors under the Contract Documents, independent contractor’s contingent coverage, broad form property damage liability endorsement, and personal injury liability endorsement.

The insurance shall provide coverage for claims arising out of subsidence.

The Products and Completed Operations coverage shall be maintained for at least two years after completion of the Contract.

B. Automobile Liability.

Automobile Liability insurance providing protection against claims of bodily injury and property damage arising out of ownership, operation, maintenance, or use of owned, hired and non-owned automobiles. Coverage shall be at least as broad as “Insurance Services Office Business Auto Coverage Form CA 0001” symbol 1 (any auto). The limits of liability per accident shall be not less than:

Bodily Injury and Property Damage, Combined Single Limit	One Million Dollars (\$1,000,000)
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If General Liability coverage, as required above, is provided by the Commercial General Liability form, the Automobile Liability policy shall include an endorsement providing automobile contractual liability.

C. Workers’ Compensation.

In accordance with the provisions of Section 3700 of the Labor Code, the Contractor, and each Subcontractor, shall secure the payment of compensation to its employees. The Contractor and each Subcontractor shall provide workers’ compensation insurance and occupational disease insurance as required by the State of California (unless the Contractor is a qualified self-insurer with the State of California), and Employer’s Liability coverage. The limits of Employers’ Liability coverage shall be not less than:

Each Accident	One Million Dollars (\$1,000,000)
Disease Each Employee	One Million Dollars (\$1,000,000)
Disease Each Policy Limit	One Million Dollars (\$1,000,000)

The Contractor shall sign and file with the City's Director of Finance the following certification prior to commencing performance of the work of the Contract:

"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 provisions before commencing the performance of the work of this Contract."

The Contractor shall require each Subcontractor to file such statement prior to allowing that Subcontractor to commence work.

The Contractor shall furnish a certificate of insurance or a certificate of permission to self-insure under the Workers' Compensation and Employers' Liability Insurance statutes of the State of California. The certificate shall provide that at least thirty (30) days' prior written notice shall be served on City prior to the cancellation or change of such insurance or self-insurance. Said certificate shall also provide that the insurer shall waive all rights of subrogation against the City, its officers, officials, employees, agents or volunteers.

D. Insurance Required in the Special Provisions.

1. Excess or Umbrella Liability. If the Special Provisions require limits of general liability insurance of more than one million dollars (\$1,000,000) per occurrence, the Contractor shall carry excess or umbrella liability insurance providing excess coverage at least as broad as the underlying coverage for general, automobile and employer's liability with a limit equal to the amount stated in the Special Provisions per occurrence and aggregate.
2. Railroad Protective Liability. When stated as a requirement in the Special Provisions, the Contractor shall procure, maintain, and keep in force during the term of the Contract, at the Contractor's sole expense, Railroad Protective Liability insurance with limits of liability as set forth in the Special Provisions.
3. Builder's Risk. When stated as a requirement in the Special Provisions, the Contractor shall procure, maintain, and keep in force at all times during the term of the Contract and until the date of transfer of the insurable interest to and acceptance by the City, at the Contractor's sole expense, Builder's Risk insurance with limits of liability equal to one hundred percent (100%) of the replacement cost of the Work.
 - a. Coverage shall be written on a completed value, non-reporting form, on a replacement cost basis, and shall cover the property against all risks of physical loss or damage including:
 - i. land movement and flood
 - ii. loss that ensues from design error, defective materials, or faulty workmanship
 - iii. mechanical breakdown or electrical damage including testing,

magnetic disturbance and changes in temperature or humidity.

The property covered shall include the Work, including any materials, equipment, or other items to be incorporated therein while the same are located at the construction site, stored offsite, while in transit or at the place of manufacture. The policy shall contain a provision that both the interests of the City and the Contractor are covered and that any loss shall be payable to the City and the Contractor as their interests may appear.

When stated as a requirement in the Special Provisions, Builders Risk insurance shall include Delay in Opening coverage with limits of liability, and for the period of time, as set forth in the Special Provisions. Coverage shall include interest and/or principal payments that become due and payable by the City upon completion of construction or other date as set forth in the Special Provisions, debt service, expense, loss of earnings or rental income or other loss incurred by the City, without deduction, due to the failure of the project being completed on schedule.

- b. The maximum deductible for land movement and flood allowable under this policy shall be five percent (5%) of replacement value per unit, including foundations, at the time loss or five hundred thousand dollars (\$500,000), whichever is less, per occurrence and in the aggregate. Unit shall be defined in the policy as (1) each separate building or structure; (2) contents of each separate building or structure; or (3) property in each separate yard. The maximum deductible for all other perils allowable under this policy shall be one hundred thousand dollars (\$100,000). All deductibles shall be borne solely by the Contractor, and the City shall not be responsible to pay any deductible, in whole or in part.
 - c. The Contractor waives all rights against the City and the City's officers, officials, employees and agents for loss or damage to the extent reimbursed by Builders' Risk insurance or any other property or equipment insurance applicable to the Work, except such rights as it may have to the proceeds of such insurance. If the policies of insurance referred to in this section require an endorsement or consent of the insurance company to provide for continued coverage where there is a waiver of subrogation, the owners of such policies will cause them to be so endorsed to obtain such consent.
 - d. If not covered by Builders' Risk insurance or any other property or equipment insurance required by this Contract, the Contractor shall procure, maintain, and keep in force at all times during the term of the Contract, at the Contractor's sole expense, property insurance for portions of the Contractor's work and/or equipment to be incorporated therein stored offsite or in transit.
4. Environmental Liability Insurance. When stated as a requirement in the Special Provisions, the Contractor shall procure, maintain, and keep in force at all times during the term of the Contract, at the Contractor's sole expense, Environmental Liability insurance which includes coverage for sudden and accidental pollution

arising out of the handling of hazardous materials or hazardous wastes, and coverage for liability arising out of the handling of asbestos. Coverage for asbestos shall contain a provision limiting coverage to a specific length of time (i.e., "sunset clause"). If coverage for Environmental Liability insurance is written on a claims-made form, the following provisions apply:

- a. The "Retro Date" must be shown, and must be on or before the date of the Contract or the beginning of the Work.
- b. Insurance must be maintained and evidence of insurance must be provided for at least two (2) years after completion of the Contract.
- c. If coverage is cancelled or non-renewed, and not replaced with another claims-made policy form with a "Retro Date" prior to the Contract effective date, the Contractor must purchase "extended reporting" coverage for a minimum of two (2) years after completion of the Contract.

E. Subcontractor's Insurance.

The Contractor shall not allow any Subcontractor to commence work on its subcontract until the Subcontractor has provided the insurance specified above. The Contractor shall require each of its Subcontractors to procure and to maintain, during the life of the subcontract, bodily and personal injury liability and property damage insurance, and workers' compensation insurance, of the type and in the same amount as specified herein.

It shall be the responsibility of the Contractor to ensure that all Subcontractors comply with this provision, and to verify their compliance when requested by the City.

If requested by the City, the Contractor shall deliver certificates of insurance or copies of the insurance policies and endorsements of all Subcontractors; provided, however, that this authority shall not relieve the Contractor of its obligation to ascertain the existence of such insurance.

F. Effective Date of Policies.

The insurance required by these General Provisions and by the Special Provisions shall be maintained by the Contractor in full force and effect at all times during prosecution of the Work and until two (2) years after the final completion and acceptance thereof by City.

G. Other Provisions

1. The Contractor's General Liability, Automobile Liability, and any Excess or Umbrella Liability, shall contain the following provisions:
 - a. The City, its officers, officials, employees and agents shall be covered as additional insureds as respects liability arising out of the activities performed by or on behalf of the Contractor, products and completed operations of the Contractor, premises owned, occupied, or used by the Contractor, or automobiles owned, leased, hired, or borrowed by the Contractor. The policy shall contain no special limitations on the scope of coverage afforded to the City, its officers, officials, employees and agents.
 - b. For any claims related to this Contract, the Contractor's insurance coverage shall be primary insurance as respects the City, its officers, officials, employees or agents. Any

insurance or self-insurance maintained by the City, its officers, officials, employees or agents shall be excess of the Contractor's insurance and shall not contribute with it.

- c. Any failure to comply with reporting or other provisions of the policies on the part of the Contractor, including breaches of warranties, shall not affect coverage provided to the City, its officers, officials, employees, and/or agents.
2. The Contractor's General Liability and any Excess or Umbrella Liability Insurance policies shall contain an endorsement stating that any aggregate limits shall apply separately to the Work.
3. The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the limits of the insurer's liability.
4. Each insurance policy shall state by separate endorsement that the insurer agrees to waive all rights of subrogation against the City, its officers, officials, employees or agents.
5. Each insurance policy shall state that coverage shall not be suspended, voided, cancelled by the Contractor or the City, reduced in scope of coverage or in limits, non-renewed, or materially changed unless the insurer(s) provide thirty (30) days written notice by certified mail to the City prior to such change. Ten (10) days prior written notice by certified mail shall be given to the City in the event of cancellation due to nonpayment of premium.
6. All of the Contractor's insurance coverage, except as noted below, shall be placed with insurance companies with a current A.M. Best rating of at least A:VII.

Exceptions:

- a. Underwriters at Lloyd's of London, which are not rated by A.M. Best.
- b. Workers' Compensation that is provided through a State Compensation Insurance Fund or a qualified self-insurer for Workers' Compensation under California law.
- c. Environmental Liability insurance shall be placed with insurance companies with a current A.M. Best rating of at least B+:VII.
7. Any Contractor that self-insures its general and/or automobile liability losses must have a minimum net worth of at least ten million dollars (\$10,000,000).
8. The City, at its discretion, may require new types of insurance coverage or increase the limits of insurance coverage required hereunder at any time during the term of the Contract by giving thirty (30) days written notice to the Contractor. Contractor shall immediately procure such insurance or increase the limits of coverage and provide certificates of insurance, including copies of all required endorsements, to the City within thirty (30) days of receipt of the City's request.
9. The required insurance coverage shall be subject to the approval of the City, but any

acceptance of insurance certificates by the City shall in no way limit or relieve the Contractor of its duties and responsibilities in this Contract.

10. If the Contractor fails to procure or maintain insurance as required by this Section and any Special Provisions, or fails to furnish the City with proof of such insurance, the City, at its discretion and in addition to its other remedies under the Contract and at law for the Contractor's default, may procure any or all such insurance. Premiums for such insurance procured by the City shall be deducted and retained from any sums due the Contractor under the Contract.

Failure of the City to obtain such insurance shall in no way relieve the Contractor from any of the Contractor's responsibilities under the Contract. Any failure of the Contractor to maintain any item of the required insurance is sufficient cause for termination of the Contract.

11. The making of progress payments to the Contractor shall not be construed as relieving the Contractor of responsibility for loss or damage, or destruction occurring prior to final acceptance by the City.
12. The City is authorized to execute amendments and waivers, with or without conditions, to the insurance requirements of the Contract. The City will provide such amendments or waivers in writing to the Contractor.
13. The failure of the City to enforce in a timely manner any of the provisions of this Section 3.10 shall not act as a waiver to enforcement of any of these provisions at any time during the term of the Contract.

H. Notification of Accident or Occurrence.

The Contractor shall report by telephone to the City within twenty-four (24) hours and also report in writing to the City within fifteen (15) Calendar Days after the Contractor or any Subcontractors or agents have knowledge of any accident or occurrence involving death of or injury to any person or persons, or damage in excess of ten thousand dollars (\$10,000) to the Work, property of the City or others, arising out of any work done by or on behalf of the Contractor as part of the Contract. Such report shall contain:

1. the date and time of the occurrence;
2. the names and addresses of all persons involved; and
3. a description of the accident or occurrence and the nature and extent of injury or damage.

ARTICLE 4. SCOPE OF WORK AND INTENT OF CONTRACT DOCUMENTS

Section 4.01. The Contract.

The Contract Documents form the Contract for Construction. This Contract represents the entire and integrated agreement between the City and the Contractor and supersedes all prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Change Order. Nothing contained in the Contract Documents shall create any contractual relationship between the City or any of its officers, officials, employees or agents and any Subcontractor or sub-subcontractor, or between the Owner's Representative or the Architect or Consulting Engineer and the Contractor.

Section 4.02. Intent of Contract Documents.

The Work shall be performed and completed according to the Contract Documents. It is the overriding intent of the Contract Documents that the work performed shall result in a complete and operable system in satisfactory working condition with respect to the functional purposes of the installation, and which complies in all respects with the Contract Documents. No extra compensation will be allowed for anything omitted but fairly implied to be included in the Contract Documents. The prices paid for the various items in the Bid shall include full compensation, including all markups and profit, for furnishing all labor, materials, tools, equipment and incidentals, and doing all items necessary to complete the Work in a good and workmanlike manner as provided by the Contract Documents.

If the Contract does not specifically allow the Contractor a choice of quality or cost of items to be furnished, but could be interpreted to permit such a choice, the Contractor shall furnish the highest quality under current industry standards, regardless of the cost of the item.

When portions of the Work are described in general terms, but not in complete detail, it is understood that the Contractor will employ only the best general practice and incorporate only the best quality materials and workmanship in the Work.

Section 4.03. General Liability of Contractor.

Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, water, light, heat, utilities, transportation and other facilities and services necessary for the execution and completion of the Work in accordance with the Contract Documents and any applicable code or statute, whether or not specifically described herein, as long as same is reasonably inferable therefrom as being necessary to produce the intended results, whether temporary or permanent, and whether or not incorporated or to be incorporated in the Work. The mention of any specific duty or liability of Contractor and, any reference to any specific duty or liability shall be construed to be for the purpose of explanation.

Section 4.04. Complementary Feature of Various Parts of Contract Documents.

The Contract Documents, including the Specifications and Drawings, are complementary and explanatory of each other, and what is called for by anyone shall be as binding as if called for by all. In case of conflict, large scale (detail) drawings shall govern over small-scale drawings, the Specifications shall govern over the Contract Drawings except as noted below, special provisions shall govern over both the Contract Drawings and the Standard Specifications, and subsequent addenda, interpretations, or approved change orders shall govern over the original documents, unless a different order of precedence is noted elsewhere in conjunction with a specific portion of the documents.

In case of conflict between the Drawings and Specifications, the Drawings shall govern in matters of quantity and size, the Specifications in matters of quality. In case of conflict within the Drawings involving quantities or within the Specifications involving quality, the greater quantity and the higher quality shall be provided.

Where on any Drawing a portion of the Work is drawn out and the remainder is indicated in outline, the drawn-out parts shall apply to all other like portions of the Work. Where ornament or other detail is indicated as starting, such detail shall be continued throughout the courses or parts in which it occurs and shall also apply to other similar parts in the Work, unless otherwise indicated.

Any material specified by reference to the number, symbol, or title of a specified standard such as a Commercial Standard, a Federal Specification, a trade association standard, or other similar standards, shall comply with the requirements in the latest approved revision thereof and any amendments or supplements thereto in effect on the date of Notice to Bidders, except as limited to type, class, or grade, or modified in such reference. The standards referred to, except as modified in the Specifications, shall have full force and effect as though printed in these Specifications.

Any work for which there are no provisions in these Specifications, the Special or Technical Provisions, or on the Contract Drawings, shall be performed in accordance with the provisions of the State Specifications

Section 4.05. Diagrammatic Drawings.

Drawings showing the locations of equipment, wiring, piping, etc., unless dimensioned, are diagrammatic, and conditions will not always permit their installation in the exact location shown. In such event, the Contractor shall submit an RFI and obtain a response before proceeding with the work in question. Unless there is a material increase in the Contractor's scope of work, installation as specified in the response to the RFI shall be without any additional compensation to the Contractor and without any increase in the Contract Time. Any work done after discovery of the issue, until authorization to proceed based on the response to the RFI, will be done at the Contractor's risk.

Section 4.06. Conformance with Codes and Standards.

The Works shall be in full compliance with the latest adopted editions of the following applicable standards and regulations:

- the State Fire Marshal
- the UBC
- Title 8
- Title 24
- the NEC
- the UPC
- the Clean Water Act
- Storm Water Pollution Prevention Plan and standards
- all other codes, laws or regulations applicable to the Work or the Contract.

Nothing in the Contract is to be construed to permit work not conforming to these requirements. When the work detailed in the Plans and Specifications differs from governing codes, the Contractor shall complete the Work in accordance with the higher standard. If the higher standard so required is more

expensive than the work detailed in the plans and specifications, the Contractor will be compensated for its additional costs by change order as provided in these General Provisions.

Section 4.07. Interpretation and Additional Instructions.

Should the Contractor discover any conflicts, omissions, or errors in the Contract Documents, or have any question concerning interpretation or clarification of the Contract Documents, or if it appears that the Work to be done or any matters relative thereto are not sufficiently detailed or explained in the Contract Documents, then before proceeding with the work affected, the Contractor shall within 48 hours notify the Owner's Representative in writing by submitting an RFI requesting interpretation, clarification, or additional detailed instructions and/or drawings concerning the work. All such questions shall be resolved and instructions to the Contractor issued by the Architect or Consulting Engineer.

The City, through the Architect or Consulting Engineer, will normally respond to the RFI within fifteen (15) Working Days. The response will be in writing, and that response shall control. The Contractor shall indicate a priority for responses to RFI's if more than five (5) RFI's are pending at the same time.

Should the Contractor proceed with the work affected before receipt of instructions from the Architect or Consulting Engineer, and, in the case of a change to the Work, before receipt of authorization to proceed, the Contractor shall remove and replace or adjust any work which is not in accordance therewith, and the Contractor shall be responsible for any resultant damage, defect, or added cost without an extension of the Contract Time.

Section 4.08. Plans and Specifications Furnished.

The City will provide, at no cost to the Contractor, five (5) copies of the Contract Drawings and Specifications (except City Standard Construction Specifications, State Specifications and State Plans). The Contractor may purchase additional copies of the Contract Drawings and Specifications, as well as the City Standard Construction Specifications, at cost.

The Contractor shall retain an approved set of Contract Documents on the job at all times during the progress of the Work. This set shall be used by the Contractor as the Record Documents as described in Section 4.15 of these General Provisions.

Section 4.09. Field Instructions/Written Directives and Drawings/Supplemental Drawings.

In addition to the Drawings incorporated in the Contract Documents, the City may issue Field Instructions, Written Directives, Supplemental Drawings or instructions from time to time as may be necessary to make clear or to define in greater detail the intent of the Contract Drawings and Specifications. In furnishing Field Instructions, Written Directives, additional drawings or instructions, the City shall have the authority to make minor changes in the Work, not involving any extra cost, and not inconsistent with the overall design of the Project. If extra cost is known to be involved, these instructions will be accompanied by an RFP. These supplemental Field Instructions, Written Directives and/or Supplemental Drawings or instructions shall become a part of the Contract Documents, and the Contractor shall make its work conform to them forthwith or within such time as may be specified therein.

Section 4.10. Notification of Disagreement Regarding Scope of Work.

If agreement cannot be reached as to cost, and the Contractor does not agree that work due to an interpretation or supplemental drawing or instruction is within the scope of the Contract Documents, the Contractor shall, within seven (7) Calendar Days after receipt of the interpretation or instruction, submit

a proposed change order to the Owner's Representative specifying in detail in what particulars the contract requirements were exceeded and the change in cost resulting there from. The Owner's Representative shall then determine whether a Change Order shall be issued in accordance with these General Provisions. If a CCD is issued, the Contractor shall perform the work without delay.

Section 4.11. Deleted Items.

The City may delete from the Work any items of work. The Contractor will be paid for all work done toward the completion of the item prior to such omission, as provided in Article 9, "Changes and Claims", of these General Provisions, but in no event will the amount paid exceed the Bid or Schedule of Values amount less the value of the deleted work.

The Contractor shall make no claim, nor receive any compensation for profits, for loss of profits, for damages, or for any extra payment whatsoever because of any deleted items of work.

Section 4.12. Extra Work.

Work not covered by the Contract but necessary for the proper completion of the Project will be classed as extra work and shall be performed by the Contractor when directed in writing by the City. Extra work shall be performed in accordance with the Contract and as directed by the City. Extra work must be authorized in writing by the City before the work is started. Payment for extra work will not be made unless such prior written authorization is obtained.

In the event of an emergency or other situation that endangers the Work or endangers public safety, the City will direct the Contractor to perform such extra work as is necessary to protect the Work or the public.

Section 4.13. Ownership and Use of Documents.

All original Drawings and Specifications prepared by or on behalf of the City, including, without limitation, by the Architect or Consulting Engineer, are and shall remain the property of the City.

Section 4.14. Lands and Rights-of-Way.

The City shall provide the lands, rights-of-way and easements upon which the Work is to be done and such other lands as may be designated in the Plans for the use of the Contractor. The Contractor shall confine its operations to within these limits.

The Contractor shall provide at the Contractor's own expense any additional land and access that is required for temporary construction facilities or storage of materials. The Contractor shall obtain all required permissions for use of private property prior to taking possession or use. The permission shall be obtained in writing and a copy forwarded to the City prior to the Contractor taking possession of said property.

Section 4.15. Record/As-Built Documents and Specifications.

The Contractor shall keep and maintain on the Site, one record set of the Drawings and Specifications, which shall be updated weekly to reflect current as-built conditions of the Work as the Work progresses and document changes to the Work shown on the Project Plans and Specifications, including buried or concealed construction and utility features that are revealed during the course of construction. Special attention shall be given to recording of all buried utilities that differ from locations indicated in the Contract Documents.

Record Documents shall be produced by marking a full size copy of the Project Plans and Specifications as follows:

Red – Additions including notes and dimensions.

Green – Deletions (by hash marks or appropriate lines through the deletion).

Graphite (gray) – General comments and notes used by the Contractor or the City and not required on the as-built.

Yellow – Work completed as shown and used by the City in field review of the as-built during the submittal phase.

Blue – City verification and notes required to be added by the City in review of the as-built, during submittal phase.

The Contractor's as-built information shall be clear and legible, and at a minimum, the following information shall be inserted and dimensioned on those drawings and specifications: the exact horizontal and vertical location of all installations in their finished condition, including all underground work, including all sprinkler system piping and components; all electrical, plumbing and mechanical installations; all changes in construction, materials and installed equipment; posting of all issued addenda to the bid documents; adequate dimensional data, both horizontal and vertical, to allow location of covered installations; the identification of changes authorized by Change Order, CCD, Field Instruction, Written Directive, Supplemental Drawing or other written instruction and the number of that Change Order, CCD, Field Instruction, Written Directive, Supplemental Drawing or other written instruction. The updated drawings and specifications shall be available for review by the City, Owner's Representative and/or the Inspector.

Written confirmation from the Owner's Representative that the as-builts have been properly updated weekly shall be submitted with each pay application request, and the existence of such properly updated as-builts shall be a condition precedent to payment. Failure to comply with the preparation and submission of as-builts may result in the City withholding the current progress payment.

As a condition to certification of final completion, the Contractor shall provide the original Record Documents, together with a certification by the Contractor that the Record Documents are a true representation of the Work as actually constructed. Timely submission of complete Record Documents shall be a condition precedent to certification of final completion and to final payment. Delays in the submission of complete Record Documents may subject the Contractor to liquidated damages.

ARTICLE 5. CONTROL OF WORK AND MATERIALS

Section 5.01. Authority of the City.

The City will decide all questions regarding the quality and acceptability of materials furnished, work performed, and rate of progress of the Work. The City will decide all questions regarding the interpretation and fulfillment of the Contract on the party of the Contractor, and all questions as to the rights of different prime contractors involved with the Work. The City will determine the amount and quality of the Work performed and materials furnished for which payment is to be made under the Contract.

The City will administer its authority through a duly designated representative identified at the pre-construction conference. The Contractor and the City's designated representative (the Owner's Representative) shall make good faith attempts to resolve disputes that arise during the performance of the Work.

Any order given by the City not otherwise required by the Contract to be in writing shall be given or confirmed by the City in writing at the Contractor's request. Such request shall state the specific subject of the decision, order, instruction, or notice and, if it has been given orally, its date, time, place, author and recipient.

Any plan or method suggested to the Contractor by the City, the Architect or Consulting Engineer, or the Owner's Representative, but not specified or required in writing, if adopted or followed in whole or in part by the Contractor, shall be used at the risk and responsibility of the Contractor. The City assumes no responsibility.

Section 5.02. Supervision Procedures.

The Contractor shall supervise and direct the Work using its best skill and attention. The Contractor shall be solely responsible for all construction means, methods, techniques, and procedures and for coordinating all portions of the Work under the Contract.

The Contractor shall be responsible to the City for the acts and omissions of its employees, Subcontractors and their agents and employees and other persons performing any of the Work.

The Contractor shall not be relieved from its obligations to perform the Work in accordance with the Contract Documents either by the activities or duties of the Architect, Consulting Engineer or the Owner's Representative in their administration of the Contract or by inspections, tests or approvals (or the lack thereof) required or performed under the Contract Documents by persons other than the Contractor.

Section 5.03. Personal Attention and Superintendence; Contractor's Agent.

The Contractor shall supervise the work to the end that it shall be faithfully prosecuted. The Contractor shall employ a competent superintendent who is fully empowered to act as agent for the Contractor on the Site. The Contractor shall advise the City in writing of its agent prior to the start of any work. The Contractor shall provide résumés for all of the Contractor's supervisory employees to be assigned to the Project for City review, and the City may reject any supervisory employees not deemed to be qualified at the sole discretion of the City. The Contractor shall be responsible for the faithful observation of all instructions delivered to its authorized agent(s). No additional compensation will be paid by the City for any work performed by the superintendent.

Section 5.04. Skilled Labor.

All non-apprentice labor shall have the skills of a journeyman in the applicable trade. All workmanship shall be of the highest quality and finish in all respects.

Section 5.05. Dismissal of Unsatisfactory Employees.

All employees engaged in the Work will be considered employees of the Contractor.

The Contractor shall at all times enforce strict discipline and good order among all employees and shall not employ on the Work any unfit person or anyone not skilled in the assigned task. The Contractor shall remove, or cause a Subcontractor to remove from the Project, any incompetent employee, or any employee not skilled for the type of work required. If any person employed by the Contractor or any Subcontractor shall fail or refuse to carry out the directions of the City or the provisions of the Contract Documents, or is, in the opinion of the City, incompetent, unfaithful, intemperate, or disorderly, or is acting or working in a manner that compromises the safety of the Work or persons or property involved with the Work, or is otherwise unsatisfactory, the Contractor shall, when requested by the City, remove the worker from the Work immediately, and shall not again employ the removed worker on the Work except with the written consent of the City.

Section 5.06. No Tenancy.

All workers, contractors, or contractors' representatives are admitted to the Site only for the proper execution of the Work, and have no tenancy.

Section 5.07. Separate Contracts.

The City reserves the right to do other work in connection with the Project by separate contract or otherwise. The Contractor shall at all times conduct its work so as to impose no hardship on the City or others engaged in the Work. The Contractor shall afford other contractors reasonable opportunity for the delivery and storage of materials and the execution of their work. The Contractor shall adjust, correct and coordinate its work with the work of others so that no delays or discrepancies shall result in the whole Project.

It shall be the duty of the Contractor and its Subcontractors, before beginning any work, to examine all construction and work of other contractors and/or Subcontractors that may affect their work, and to satisfy themselves that everything is in proper condition to receive such work. The Contractor shall notify the Owner's Representative in writing prior to starting work of any discrepancies or conditions which deviate from the Contract Documents or are otherwise unsuitable for proper execution and results. Failure on the part of the Contractor to so inspect and promptly notify the Owner's Representative shall constitute an acceptance by the Contractor and all Subcontractors of all construction in place as being suitable in all respects to receive further work by the Contractor or Subcontractors, unless defects develop in the other contractor's work after the execution of the Contractor's Work.

Section 5.08. Cooperation with Other Contractors.

The City or adjacent property owners may perform work adjacent to or within the Work areas concurrent with the Contractor's operations. The Contractor shall conduct operations to minimize interference with the work of other forces or contractors. Any disputes or conflicts between the Contractor and other forces or contractors retained by the City which create delays or hindrance to each other shall be referred to the

City for resolution.

Section 5.09. Contractor's Equipment.

The Contractor shall provide adequate and suitable equipment, labor and means of construction to meet all the requirements of the Work, including completion with the Contract Time. Only equipment suitable to produce the quality of work required will be permitted to operate on the Project. Specific types of equipment may be requested by the City on component parts of the Work.

The City may, at the City's option, permit the use of new or improved equipment. If such permission is granted, it is understood that it is granted for the purpose of testing the quality and continuous attainment of work produced by the equipment, and the City shall have the right to withdraw such permission at any time that the City determines that the alternative equipment is not producing work that is equal in all respects to that specified in the Contract.

In any case where the use of a particular type or piece of equipment has been banned, or in cases where the City has condemned for use on the Work any piece or pieces of equipment, the Contractor shall promptly remove such equipment from the site of the Work. Failure to do so within a reasonable time may be considered a breach of contract.

Section 5.10. Submittals.

The Contractor, at its sole cost and expense, shall furnish to the Owner's Representative all Submittals and other descriptive material as are required by the specifications or requested by the Architect or Consulting Engineer to demonstrate fully that the materials and equipment to be furnished and the methods of work comply with the provisions and intent of the Plans and Specifications. Submittals shall include, but not be limited to, all mechanical and electrical equipment and systems, reinforcing steel, fabricated items and piping details.

Shop Drawings shall be done with sufficient detail to adequately describe items proposed to be furnished or methods of installation to enable the City and Architect or Consulting Engineer to determine compliance with the Specifications and with the design and arrangement shown on the Working Drawings.

Electrical, instrumentation, control and communication system drawings shall include elementary and loop diagram drawings, functional single line system layout drawings, connection drawings, interconnection drawings, panel/cabinet fabrication drawings, and detailed circuit board and component drawings. Detailed circuit schematics and circuit board layout drawings shall be provided which clearly show, locate and identify all components and wiring. Each circuit board component shall be identified by the component's original manufacturer name and part number. Industry standard part numbers shall be used. Component values, voltage/current levels, setpoint, and timing values shall be defined.

Complete annotated software/firmware source code listings and program documentation shall be provided for all electronic/electrical systems, subsystems, assemblies, parts, components and equipment which incorporate programmable devices. All instructions and hardware necessary to load, store, modify and activate software/firmware source codes and programs shall be provided. The Contractor shall check and coordinate all Submittals with the work of all trades involved before they are submitted. The Contractor shall review each submittal for conformance with the requirements of the Contract Documents.

Unless otherwise provided in the Contract Documents, all Submittals for the Project shall be made within thirty-five (35) Calendar Days of the Notice to Proceed; however, the Contractor shall have the additional responsibility to coordinate the schedule of its Submittals with the requirements of the Contract Schedule so as not to delay the Project. No delay claims related to Submittals will be entertained on the Project for any Submittal originally received after the 35 day submittal period. The City shall not accept limitations in materials, colors, quality, or any other aspect of products or materials due to the Contractor's failure to provide Submittals as required. At the City's discretion, the Contractor may be directed to furnish and install temporary materials until the City selected material is available.

Contractor shall submit a schedule of Submittals organized by specification section required for the Project. It shall delineate whether product data, installation instructions, shop drawings, samples, extra stock or mock-ups are required. This schedule of Submittals shall be submitted prior to the issuance of the Notice to Proceed. Any omissions or inaccuracies shall not relieve the Contractor of the obligation for conforming to the requirements in the Contract Documents. The Contractor's submittal schedule shall provide sufficient time for delivering the Submittal to the Architect or Consulting Engineer, the Architect's or Consulting Engineer's review of each Submittal, delivering the Submittal to the Contractor and re-submittal as necessary. In no case shall the Contractor allow fewer than twenty-one (21) Calendar Days, exclusive of delivery time, for the Owner's Representative and the Architect or Consulting Engineer to review each Submittal. In certain cases, the Contract Documents also may require City review of Submittals. In those cases, in addition to the time allowed for review by the Owner's Representative and the Architect or Consulting Engineer, the Contractor shall allow no fewer than fourteen (14) additional Calendar Days for that City review.

A. Submission of Submittals.

The Contractor shall submit no less than one reproducible and six (6) copies of all Submittals, two (2) of which shall be returned after review. The Submittals shall be accompanied by a letter of transmittal, to the Owner's Representative, listing the identifying number of the Submittals submitted and cross-referencing them to the page or sheet in the Specifications and/or Working Drawings to which they are related.

Where any items of the Works is required to be installed in accordance with the manufacturer's installations recommendations, the Contractor shall furnish six (6) complete sets of the manufacturer's installation recommendations to the Owner's Representative prior to starting the installation. These submittals will be retained by the City.

All Submittals must be marked with the name of the Project and the name of the Contractor and shall be numbered consecutively and complete in every respect.

By approving and submitting Submittals, the Contractor represents that it has determined and verified all materials, field measurements and field construction criteria related thereto and that it has checked and coordinated the information contained within those Submittals with the requirements of the Work and to the Contract Documents. The Contractor shall adhere to any supplementary processing and scheduling instructions pertaining to Submittals as may be issued by the Owner's Representative.

The Owner's Representative will not accept Submittals which are not sufficiently dimensioned

and detailed to demonstrate compliance with the Contract Documents.

B. Submittals Containing Proprietary Information.

All required information shall be provided even though some or all of such information may be considered proprietary. If any of the information required herein is considered proprietary, the City's standard proprietary agreement shall be executed between the City and the Contractor, stipulating that all such information will be supplied by the Contractor and kept confidential by the City. All proprietary data shall be identified as part of the Contractor's bid and the City's standard proprietary agreement shall be executed before award of the Contract. Proprietary information is defined as any information or data describing or defining a product, process or system which (1) was developed at the expense of the Contractor, a subcontractor or supplier; (2) is not generally available in the industry; and (3) is kept secret by its owner for purposes of preventing its use by others. Application software and all other documentation, or any other product, prepared by the Contractor, Subcontractor or supplier at the expense of the City for specific use on the facility being construction under the Contract Documents shall not be considered proprietary.

Not more than seventy percent (70%) of all electronic/electrical work shall be paid for until all proprietary information has been submitted and approved.

All submitted proprietary information shall describe the final record Work. No part of the Work covered by the proprietary agreement shall be modified after proprietary submittal acceptance until updated proprietary information has been submitted by the Contractor and accepted by the City. Updated proprietary information shall fully document all modifications to be implemented. All proprietary data shall be marked "PROPRIETARY" by the Contractor.

C. Review of Submittals.

Following submission, the Submittals will be returned with one or more of five possible responses by the Owner's Representative, Architect or Consulting Engineer. These possible responses are as follows:

1. Unreviewed: If the Submittal is not required, or if it is not complete, or if it does not meet the form, format, and number requirements specified, it may be returned unreviewed. If the Submittal is not required, work may commence; if the Submittal was returned due to form requirements, it shall be resubmitted, and approval obtained prior to commencement of the work.
2. Approved, Reviewed, or No exceptions taken: In the event the Submittal is acceptable as submitted, it will be returned with this status. Work may proceed upon receipt of approved Submittal.
3. Make Corrections Noted: If the Submittal is acceptable except for certain items which have been noted by the Architect or Consulting Engineer, it will be so designated. Work may proceed with the corrections made, and no resubmittal is necessary.
4. Revise and Resubmit: This status indicates that revisions are noted on the Submittal, and an additional Submittal is required to reflect those revisions and/or additional information. Work may not commence until the resubmittal is approved.
5. Rejected: A Submittal may be rejected if it is not in compliance with the Contract

Documents, or if it proposes an “or equal” or substitution which is not acceptable to the Architect or Consulting Engineer. A superseding Submittal shall be submitted and approved prior to commencement of the work.

Should the Contractor proceed with the work shown on a Submittal before approval is received, it shall remove and replace or adjust any work which is not in accordance with the Submittal as ultimately approved, and it shall be responsible for any resultant damage, defect, or added cost. The City shall be under no obligation to pay for work installed prior to approval of Submittals, until the Submittals are approved and the work in place is found to be in compliance with the Contract Documents.

The Contractor shall resubmit Submittals in categories 4 and 5 above after making any changes required so that Submittals will comply with the Contract Documents. When resubmitting, the Contractor shall direct specific attention to deficient areas. Resubmittals shall be made in the same number of copies as the original Submittal. Resubmittals shall be made within ten (10) Calendar Days of return of the previous Submittal, and in any event in sufficient time so as to avoid delay to the Work. No delay claims related to resubmittals will be entertained on the Project for any resubmittal originally received after the 10 days.

The Architect or Consulting Engineer shall determine the adequacy and completeness of all Submittals. Where the Architect or Consulting Engineer deems a Submittal to be inadequate, incomplete, or otherwise unsuitable for proper review, the Contractor shall submit all additional information requested by the Architect or Consulting Engineer. There shall be no change to the Contract Time or the Contract Sum when such additional information is required.

D. Submittals Showing Variation from Contract.

It shall be the responsibility of the Contractor to specifically point out any variation or discrepancy between the Submittals submitted and the Contract Documents. The Contractor shall make specific mention of all variations, along with an explanation of why they are requested, in its letter of transmittal. Failure by the Contractor to identify in its letter of transmittal any variation, discrepancy, or conflict with the Contract Documents shall render the approval null and void, and the Contractor shall bear all risk of loss and reconstruction costs or delays.

If any modifications to the Work are required as a result of the approval of Submittals which deviate from or do not comply with the Contract Documents, those modifications shall be made without extra cost to the City, and without extension of the Contract Time. Any other resultant costs, including but not limited to design fees, construction management fees, costs incurred by other contractors, or inspection fees, shall be at the expense of the Contractor.

E. Effect of Approval of Submittals.

The approval of Submittals shall not relieve the Contractor of the obligation for accuracy of dimensions and details; for conforming the work to the requirements of the Contract Documents; or from responsibility to fulfill the Contract at no extra cost to the City, within the Contract Time.

The Contractor shall make no changes to any Submittal after it has been approved, and the equipment or materials shall not deviate in any way except with the written approval of the City.

F. Operations and Maintenance (O&M) Submittals.

For use in subsequent maintenance and operations the Contractor shall furnish, unless otherwise provided for in the Special Provisions, operation and maintenance (“O&M”) information in accordance with Article 18 of these General Provisions. The City may withhold retention until O&M submittals have been submitted and approved.

Section 5.11. Equal Materials.

Unless otherwise provided in the technical specifications, whenever in the Contract Documents any systems, processes, products, or materials are indicated or specified by the name brand of the manufacturer, or by patent or proprietary names, those specifications shall be deemed to be a measure of quality and utility or a standard, and shall be deemed to be followed by the words, “or equal.” It is the intent of this Article to comply with Public Contract Code Section 3400.

If the Contractor desires to use any other brand or manufacturer of equal quality and utility to that specified, it shall make application to the Owner’s Representative in writing, within ten (10) business days after Notice to Proceed, and shall submit samples and all other information necessary to substantiate its claim of “or equal”. Such application constitutes a certification that the Contractor:

- A. Has investigated the proposed Equal and determined that it meets or exceeds, in all respects, the specified system, process, product, or material.
- B. Will provide the same warranty for the proposed Equal as for the specified system, process, product or material.
- C. Will coordinate installation and make other changes which may be required for work to be complete in all respects and at no additional cost to the City.
- D. Waives claims for additional costs and/or Contract Time which may subsequently become apparent.

The Architect or Consulting Engineer then will determine whether or not the proposed system, process, product or material is equal in quality and utility to that specified, and its decision shall be final. The Architect or Consulting Engineer will render its decision within fourteen (14) business days after submission of all required information for the application. If the request is not accepted, the Contractor shall provide the specified system, process, product or material without an increase in the Contract Sum and/or Contract Time.

Neither the submission of a request for an Equal, nor the Architect’s or Consulting Engineer’s review of the application, will extend the time for submission of any required Submittals. Requests for Equal systems, process, products or materials will be considered only when offered by the Contractor as required by this Article.

Section 5.12. Substitutions.

Unless otherwise provided in the technical specifications, the Contractor may make proposals for Substitutions to systems, process, products or materials shown or specified only under one or more of the following conditions:

- A. Unavailability: If the specified system, process, product, or material, or an Equal, is no longer available in the marketplace.
- B. Delay: If obtaining the specified system, product, process or material, or an Equal, will delay completion of the Work through no fault of the Contractor.
- C. Better system, process, product or material: If a better system, product, process or material is available at no additional cost.
- D. Savings: If a system, process, product or material which meets all of the performance requirements of that specified is available at a savings to the City.

A proposal for Substitution shall include all information required by the Architect or Consulting Engineer to evaluate the substitute system, process, product or material. Such proposal constitutes a certification that the Contractor:

- A. Has investigated the proposed Substitution and determined that it meets or exceeds the performance requirements of the specified system, process product or material.
- B. Will provide the same or better warranty for the proposed Substitution as for specified system, process, product or material.
- C. Will coordinate installation and make other changes which may be required for the work to be complete in all respects at no additional cost to the City.
- D. Waives claims for additional costs and/or Contract Time, which may subsequently become apparent.

The Owner's Representative and the Architect or Consulting Engineer shall evaluate a timely Substitution request, and shall approve, deny, approve with conditions, or initiate the procedure for a change order in response to the Contractor's request. This decision shall be final. This decision will be rendered within fourteen (14) business days after submission of all required information for the proposal. If the request is not accepted, the Contractor shall provide the specified system, process, product or material without an increase in the Contract Sum and/or Contract Time.

Failure by the Contractor to identify all deviations from the Contract Documents in its request for substitution shall render any City action taken thereon null and void. The Contractor shall bear all costs resulting from any error in the request for Substitution. Only one request for Substitution will be considered for each product.

Substitution proposals will not be considered prior to bidding. All requests for Substitutions shall be made within the same time requirement for initial Submittals. Failure to timely submit a Substitution request

shall constitute a waiver by the Contractor and an acceptance of the specified systems, processes, products and materials. Late substitution requests may be considered only when the City consents in writing, and the City's best interests so require.

Neither the submission of a request for substituted systems, processes, products, or materials, nor the Owner's Representative's and/or Architect's or Consulting Engineer's review of the application, will extend the time for submission of any required Submittals.

Section 5.13. Samples and Testing of Proposed Substitutions; Costs of Adapting to Work.

When the Owner's Representative or Architect or Consulting Engineer determines that samples and testing are required to evaluate a request for a Substitution, the Owner's Representative shall so advise the Contractor, and specify the systems, processes, products, materials or work to be sampled. The Contractor shall, at no cost to the City, provide samples as required by these General Conditions dealing with samples and testing, or the Technical Specifications.

The Contractor shall bear all costs of sampling and testing required to decide a request for Substitution, and if a Substitution is accepted, the Contractor shall bear all costs associated therewith, including the cost of the Owner's Representative's, Architect's and/or Consulting Engineer's services required to adapt the Substitution to the design to the complete satisfaction of the City, and all costs of mechanical, electrical, structural, or other changes needed to adapt the Substitution to the Work.

Section 5.14. Effect of Approval of Equal Materials or Substitution Request.

If an application for an Equal or Substitution request is approved, the Contractor shall be solely and directly responsible for setting approved Equal or Substitution systems, processes, products, materials and/or equipment into the available space, and for the proper operation of the Equal or Substitution systems, process, products, materials and/or equipment with all other systems, processes, products, materials and/or equipment with which it may be associated, all in a manner acceptable to the City.

No time extensions nor any increases in the Contract Sum shall be granted on account of an Equal or Substitution. In the event of a savings, the Contract Sum shall be adjusted by the price difference between the approved Equal or Substitution and the originally specified item.

Section 5.15. Surveys.

A. Contractor Surveys.

Except as set forth in the Special Provisions, the Contractor is responsible to do all necessary surveys to layout and control the Work to the locations, elevations, lines and dimensions shown or specified in the Contract Documents. Any deviations must receive prior approval of the City. All surveys affecting the line or elevation of underground drainage, sewers, or utilities, and all other work within public rights-of-way or easements shall be performed by or under the direction and supervision of a California Licensed Land Surveyor or a California Registered Civil Engineer authorized to practice land surveying.

The Contractor shall be responsible for protecting and perpetuating survey monuments affected by construction activities in accordance with Business and Professions Code section 8771. The Contractor shall be responsible for referring, resetting, and filing of corner records for all survey monuments disturbed or destroyed by construction activities in accordance with Business and Professions Code section 8771.

The Contractor shall be responsible for the accuracy of the Contractor's own layout work and shall be liable for the preservation of all established lines and grades. Stakes damaged or destroyed by the operations of the Contractor shall be replaced at the Contractor's expense.

B. City-Furnished Surveys.

If the Special Provisions provide that surveys will be furnished by the City, the Contractor shall notify the City at least two (2) Working Days in advance of the time and places the Contractor will need lines, elevations, and reference points. Unless authorized by the City, any work done without line and grade will be done at the Contractor's risk.

Unless otherwise set forth in the Special Provisions, the City will furnish the following surveys:

1. For Streets and Highways:

Slope Stakes – One (1) line of slope stakes at fifty-foot (50') intervals for the construction of each pavement edge. The Contractor shall set back and reference the stakes.

Subgrade – One (1) line of blue tops at centerline or at a location directed by the City, for each of two (2) lanes of roadway at fifty-foot (50') intervals, and three (3) lines on super-elevated sections for each two (2) lanes. The Contractor shall reference subgrade stakes for the subbase and base layers.

Finish Base – One (1) line of blue tops at centerline or at a location directed by the City for each two (2) lanes of roadway at fifty-foot (50') intervals, and three (3) lines for each two (2) lanes on super-elevated and widened sections.

All necessary line, location and elevation stakes for curb and gutter, inlets, pipes, drainage structures, signals, box culverts and other miscellaneous facilities.

C. Survey Monuments.

On the Plans, the City shall show, to the best of its knowledge, the location and character of survey monuments located within the construction area. It is the Contractor's responsibility to arrange and pay for a diligent and thorough search for survey monuments. This work shall be performed by or under the direction of a California Licensed Land Surveyor or a California Registered Civil Engineer authorized to practice land surveying, prior to the beginning of construction or maintenance work that could disturb or destroy a survey monument. Any monuments found shall be referenced and reset by or under the direction of a California Licensed Land Surveyor or a California Registered Civil Engineer authorized to practice land surveying in accordance with Business and Professions Code section 8771. On thin surface treatments, such as chip seals, the monuments can be covered in advance of the maintenance treatment with a suitable material and then removed to expose the monument. When survey monuments not shown on the Plans are discovered, the Contractor shall bring them to the attention of the City prior to damaging them. Any damaged or destroyed City survey monuments shall be reset by the City at the Contractor's expense. Any other damaged or destroyed survey monuments shall be reset by the Contractor in accordance with the Land Surveyors Act, Business and Professions Code section 8700 et seq.

All survey monuments and references shall be set or reset by or under the direction of a California Licensed Land Surveyor or a California Registered Civil Engineer authorized to practice land surveying.

Section 5.16. Responsibility for Accuracy.

The Contractor shall obtain all necessary measurements for and from the Work, and shall check dimensions, elevations and grades for all layout and construction work and shall supervise such work, the accuracy for all of which the Contractor shall be responsible. The Contractor is responsible for adjusting, correcting and coordinating the work of all Subcontractors so that no discrepancies result.

Section 5.17. Quality of Materials and Products.

Unless otherwise allowed or required by the Special Provisions, all materials shall be new and of a quality at least equal to that specified. When the Contractor is required to furnish materials or manufactured articles for which no detailed specifications are set forth, the materials or manufactured articles shall be of the best grade in quality and workmanship obtainable in the market. If not ordinarily carried in stock, the articles shall conform to the usual standards for first-class materials or articles of the kind required. The work performed shall secure the best standard of construction and equipment of the work as a whole or in part. The Contractor shall, if required by the Architect, Consulting Engineer, Project Inspector, or Owner's Representative, furnish satisfactory evidence as to the kind and quality of materials provided.

The Owner's Representative may require, and the Contractor shall submit if required, a list designating the source of supply of each item of materials incorporated into the Work, and in such event, those materials or products shall not be delivered to the Work nor installed therein until after the Owner's Representative has approved the list.

Contractor shall certify that the materials and equipment installed comply with the Contract Documents.

In the event that the Contractor furnishes a material, product, process, or article better than that specified in the Contract Documents, the difference in cost of that material, product, process, or article shall be borne by the Contractor.

All materials shall remain in their original packages or containers until ready for use. The labels of all packages or containers shall remain affixed and kept legible. No product shall be stored in any container, the label of which does not accurately describe the contents of the container.

All materials furnished shall comply with industry standards as follows:

- A. Any material specified by reference to the number, symbol, or title of a specified standard such as a Commercial Standard, a Federal Specification, a Trade Association Standard, or other similar standard, shall comply with the requirements in the latest revision thereof, including any amendments or supplements thereto, in effect on the date of the Bid, except as limited to type, class, or grade, or modified in that reference.
- B. The standard referred to, except as modified in the specifications, shall have full force and effect as though printed in these specifications. These standards are not furnished to the bidder for the reason that the manufacturers and trades involved are assumed to be familiar

with their requirements.

1. Where Federal Specifications are referred to as a measure of quality and standard, they refer to Federal Specifications established by the Procurement Division of the United States Government and are available from the Superintendent of Documents, U.S. Government Printing Office.
2. Where Federal Specification numbers are used, they refer to the latest edition including amendments thereto.
3. Where Commercial Standards (CS) or Product Standards (PS) are referred to as a measure of quality, standard, and method of fabrication, they refer to Commercial Standards and Product Standards issued by the U.S. Department of Commerce.
4. Where ASTM serial numbers are used, they refer to the latest tentative specifications, standard specifications, standard method, or standard methods of testing, issued by the American Society for Testing Materials, unless specifically noted.

The Contractor shall protect the work, materials, and equipment from damage due to the action of the elements, trespassers, or other causes. The Contractor shall properly store materials and equipment and, when necessary, erect temporary structures to protect them from damage. The Contractor shall replace any items damaged as a result of improper protection at no expense to the City.

Section 5.18. 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, after they have been installed, attached or affixed to the work, but all such materials shall be the property of the Contractor and the City jointly as their interest may appear and cannot be removed from the work without the consent of the City.

Section 5.19. Inspection.

All work done and all materials and equipment furnished shall be subject to the inspection and approval of the City. Neither the final inspection and payment, nor any interim inspection or progress payment shall relieve the Contractor of its obligation to fulfill the Contract as required by the Contract Documents. Any work, materials or equipment not meeting the requirements and intent of the Contract Documents may be rejected, and unsuitable work or materials shall be made good, notwithstanding the fact that such work or materials may previously have been inspected and/or payment therefor may have been made.

The Project Inspector shall be considered to be a representative of the City and shall be designated at the pre-construction conference. It is the Project Inspector's duty to inspect the Work.

Where the Contract Documents, instructions by the Project Inspector, Owner's Representative or the Architect or Consulting Engineer, laws, ordinances, or any public authority having jurisdiction require work to be inspected, tested or approved before the Work proceeds, such work shall not proceed, nor shall it be covered up without inspection. If any part of the Work is covered prior to inspection, the City may order the work to be uncovered so that inspection may be accomplished. The Contractor shall bear all

expenses of such examination and satisfactory reconstruction.

The Contractor shall provide written notice to the Project Inspector at least twenty-four (24) hours in advance of the readiness for inspection.

All work shall be available for inspection and the Project Inspector shall have full access to review all work during all working times. The Contractor shall provide all necessary means of safe access (e.g. ladders) for the Project Inspector to perform his/her duties. The Contractor shall furnish the Project Inspector with any information necessary to fully inform him/her of conditions.

The Project Inspector shall have the authority to order the work designated for inspection stopped if a determination is made that work is proceeding in violation of the Contract Documents or any orders issued by the City, its representatives, or the Architect or Consulting Engineer. The failure of the Project Inspector to order the work stopped does not excuse the Contractor from complying with the Contract Documents for that work. Upon issuing a stop work notice, the Project Inspector shall notify the Architect or Consulting Engineer, who shall inspect the work in question and determine whether it does or does not comply with the Contract Documents. The decision of the Architect or Consulting Engineer shall be final. The Contractor shall thereafter comply with the instructions of the Architect or Consulting Engineer regarding corrections needed to cure the defect. The suspended work shall be resumed only when the instructions are fulfilled. The Contractor shall not be entitled to an extension of time in the event of such suspension of work.

Should the Owner's Representative or the Architect or Consulting Engineer determine that it is necessary or advisable to make an inspection of work already completed at any time before final inspection and acceptance of the Work, by removing or exposing any work, the Contractor shall, upon instruction of the Owner's Representative, promptly furnish all necessary facilities, labor, and materials to do so. If the work is found to be defective in any respect due to the fault of the Contractor or any Subcontractor, the Contractor shall bear all expenses of such examination and satisfactory reconstruction. If, however, the work is found to meet the requirements of the Contract Documents, the additional cost of labor and material necessarily involved in the examination and replacement shall be allowed the Contractor and a change order shall be issued for such cost and any time extension justified by delays to the critical path.

Whenever the Contractor arranges to work at night or any time when work is conducted other than the normal 8-hour work day or 40-hour week, or to vary the period during which work is carried on each day, it shall give the Owner's Representative and the Project Inspector a minimum of 48-hour notice so that inspection may be provided. Additional inspection costs incurred because of overtime or shift work that are incurred at the request of the City shall be paid by the City. All other additional inspection costs shall be borne by the contractor unless otherwise agreed to by the parties. If this overtime work is necessitated by the Contractor's error or failure to perform, the cost of inspection will be borne by the Contractor.

Section 5.20. Plant Inspection.

The City may inspect the production of materials or manufacture of products at the source of supply. Plant inspection, however, will not be undertaken until the City is assured of the cooperation and assistance of both the Contractor and the material producer. The City or the Contractor's authorized representative shall have free entry at all time 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 and tests.

The City assumes no obligation to inspect materials at the source of supply. The responsibility of incorporating satisfactory materials in the Work rests entirely with the Contractor, notwithstanding any prior inspections or tests.

Section 5.21. Samples and Testing.

The City reserves the right to require the Contractor to provide samples, and to perform tests on any materials, articles, equipment, installations, or construction performed by the Contractor in addition to those specified in the Contract Documents. The City shall assume the cost of sampling and testing materials only when the Contract Documents do not require the Contractor to do so.

All tests shall be performed under the supervision of the testing laboratory or consultant employed by the City and at such times as are convenient to the City. The Contractor shall provide written notice to the Owner's Representative at least 24 hours prior to the need for off-site tests or inspections, and the Owner's Representative will arrange such tests or inspections. The Contractor shall bear all expenses of tests performed where the Contractor failed to provide this minimum notice.

The Contractor shall, at its sole cost and expense, repair all damage resulting from testing specified in the Contract Documents. The City shall issue a Change Order for repair of damage due to sampling or testing other than specified in the Contract Documents.

The Contractor shall not make any tests upon portions of the Project already completed, except with the prior written consent and under the direction and supervision of the Owner's Representative.

If as a result of any test, whether originally specified or not, any material or work is found to be unacceptable, it shall be rejected, and all further sampling and testing required by the City or the Owner's Representative shall be at the Contractor's expense.

All samples and specimens for testing shall be selected by the Project Inspector or by the testing laboratory, but not by the Contractor.

The Contractor shall, at the Contractor's sole cost and expense, furnish, package, mark, and deliver all samples to be tested at locations other than the Site. Samples shall be delivered either to the Project Inspector or to the testing laboratory or such other address specified in the Contract Documents.

Delivery of all samples to the testing laboratory shall be made in ample time to allow the test to be made without delaying construction. No extra time will be allowed for the completion of the Work by reason of delay in testing samples required by the Contract Documents or due to the Contractor's request for substitution.

The Contractor shall allow free access at all times to the representatives of the testing laboratory to the Work and shall point out the sources from which samples are taken. All test reports shall be sent to all parties specified in the Contract Documents.

No materials or work of which samples and/or tests are required shall be used or covered until the Owner's Representative or the Project Inspector informs the Contractor that such samples and/or tests have been approved. If the Contractor installs, uses, or covers any such material, article, or work prior to testing and approval, such shall be at the Contractor's sole risk and expense, and it shall bear all costs of uncovering, repair, and replacement thereof.

The approval of any samples shall be for the characteristics thereof, or for the uses named in such approval, and no other. No approval of any samples shall be deemed a change or modification in any requirement of the Contract Documents. Upon testing of any sample of material or work, no additional sample shall be considered. All material or work installed after the sampling and testing is performed and approved shall be equal to or better than the approved sample in all respects and shall be accompanied by documentary proof that the material and work sampled is actually representative of that installed.

The City assumes no obligation, and the Contractor shall not be relieved of any obligation undertaken pursuant to the Contract Documents by virtue of sampling and testing specified in this Article.

The responsibility for incorporating satisfactory materials and workmanship which meet the Contract Documents in the work rest entirely with the Contractor, notwithstanding any prior samples or tests.

Section 5.22. Rejection of Materials and Workmanship.

The City shall have the right to reject materials and workmanship which are determined by the Owner's Representative, the Architect, Consulting Engineer, or the Project Inspector to be defective or fail to comply with the Contract Documents. Rejected workmanship shall be promptly corrected to the satisfaction of the City and/or Architect or Consulting Engineer, and rejected materials shall be removed from the premises and replaced, all without added cost to the Owner and/or an increase in the Contract Time.

If the Contractor does not correct such rejected work and/or materials within a reasonable time, fixed by the Owner's Representative or the Architect or Consulting Engineer in a written notice to the Contractor, the City may correct the same and charge the expense to the Contractor, and deduct such expense from the next progress payment otherwise payable to the Contractor.

If the City determines that it is in its best interest not to correct defective workmanship and/or materials, or work not done in accordance with the Contract Documents, the Contractor agrees that an equitable deduction from the Contract Sum shall be made therefor, and deducted from the next progress payment.

Section 5.23. Correction of Work

The Contractor shall promptly correct all work rejected by the Owner's Representative, Project Inspector or the Architect or Consulting Engineer as defective or as failing to conform to the Contract Documents, whether observed before or after final completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected work including compensation for the Architect's, Consulting Engineer's Project Inspector's and the Owner's Representative's additional services.

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within three (3) days after receipt of written notice from the City to commence and continue correction of the default or neglect with diligence and promptness, the City may, without prejudice to any other remedy it may have, correct the deficiencies and may further elect to complete that portion of the Work through such means as the City may select, including the use of a new contractor. In such case, an appropriate Change Order shall be issued deducting from the payments then or thereafter due the Contractor the cost of correcting the deficiencies, and any other appropriate costs, including compensation for the Architect's or Consulting Engineer's, the Project Inspector's and the Owner's Representative's additional services made necessary by the default, neglect or failure. If the payments then or thereafter due the Contractor are not sufficient to cover that amount, the Contractor shall pay the difference to the City.

If within two (2) years after the Date of Completion and acceptance of the Work or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be defective or not in accordance with the Contract Documents, the Contractor shall correct any or all such work, together with any other work which may be displaced in so doing, without expense to the City, promptly after receipt of a written notice from the City unless the City has previously given the Contractor a written acceptance of such condition. The City shall issue a correction notice promptly after discovering the condition. The Contractor shall notify the City upon completion of repairs. This obligation shall survive termination of the Contract with respect to work in place prior to termination.

The Contractor shall bear the cost of making good work destroyed or damaged by such correction or removal.

Nothing contained in this Section shall be construed to establish a period of limitation with respect to any other obligations which the Contractor might have under the Contract Documents or by operation of law. The establishment of the time period of two (2) years after the Date of Completion, or such longer period of time as may be prescribed by law or by the terms of any warranty required by the Contract Documents, relates only to the specific obligation of the Contractor to correct the Work and has no relationship to the time within which an action may be

Commenced to establish the Contractor's liability with respect to its obligations other than specifically to correct the work.

Section 5.24. Termination for Convenience.

The City may at any time and for any reason, terminate, in whole or in part, Contractor's Work at the City's convenience. Termination shall be by written notice to Contractor. Upon receipt of such notice, Contractor shall, unless the notice directs otherwise, immediately discontinue Contractor's work and the placing of orders for materials, facilities and supplies in connection therewith, and shall, if requested, make every reasonable effort to procure cancellation of all existing orders or contracts upon terms satisfactory to the City, or at the option of the City, the City shall have the right to assume those obligations directly, including all benefits to be derived therefrom. Contractor hereby assigns to the City all of its interest in said orders and/or contracts, and the assignment of said orders and/or contracts shall be effective upon notice of acceptance by the City in writing, and only as to those orders and/or contracts which the City designates in writing. Following receipt of notice of termination, Contractor shall thereafter do only such work as may be necessary to preserve and protect portions of its work already in progress

and to protect materials and equipment on or in transit to the Project.

Upon such termination, Contractor shall be entitled to payment only as follows: (1) Contractor's direct, actual cost of the Work allocable to the portion of the Work completed in conformity with the Contract, but in no event to exceed the amount of the Contract Sum allocable to the portion of the Work completed in conformity with the Contract; plus (2) previously unpaid costs of any items delivered to the Project Site which were fabricated for subsequent incorporation in the Work, but in no event to exceed the portion of the Contract Sum allocable to said items; plus (3) an allowance of ten percent (10%) of the foregoing costs for Contractor's overhead and profit; plus (4) any proven losses with respect to materials and equipment directly resulting from the termination; plus (5) reasonable demobilization costs. The costs referred to in this Section shall be calculated and documented as required for a Change Order under Article 9 of these General Provisions, except that markup shall be only as allowed by this Section. There shall be deducted from such sums the amount of any payments made to Contractor prior to the date of the termination of this Contract. Contractor shall not be entitled to any claim or claim of lien against the City for any additional compensation or damages in the event of such termination and payment beyond that provided for in this Section.

In connection with any termination for convenience, Contractor shall allow the City and any of its authorized representatives to inspect, audit, or reproduce any records to the extent necessary for the City to evaluate and verify the costs incurred by Contractor in performing the Work, including direct and indirect costs such as overhead allocations. Contractor will make this material available upon 48-hours' written notice from the City. The City may inspect and copy, from time to time and at reasonable times and places, any and all information, materials and data of every kind and character (hard copy, as well as computer readable data if it exists), including without limitation, books, papers, documents, subscriptions, recordings, estimates, price quotations, agreements, purchase orders, leases, contracts, commitments, arrangements, notes, daily diaries, superintendent reports, drawings, receipts, vouchers, monthly, quarterly, yearly or other financial statements, and any and all other information or documentation that may, in the judgment of the City have any bearing on or pertain to any matters, rights, duties, or obligations under or covered by the Contract Documents. Such records shall include but not be limited to, the following: accounting records, payroll records, job cost reports, job cost history, margin analysis, written policies and procedures, subcontract files (contracts, correspondence, change order files, including documentation covering negotiated settlements), back charge logs and supporting documentation, general ledger entries detailing cash and trade discounts earned, insurance rebates and dividends, and any other documents customarily maintained by contractors performing work on public works projects or that the City otherwise deems necessary to substantiate charges related to a Termination.

If this Contract is terminated for default under Section 5.25, and if it is later determined that the default was wrongful, such default termination automatically shall be converted to and treated as a termination for convenience under this Section. In such event, Contractor shall be entitled to receive only the amounts payable under this Section, and Contractor specifically waives any claim for any other amounts or damages, including any claim for consequential damages or lost profits.

Section 5.25. Termination for Cause.

The City may terminate the Contract, pursuant to the provisions of this Article, for the following causes:

- A. The Contractor is insolvent or has made a general assignment for the benefit of creditors, or

a receiver has been appointed on account of the insolvency of the Contractor.

- B. The Contractor or any of its Subcontractors violate any of the provisions of the Contract Documents or fail to perform the work within the time specified in the current Contract Schedule.
- C. The Contractor or any of its Subcontractors should fail to make prompt payment to Subcontractors or material suppliers for material or for labor as required by statute.
- D. The Contractor or a Subcontractor persistently disregards laws, ordinances, or the instructions of the Owner's Representative, Architect, Consulting Engineer, or the City.
- E. The Contractor fails to abide by a Stop Work Notice or fails to correct rejected work or materials as required.
- F. The Contractor fails to provide and keep in full force and effect all required insurance or fails to cause all Subcontractors to so comply.
- G. The Contractor fails to supply a sufficient number of properly skilled workers or proper materials.
- H. The Contractor commits any substantial violation of the terms and conditions of the Contract Documents which the City, in its sole discretion, finds to be a material breach of the Contract.

The City may, without prejudice to any other right or remedy, give written notice to the Contractor and its surety or sureties of its intention to terminate the Contract.

Unless within seven (7) Calendar Days of the delivery of such notice, the Contractor shall cease such violation and make satisfactory arrangements for a correction thereof, which arrangements are set forth in a written agreement signed by the Contractor and the City, the Contractor's right to complete the Work shall cease and terminate.

In the event of any such termination, the City shall immediately give written notice thereof to the surety and to the Contractor and the surety shall have the rights and obligations set forth in the performance bond. If the City is forced to take over the Work, it may prosecute the same to completion by contract or by any other method it may deem advisable, for the account and at the expense of the Contractor, and the Contractor and its sureties shall be liable to the City for any excess costs, including management, supervision, and design support, occasioned thereby. In such event, the City may, without liability, take possession of and utilize in completing the Work, the Contractor's materials whether stored at the Site or elsewhere, that are necessary for completion. Contractor hereby assigns to the City all of its interest in orders and/or contracts existing at the time of termination. The assignment of said orders and/or contracts shall be effective upon notice of acceptance by the City in writing, and only as to those orders and/or contracts which the City designates in writing. Whenever the Contractor's right to proceed is terminated, the Contractor shall not be entitled to receive any further payment until the Work is finished.

Section 5.26. Option in Event of a Loss.

In the event that any destruction or loss should exceed twenty percent (20%) of the value of the

construction completed to date, as determined at the end of the preceding month, or is due to an “Act of God,” the City shall have the option, at its sole discretion, to terminate this Contract.

Section 5.27. Provisions for Termination of Contract.

This Contract is subject to termination as provided by Sections 4410 and 4411 of the Government Code, being portions of the Emergency Termination of Public Contracts Act of 1949.

Section 5.28. Termination After Contract Time.

In addition to any rights it may have, the City may terminate this Contract at any time after the Contract Time, as adjusted by any extensions of time that the City may have granted.

Upon such termination, in addition to the Contractor’s obligations under Section 5.29 and the other provisions of the Contract Documents, the Contractor shall not be entitled to receive any compensation for services rendered before or after such termination until the Work is completed, and the Contractor shall be liable to the City for liquidated damages for all periods of time from such termination date until the Date of Completion, as well as for all losses incurred by the City in completing the Work.

Section 5.29. Survival of Obligations.

No termination of this Contract or of Contractor’s Work shall excuse or otherwise relieve the Contractor of its responsibilities under the Contract Documents with respect to any Work performed prior to the date of termination, including, without limitation, its obligation to perform the Work in a good and workmanlike manner, free of defects, and in accordance with the Contract Documents, its warranty obligations with respect to the Work, and its obligation to make all payments due. All of Contractor’s responsibilities under the Contract Documents with respect to the Work performed prior to the date of termination shall survive any termination.

Section 5.30. Termination of Unsatisfactory Subcontractors.

When any portion of the Work that has been subcontracted by the Contractor is not being prosecuted in a satisfactory manner, or when materials supplied do not conform to the Contract Documents, the City may direct the Contractor to discharge the Subcontractor or supplier. Any Subcontractor or supplier which is discharged shall not again be employed on this Project.

Any termination of a Subcontractor pursuant to this Section shall be in strict conformity with the requirements of the Subletting and Subcontracting Fair Practices Act, Part 1 of Division 2 of the Public Contract Code, commencing with Section 4100.

ARTICLE 6. LEGAL RELATIONS AND RESPONSIBILITIES

Section 6.01. Compliance with Laws and Regulations.

The Contractor shall keep itself fully informed of and shall observe and comply with, and shall cause any and all persons, firms, or corporations employed by it or under it to observe and comply with all federal and state laws, and county or municipal ordinances, regulations, orders, and decrees which in any manner affect those engaged or employed on the Work, or the materials used in the Work, or in any way affect the conduct of the Work. No pleas of misunderstanding of such laws, ordinances, codes, regulations, orders or decrees or ignorance of the same on the part of the Contractor shall modify the provisions of the Contract Documents. The Contractor and the Contractor's surety shall indemnify and save harmless the City and the City's officers, officials, agents, employees, volunteers, members, affiliates and their duly authorized representatives against any claim for liability arising from, or based upon the violation of any such law, ordinance, regulation, order or decree, whether by the Contractor, the Contractor's employees, or any Subcontractor or supplier.

Attention is directed to certain laws that affect the Contract. The listing of these laws in this Section is not to be construed as a listing of all applicable laws. The Contractor is solely responsible for familiarity and compliance with all applicable laws.

A. Prevailing Wage Rate.

The Contractor shall pay, and shall cause all Subcontractors under it to pay, not less than the specified prevailing wage rates, including, but not limited to, overtime, Saturday, Sunday and holiday work, travel and subsistence, to all workers employed in the execution of this Contract. Pursuant to Chapter 1 of Part 7, Division 2 of the Labor Code, commencing with Section 1770, the Director of the California Department of Industrial Relations (DIR) of the State of California has determined the prevailing rate of wages in the locality in which the work on the project is to be performed for each craft, classification, or type of worker needed to execute this Contract. The prevailing rates so determined are on file with the City Clerk and they are available for public inspection. They may also be obtained on the internet at:

<http://www.dir.ca.gov/OPRL/DPreWageDetermination.htm>

Those prevailing wage rates hereby are incorporated in this Contract and made a part hereof.

The Contractor should contact the DIR as indicated in the prevailing wage determinations to obtain predetermined wage changes.

The responsibility to check prevailing wage rates is the Contractor's. In the event this Contract calls for work requiring any craft, classification, or type of worker for which the DIR has not specified a prevailing wage rate, the Contractor shall contact the Owner's Representative within ten days following the first advertisement to request a determination. After consultation with the DIR, the City will issue a determination of the prevailing wage for the specified work, and the Contractor and all Subcontractors shall pay each worker engaged in the specified work not less than those rates. Pending such determination, the wages may be assumed to be those in the applicable collective bargaining agreement, but no adjustment in the Contract Sum shall be made if such assumption is incorrect.

The Contractor shall obtain and post copies of all applicable prevailing wage rates in a prominent place at the job site, in accordance with the regulations of the Department of Industrial Relations.

B. Hours of Work; Approval of Schedules.

Eight (8) hours of labor constitutes a legal day's work, and forty (40) hours constitutes a legal work week. No worker employed at any time by the Contractor, or by any Subcontractor upon the Project, shall be required or permitted to work more than eight (8) hours in any one calendar day or forty (40) hours in any one week, except as provided in Labor Code Sections 1810 through 1815.

Overtime shall be paid at the rate of not less than one and one-half (1-1/2) times the basic rate of pay, or at such higher rate as may be required by the DIR, applicable statutes or collective bargaining agreements.

The City reserves the right to approve or disapprove the days scheduled for work, and the hours during which work is in progress. Overtime and shift work may be established by the Contractor with reasonable notice and the written permission of the City. No work other than overtime and shift work shall be done between the hours of 6:00 p.m. and 7:00 a.m., except such work as is necessary for the proper care and protection of the work already performed or except in case of an emergency. Failure of the Contractor to perform the work in accordance with this policy shall be deemed to be a failure on the Contractor's part to comply with the Contract and is cause for termination.

C. Records of Hours Worked and Wages.

All public works projects are subject to compliance monitoring and enforcement by the Department of Industrial Relations in accordance with Section 1771.4 of the Labor Code. The Contractor and all Subcontractors shall furnish the records specified in Section 1776 directly to the Labor Commissioner in accordance with Section 1771.4. The Contractor shall maintain, and shall cause all its Subcontractors to maintain, records of the hours and wages of all employees employed on the Project, and those records shall be open at all times for inspection by the City and/or the Division of Labor Standards Enforcement of the Department of Industrial Relations, in accordance with Sections 1776 and 1812 of the Labor Code.

The Contractor shall not carry on its payrolls any person not actually employed by the Contractor, nor shall it carry on its payrolls employees of a Subcontractor. The Contractor shall show on its payrolls all persons actually employed by the Contractor on the Project, in any capacity. The Contractor shall supervise all Subcontractors to ensure that all Subcontractors comply with this Section.

The Contractor shall provide, and shall require all Subcontractors to provide, on a monthly basis, included with the progress payment request and the final payment request, verification of the actual wages paid to any or all employees on the Project, including but not limited to copies of timecards, payroll checks and stubs, job cost detail ledger for labor, evidence of payment of benefit contributions, and any other records necessary to establish compliance. The Contractor shall submit the monthly certified payrolls for all workers employed at the Site directly to the Owner's Representative with the monthly progress payment request. Failure to submit timely, complete certified payrolls or the other documents described in this section shall entitle the City to withhold payment from the Contractor. Additionally, in the event of noncompliance with this

section, the Contractor shall have 10 days in which to comply subsequent to receipt of written notice specifying in what respects the Contractor must comply. In the event of continued noncompliance, the penalties specified in subdivision (h) of the Labor Code section 1776 may be deducted from progress payments to the Contractor.

In accordance with Government Code Section 8546.7, or any amendments thereto, all books, records, and files of the Contractor, or any Subcontractor connected with the performance of this Contract, shall be subject to examination and audit by the Auditor General for a period of three (3) years after final payment. Contractor shall preserve and cause to be preserved such books, records and files for the audit period.

D. Underpayment of Wages; Penalties.

The Contractor agrees that in the event of underpayment of wages to any employee on the Project, whether by the Contractor or any Subcontractor, the City may retain from payments due to the Contractor, an amount sufficient to pay such worker the difference between the wages required to be paid by the DIR, and the wages actually paid such worker for the total number of hours worked. The City may disburse such retention to such employees.

In accordance with Articles 2 and 3, Chapter 1, Part 7, Division 2 of the Labor Code, particularly Sections 1775 and 1813, the Contractor shall forfeit to City as a penalty the sum specified below, over and above any retention or withholds otherwise authorized by the agreement, as follows:

1. Fifty dollars (\$50) for each calendar day, or portion thereof, for each worker paid less than the applicable prevailing wages for any work done under this Contract by him/her or any Subcontractor above him/her; and/or
2. Twenty-five dollars (\$25) for each worker employed in the execution of this agreement by the Contractor or by any Subcontractor for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week and to whom applicable overtime rates have not been paid.

E. Apprentices.

Attention is directed to the provisions of Sections 1777.5, 1777.6 and 1777.7 of the Labor Code concerning the employment of apprentices by the Contractor or any Subcontractor under it.

The Contractor and all Subcontractors under it shall comply with the requirements of Section 1777.5 and Section 1777.6 in the employment of apprentices. Violation of these requirements shall subject the Contractor and/or Subcontractor to the penalties set forth in Section 1777.7 of the Labor Code and/or otherwise provided by law or Contract.

Information relative to apprentice standards, wage schedules, and other requirements may be obtained from the Director of Industrial Relations, ex-officio the Administrator of Apprenticeship, San Francisco, California, or from the Division of Apprenticeship Standards and its branch offices. Adequate supervision of all apprentices shall be maintained at all times by the Contractor and any Subcontractor employing the apprentice.

F. Workers' Compensation.

Pursuant to Labor Code section 1860, in accordance with the provisions of Section 3700 of the Labor Code, the Contractor is required to secure the payment of workers' compensation to its employees. See also Article 3 of these General Provisions.

G. Compliance with State Anti-Discrimination Laws.

The Contractor shall comply with Section 1735 of the Labor Code, which provides 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 disability, mental disability, 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 [Chapter 1 of Part 7, Division 2 of the Labor Code]."

H. Fair Labor Standards.

The Contractor shall comply with the Fair Labor Standards Act of 1938 as amended (29 U.S.C. § 3201 et seq.) as applicable.

I. Contractor's License.

The Contract shall comply, and cause its Subcontractors to comply, with the requirements of the California State Licensing Board and to have a valid contractor's license which is to be active as to the date of the receipt of bids and maintained in "Good Standing" from the receipt of bids throughout the Project.

J. Use of Pesticides.

The Contractor shall comply with all rules and regulations that govern the use of pesticides required in the performance of the Work, including any certifications that may be required for purchase, use, storage or application.

Pesticides include, but are not limited to, herbicides, insecticides, fungicides, rodenticides, germicides, nematocides, bactericides, inhibitors, fumigants, defoliant, desiccants, soil sterilants and repellants.

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.

K. Reporting Requirements and Sanctions.

Failure to provide specific information, records, reports, certifications, or any other documents required for compliance with the Contract Documents will be considered noncompliance. The minimum documents required include the following:

1. List of Subcontractors: Required from the Contractor and each Subcontractor with a lower tier subcontractor; due within ten (10) Calendar Days after the date of the pre-construction conference or within ten (10) Calendar Days after the date of award of

the subcontract, whichever date is later.

2. Certified Payroll Reports: Required from the Contractor and each Subcontractor, regardless of the subcontract amount or the type of procurement, for every payroll period in which work is performed; due with each progress payment application and the final payment application.
3. Fringe Benefit Statement: Required from the Contractor and each Subcontractor if fringe benefits are paid to an approved plan, fund or program; due with first certified payroll report and any time the fringe benefit amounts change; not required if the fringe benefits are paid in cash to the employees.
4. Other Documentation: When required by the Special Provisions, other reporting documentation may be required depending on the funding for the project.

If the Contractor fails to comply with the reporting requirements of the Contract Documents, the Contractor will be advised of the specific deficiencies and requested to make immediate correction. The Contractor will be advised that payments will be withheld for failure to make corrections or cure delinquencies.

Section 6.02. Responsibility of the Contractor.

The Work shall be under the Contractor's responsible care and charge until completion and final acceptance, and the Contractor shall bear the entire risk of injury, loss, or damage to any part by any cause. The Contractor shall rebuild, repair, restore, and make good all injuries, losses, or damage to any portion of the Work or the materials occasioned by any cause, and shall bear the entire expense.

The mention herein of any specific duty or responsibility imposed upon the Contractor shall not be construed as a limitation or restriction of any other responsibility or duty imposed upon the Contractor by the Contract, said reference being made herein merely for the purpose of explaining the specific duty or responsibility.

The Contractor shall do all of the work and furnish all labor, materials, tools, equipment, and appliances, except as otherwise herein expressly stipulated, necessary or proper for performing and completing the Work herein required, including any change order work or disputed work directed by the City in conformity with the true meaning and intent of the Contract Documents, within the time specified.

Section 6.03. Subcontracting.

If the Contractor subcontracts any work to be performed or materials to be supplied pursuant to this agreement, the Contractor shall be as fully responsible to the City for the acts and/or omissions of such Subcontractor or supplier and of the persons either directly or indirectly employed or engaged as Subcontractors by such Subcontractor or supplier as it is for its own acts and omissions.

The City and its representatives will deal only with the Contractor, and the Contractor shall be responsible for the proper execution of the Work. Any and all discussions between any Subcontractor or supplier and the City or any of its representatives shall be initiated through the Contractor or its representative.

The Contractor shall bind every Subcontractor or supplier, and every subcontractor of a Subcontractor, by the terms of the Contract Documents. The Contractor shall include provisions in every Subcontract that the Contract between the Contractor and the City is part of the Subcontract, and that all terms and provisions of the Contract are incorporated in the Subcontract. Copies of all Subcontracts shall be available to the City upon written request.

Nothing contained in the Contract Documents shall create any contractual relationship between any Subcontractor or supplier and the City or any of its representatives, nor shall this Contract be construed to be for the benefit of any Subcontractor or supplier.

The Contractor shall not perform work on the Project with a Subcontractor who is ineligible to perform work on public works project pursuant to Labor Code sections 1777.1 or 1777.7.

If, through acts or neglect on the part of the Contractor, including failure to supervise and control its Subcontractors or suppliers, any other contractor, Subcontractor or supplier, or worker suffers loss or damage, the Contractor agrees to settle with such other contractor, Subcontractor, supplier, or worker by agreement or arbitration, if such other contractor, Subcontractor, or worker shall assert any claim against the City or any of its officers, agents, or employees, on account of any damage alleged to have been so sustained.

In the event of the receipt of any such claim, the City shall notify the Contractor, who shall defend, indemnify, and save harmless the City and all of its officers, agents, and employees against any such claim.

Section 6.04. Listing of Subcontractors.

The Contractor shall comply with the requirements in the Instructions to Bidders regarding the listing of Subcontractors and shall comply with the requirements of the Subletting and Subcontracting Fair Practices Act, Chapter 4 of Part 1 of Division 2 of the Public Contract Code, commencing with Section 4100, forbidding bid shopping and bid peddling, requiring accurate listing of all Subcontractors, and requiring Subcontractors to be licensed.

Should the Contractor violate any of the provisions of this Section, the violation shall be deemed a breach of this contract and the City shall have all remedies provided by California law, including but not limited to those provided in Public Contract Code Section 4110, allowing termination of the Contract or a penalty assessment of ten percent (10%) of the subcontract amount.

Section 6.05. General Safety and Protection Requirements.

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work, for maintaining all safety and health conditions on the Site and for ensuring against and/or correcting any hazardous conditions on the Site. Also, in no case shall the City, the Owner's Representative, the Architect or Consulting Engineer, the Inspector, or their agents, employees or representatives, have either direct or indirect responsibility for the means, methods, techniques, sequences or procedures utilized by the Contractor, or for safety precautions and programs in connection with the Work, or for maintaining any safety or health conditions on the Site, or for ensuring against or correcting any hazardous conditions on the Site.

The Contractor shall comply with all Occupational Safety laws, rules and regulations applicable to the work.

A. Protection of Persons and Property.

The Contractor shall always, until final acceptance and payment hereunder, maintain adequate protection against injury to persons, including employees, or damage to property, on or near the Project, or adjacent to the Site. The Contractor shall be responsible for maintaining all safety and health conditions on the Site and for ensuring against and/or correcting any hazardous conditions on the Site. In no case shall the City, the City's Representative, the Architect, Consulting Engineer, Project Inspector or their agents, employees or representatives, have either direct or indirect responsibility for maintaining any safety or health conditions, or for ensuring against or correcting any hazardous conditions, on or near the Site, or adjacent to the Site.

The Contractor shall provide a safe environment for all functions to be performed by the Owner's Representative, Architect, Consulting Engineer and Project Inspector, and a safe place for all employees to work.

The use of alcohol or drugs will not be permitted on City property.

B. Protection and Repair of Work.

The Contractor shall protect the City's structures, facilities, equipment, tools, materials, and any other property on or adjacent to the Site against damage, loss, or theft by providing adequate security measures for its work. The Contractor shall, until final payment hereunder, maintain protection of all of its work and work performed by others under this Contract from damage, loss, defacement, or vandalism. The Contractor shall provide protection of completed work which may be subject to damage as a result of the Contractor's failure to perform as scheduled.

The Contractor shall repair or replace any damage and remove any damaged or defaced material and/or equipment from the Site at no cost to the City.

C. Protection of Workers.

The Contractor shall take every precaution for the safety of all employees and others on the Work, and to comply with all applicable provisions of federal, state and local safety laws and building codes to prevent accidents or injury to persons on, about, or adjacent to the premises where the Work is being performed.

The Contractor shall erect and properly maintain at all times, as required by the conditions and progress of the Work, all necessary safeguards for the protection of workers and the public, and shall post danger signs warning against hazards created by construction including, but not limited to, protruding nails or reinforcing steel, hod hoists, elevator hatchways, scaffolding, window openings, stairways, and falling materials.

The Contractor shall immediately replace or repair any unsafe ladder, scaffolding, shoring, or bracing, or correct any other dangerous or hazardous situation that may exist.

The responsibility for maintaining a safe working site shall be the Contractor's, and the City, Owner's Representative, Architect, Consulting Engineer and Project Inspector undertake no obligation to suspend the work or notify the Contractor of any hazardous conditions or noncompliance with safety laws. In no case shall the City, the Owner's Representative, the

Architect, Consulting Engineer, Project Inspector, or their agents, employees or representatives, have either direct or indirect responsibility for maintaining any safety or health conditions, or for ensuring against or correcting any hazardous conditions on the Site.

D. Working Limits and Regulations.

The Contractor shall confine its apparatus, storage and materials, and construction operations within the limits established by the Owner's Representative and shall not unreasonably encumber the Site or adjacent areas with its materials and/or equipment.

The Contractor shall enforce any instructions from the City or the Owner's Representative regarding fires, placement of signs, danger signals, barricades, radios, noise and smoking.

E. Overloading.

The Contractor shall determine safe loading capacities and shall not overload any structure beyond its safe capacity during construction. In addition to assuming full responsibility for bodily injury and/or property damage resulting from any such overloading, the Contractor shall repair to the City's satisfaction or reimburse the City for the costs of repairing any damage resulting therefrom.

F. Protection of Existing Improvements.

The Contractor shall clean the portions of existing improvements and facilities which are used by, traversed, or dirtied by the workers on the Work, normal maintenance due to use by City employees or the public excepted.

All existing improvements and facilities shall be protected from any damage resulting from the operations, equipment, or workers of the Contractor during the course of the construction.

The Contractor shall take all necessary precautions to protect existing facilities against the effects of the elements and Contractor shall be strictly liable for failure to adequately protect any facility.

All damaged improvements and facilities shall be replaced, repaired, and restored to their original condition without additional cost to the City and without an extension of the Contract Time.

G. Security of the Site.

The Contractor is responsible for the security of the Site.

H. Removal of Barricades.

Upon completion of the work, the Contractor shall remove from the Site all materials used for barricades, temporary scaffolding, or any other temporary uses.

I. Protection of Adjacent Property; Notices.

In addition to any requirements imposed by law, the Contractor shall shore up, brace, underpin, and protect as may be necessary all foundations and other parts of all existing structures on the Site or adjacent to the Site which are in any way affected by the excavations or other operations connected with the completion of the Work.

Prior to excavation, the Contractor shall contact USA Underground Service Alert and shall obtain from them the location of underground utilities.

Prior to commencing any work which in any way affects adjoining or adjacent land or buildings thereon, or public utilities, the Contractor shall notify the Owner's Representative, who will send the City and occupants thereof a notice, which specifies the type of work to be done, the schedule of the work, the impacts expected from the work and the protective measures being taken by the Contractor. The notice shall also specify that any person receiving notice who has questions regarding it may contact the Owner's Representative.

Whenever any notice is required to be given to any adjoining or adjacent landowner, utility, governmental agency or other party before commencement of any work, the notice shall be given by the Contractor at least seven (7) days in advance of the work, or longer if required by law or regulation, with a copy delivered to the Owner's Representative.

The Contractor shall, at the written instruction of the Owner's Representative, meet with any recipient of such notice to explain and discuss the proposed work.

J. Fire Protection.

The Contractor shall take all steps necessary to protect all structures from fires and sparks originating from the Work, shall comply with all laws and regulations regarding fire protection, and shall comply with all instructions of the fire department with jurisdiction.

The Contractor shall notify the Owner's Representative and the fire department in writing at least seventy-two (72) hours prior to disconnection of either water or electrical service to the Site and shall comply with the fire department's instructions regarding fire safety.

The Contractor must keep fire detection systems operational throughout the duration and scope of its work.

K. Repairs or Replacement.

Any damage to existing conditions, or to any other improvement or property above or below the surface of the ground, whether private or public, arising from performance of this Contract shall be repaired within forty-eight (48) hours by the Contractor without expense to the City, unless disruption of City operations or creation of a safety hazard has occurred, in which case damage will be corrected immediately.

If, in the opinion of the Architect or Consulting Engineer, the best interest of the City requires that repairs be made prior to the execution of any further work, the Owner's Representative will so notify the Contractor who shall delay or discontinue that part of the Work until the necessary repair has been made. Such delay shall be considered non-compensable, and no extension of the Contract Time will be granted therefor.

Upon the failure of the Contractor to comply with any such order, or upon the Contractor's failure to make immediate emergency repairs which are necessary to protect the Work, the City shall do that work itself as is necessary to protect life and property, in its sole discretion, and deduct the total cost of such work from the next progress payment. No prior notice to the Contractor shall

be necessary for the City to take this action.

L. Emergency Safety Actions.

In an emergency affecting the safety of life or property, including adjoining property, the Contractor, without previous instructions or authorizations from the City, is authorized and shall act at its discretion and risk to prevent such threatened loss or injury, and the Contractor shall bear all costs of that action. The Contractor shall immediately notify the Owner's Representative of such actions, and thereafter shall comply with any instructions issued by the Owner's Representative.

Section 6.06. Asbestos Related Work.

All work involving asbestos containing material must be performed in accordance with California Labor Code, sections 6501.5 through 6510, inclusive, and California Administrative Code, Title 8, Section 5208 and all other pertinent laws, rules, regulations, codes, ordinances, decrees and orders.

Section 6.07. Air Pollution Control.

The Contractor shall comply with all air pollution control laws, statutes, rules, regulations and ordinances, including, without limitation, all County of Sacramento and City of Folsom air pollution control rules, regulations, and ordinances, which apply to any work performed pursuant to the Contract Documents.

Section 6.08. Water Pollution

The Contractor shall comply with all City of Folsom rules, regulations, ordinances and statutes which apply to water pollution, including Section 7-1.01G of the State Specifications and the City's NPDES permit requirements.

Unless provided by the City as part of the Contract Documents, within ten (10) Calendar Days of the Notice to Proceed, the Contractor shall prepare and submit to the City for approval a Storm Water Pollution Prevention Plan (SWPPP). The Contractor shall conduct all of its operations and shall cause its Subcontractors and suppliers to conduct their operations, related to the Project so as to comply with the approved SWPPP. Failure to comply with the approved SWPPP shall subject the Contractor to a withholding of ten percent (10%) of each progress payment until the Contractor, Subcontractor or supplier is in compliance, in addition to any actual damages suffered by the City as a result of the noncompliance.

Section 6.09. Sound Control Requirements.

The Contractor shall comply with all local sound control and noise level rules, regulations and ordinances which apply to any work performed pursuant to the Contract Documents.

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.

Section 6.10. Indemnification.

The Contractor shall defend, indemnify and save harmless the City, the Owner's Representative, the Architect, the Consulting Engineer and any of their respective officers, officials, agents, and employees from any and all claims, demands, damages, costs, expenses, attorney's fees, or liability arising out of or in any way connected with the performance or attempted performance of the provisions hereof, or in any way arising out of or connected with this Contract, including but not limited to, inverse condemnation,

equitable relief, or any acts or omissions, any wrongful act, or any negligent act or omission to act, whether active or passive, on the part of the Contractor or any of its agents, employees, independent contractors, Subcontractors or suppliers; provided, further, without limiting the foregoing, that the indemnity is intended to apply to any wrongful acts, or any actively or passively negligent acts or omissions to act, committed jointly or concurrently by the Contractor, the Contractor's agents, employees, independent contractors, Subcontractors or suppliers, and the City, its agents, employees, or independent contractors.

The indemnity obligation expressly extends to and includes any and all claims, demands, damages, costs, expenses, or liability occasioned as a result of damages to adjacent property caused by the conduct of the Work.

The indemnity obligation expressly extends to and includes any and all claims, demands, damages, costs, expenses, or liability occasioned as a result of the violation by the Contractor, the Contractor's agents, employees, or independent contractors, Subcontractors or suppliers of any provisions of federal, state or local law, including applicable administrative regulations.

The indemnity obligation also expressly extends to and includes any claims, demands, damages, costs, expenses, or liability occasioned by injury to or death of any person, or any property damage to property owned by any person while on or about the Site or as a result of the Work, whether such persons are on or about the Site by right or not, whenever the Work is alleged to have been a contributing cause in any degree whatsoever.

Nothing contained in the foregoing indemnity provisions shall be construed to require the Contractor to indemnify the City in contravention of Section 2782 of the Civil Code for the sole negligence or willful misconduct of the City or its agents, employees or independent contractors.

In claims against any person or entity herein indemnified that are made by an employee of the Contractor or an employee of any of the Contractor's agents, independent contractors, Subcontractors or suppliers, a person indirectly employed by the Contractor or by any of the Contractor's agents, independent contractors, Subcontractors or suppliers, or anyone for whose acts the Contractor or any of the Contractor's agents, independent contractors, Subcontractors or suppliers may be liable, the indemnification obligation herein shall not be limited by any limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or the Contractor's agents, independent contractors, Subcontractors or suppliers under workers' compensation acts, disability acts, or other employee benefit acts.

The indemnification obligations herein shall not be limited by any assertion or finding that the person or entity indemnified is liable by reason of a non-delegable duty.

The indemnities set forth herein shall not be limited by the insurance requirements set forth in the Contract Documents.

The indemnification requirements herein set forth shall extend to claims occurring after this Contract is terminated as well as while it is in force.

Section 6.11. Indemnification of Adjacent Property Owners.

In the event the Contractor enters into any agreement with the owners of any adjacent property to enter upon or adjacent to such property for the purpose of performing this Contract, the Contractor shall fully indemnify, defend and save harmless such person, firm, or corporation, state or other governmental agency which owns or has any interest in the adjacent property. The form and content of the indemnification agreement shall be approved by the City prior to commencement of any work on or about such property. These provisions shall be in addition to any other requirements of the owners of adjacent property.

Section 6.12. Contractor's Legal Address; Written Notice.

Both the address given in the Bid and the Contractor's office in the vicinity of the Work are designated as places that samples, notices, letters or other articles or communications to the Contractor may be mailed or delivered. The delivery to either of these places shall be deemed sufficient service to the Contractor and the date of such service shall be the date of delivery. Written notice may be accomplished by personal delivery, United States mail, telegram, facsimile or any other form of commercially accepted communication. The written notice shall become effective upon delivery. Delivery is complete when the notice is hand-delivered to the Contractor's address given in the Bid or its job-site office; or when the facsimile transmission is complete; or two days after mailing by U.S. mail; or upon actual delivery as evidenced by a delivery receipt.

The address named in the Bid may be changed at any time by written notice from the Contractor to the City.

Nothing herein shall be deemed to preclude or render inoperative the service of any drawing, sample, notice, letter or other article or communication to the Contractor.

Section 6.13. Contractor Not Agent, Nor Employee.

Neither the Contractor nor any Subcontractor, or any officer, agent, or employee of either, is, nor shall they represent themselves to be, an agent, employee or other representative of the City for any purpose whatsoever.

No person employed by the Contractor, or by any Subcontractors, are, nor shall they be construed to be in any manner or for any purpose whatsoever, agents, employees, or representatives of the City.

Nothing in the Contract Documents shall be construed to create any relationship of joint venture, partnership, or other association of any nature whatsoever between the City and the Contractor other than that of owner and independent contractor. The City shall have the right to direct the Contractor as provided in the Contract Documents. The aforementioned right of supervision shall not reduce or abrogate the Contractor's liability for all damage or injury to persons, public property or private property that may arise directly or indirectly from the Contractor's execution of the Work.

Section 6.14. Conflict of Interest.

No official of the City who is authorized on behalf of the City to negotiate, make, accept, or approve, any architectural, engineering, inspection, construction, or materials supply contract, or any subcontract in connection with the construction of the Project, or any land acquisition in connection with the Project, shall become directly or indirectly interested personally in this Contract or in any part thereof.

No officer, employee, architect, attorney, engineer, or inspector of or for the City who is authorized on behalf of the City to exercise any executive, supervisory, or other similar function in connection with the construction of the Project shall become directly or indirectly interested personally in this contract or any part thereof.

Section 6.15. Third Party Claims.

The Contractor shall be responsible for all third-party claims and costs or injuries incurred by a third party which result from the operations of the Contractor.

Section 6.16. Assignment of Contract.

The Contract or the performance of the Contract may be assigned by the Contractor, but only upon written consent of the City, which consent the City has the sole discretion to refuse for any reason whatsoever, and the consent of the Contractor's surety, unless the surety has waived its right of notice of assignment. No such assignment or subcontracting shall be permitted that would relieve the Contractor or the Contractor's surety of their responsibilities under the Contract Documents

Section 6.17. Assignment of Monies.

The Contractor may assign monies due the Contractor under the Contract, and such assignment will be recognized by the City, if given proper notice, to the extent permitted by law. Any assignment of monies shall be subject to all deductions provided for in the Contract Documents. Any money withheld may be used by the City for the completion of the Work if the Contractor defaults.

Section 6.18. Permits and Licenses.

The Contractor shall, at the Contractor's sole expense, obtain all necessary permits and licenses for the construction of the Work, give all necessary notices and pay all fees required by law relating to the Work. The Contractor shall also procure all permits and licenses necessary for the normal conduct of the Contractor's business and construction operations.

Unless otherwise noted in the Special Provisions, building, plumbing, heating, electrical and similar permits which the Contractor is required to obtain from the City Building Inspection Divisions for City owner projects are fee exempt and will be obtained by the City.

The California Environmental Quality Act of 1970 (CEQA) may be applicable to permits, licenses, and other authorizations that the Contractor shall obtain from local agencies in connection with performing the Work. The Contractor shall comply with the provisions of CEQA in obtaining such permits, licenses, and other authorizations, which will be obtained in time to prevent delays to the Work.

The Contractor shall comply with permits, licenses, or other authorizations applicable to the Work obtained by the City in conformance with the requirements in CEQA.

Section 6.19. Patents and Royalties.

All fees, claims, or royalties for any patented or copyrighted invention, article, arrangement, or plan that may be used upon or in any manner connected with the doing of the work or any part thereof shall be included in the price bid for doing the work. The Contractor and its sureties shall protect and hold harmless the City, Owner's Representative, Architect, Consulting Engineer and their consultants, Project Inspector, and each of their respective officers, agents, and employees against any and all demands made

for such fees or claims and against any and all suits, demands, claims or causes of action brought or made by the holder of any invention, patent, copyright, or trademark, or arising from any alleged infringement of any invention, patent, copyright, or trademark.

Before final payment is made on account of this Contract, the Contractor shall furnish acceptable proof to the City of proper release from all such fees or claims.

Section 6.20. Approval of Contractor's Plans No Release from Liability.

The review or approval by the City of any working drawing or any method of work proposed by the Contractor shall not relieve the Contractor of any of the Contractor's responsibility for any errors and shall not be regarded as any assumption of risk or liability by the City or any officer, official, agent, employee, or representative of the City. The Contractor shall have no claim under the Contract because of the failure or partial failure or inefficiency of any reviewed or approved plan or method. City review or approval means that the City has no objection to the Contractor using the proposed plan or method at the Contractor's responsibility and risk.

Section 6.21. Providing and Paying for Materials.

Except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, products, articles, processes, labor, tools, equipment, and installation, and all associated superintendence of every nature whatsoever necessary to execute and complete the Work within the Contract Time.

Section 6.22. Warranty of Title.

No material, article, product, supplies, or equipment for the Work shall be subject to any chattel mortgage, or a conditional sale or other agreement by which an interest therein or in any part thereof is retained by the seller or supplier.

The Contractor warrants good and sufficient title to all material, supplies, and equipment installed or incorporated in the Work, and 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.

The Contractor agrees that neither it nor any person, firm, or corporation furnishing any materials or labor for any work covered by this Contract shall have any right to a lien upon the premises or any improvement or appurtenances thereon; provided, however, that nothing contained in this Section shall defeat or impair the rights of persons furnishing materials or labor under the payment bond given by the Contractor, nor any rights under any law permitting such persons to look to funds due to the Contractor but retained by the City.

The Contractor shall cause the provisions of this Section to be inserted in all subcontracts and material contracts executed by the Contractor and notice of this provision shall be given to all persons furnishing materials for the Work.

This Section shall not disallow the Contractor's installing any devices or equipment of utility companies or of governmental agencies, the title to which is commonly retained by the utility company or the agency.

Section 6.23. Rights and Remedies.

The duties and obligations of the Contractor imposed by the Contract Documents and the rights and remedies of the City available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

The failure of the City or its officials, officers, employees, agents, or of the Owner's Representative, the Project Inspector, Architect or Consulting Engineer to insist in any one or more instances upon the strict performance of any one or more of the provisions of this Contract or to exercise any right herein contained or provided by law, shall not be construed as a waiver or relinquishment of the performance of such provision or right(s) or of the right to subsequently demand such strict performance or exercise such right(s) and the rights shall continue unchanged and remain in full force and effect.

The Contractor agrees that it can be adequately compensated by money damages for any breach of this Contract which may be committed by the City or its officials, officers, employees, agents, or by the Owner's Representative, the Project Inspector, Architect or Consulting Engineer, and hereby agrees that no default, act or omission of the City or its officials, officers, employees, agents, or of the Owner's Representative, the Project Inspector, Architect or Consulting Engineer shall constitute a material breach of the Contract entitling the Contractor to cancel or rescind the provisions of the Contract or to suspend or abandon performance of all or any part of the Work. The Contractor hereby waives any and all rights and remedies to which it might otherwise be or become entitled, saving only its right to money damages.

Section 6.24. Guarantee Required.

In addition to any guarantees required elsewhere by the Contract Documents, the Contractor shall guarantee the Work for a minimum of two (2) years from and after the recordation of the Notice of Completion and completion of all contract obligations by the Contractor, including formal acceptance of the entire Project by the City. The Contractor specifically waives any right to claim or rely on the statutory definition of completion set forth in Civil Code section 3086. The Contractor specifically acknowledges and agrees that completion shall mean the Contractor's complete performance of all Work required by the Contract Documents, amendments, change orders, construction change directives and punch lists, and the City's formal acceptance of the entire Project, without regard to prior occupancy, substantial completion doctrine, beneficial occupancy, or otherwise. Such guarantee shall be made on the form provided by the City.

The guarantee period for corrected defective work shall continue for a duration equivalent to the original guarantee period.

Such guarantee is in addition to, and not in lieu of, the City's rights to enforce this Contract in all respects.

Section 6.25. Anti-Trust Assignment.

By execution of the Contract Documents, or any subcontract awarded by the Contractor, the Contractor or any Subcontractor offers and agrees to assign and hereby does assign to the City all rights, title, and interest in and to all causes of action the Contractor or Subcontractor may have under Section 4 of the Clayton Act (15 USC Section 15) or under the Cartwright Act (Chapter 2 of Part 2 of Division 7 of the Business and Professions Code, commencing with Section 16700), arising from purchases of goods, services, or materials pursuant to this public works contract or subcontract. This assignment shall be made and shall become effective at the time the City tenders final payment to the Contractor, without further acknowledgment by the parties.

Section 6.26. Access to Records.

The City or the City's authorized representative shall have access, upon reasonable notice, during normal business hours, to any books, documents, accounting records, papers, project correspondence, project files, scheduling information and other relevant records of the Contractor and all Subcontractors directly or indirectly pertinent to the Work, original as well as change and claimed extra work, to verify and evaluate the accuracy of cost and pricing data submitted with any change order prospective or executed, or any claim for which additional compensation has been requested.

Such books, documents and other records mentioned above shall include, but are not limited to all those reasonably necessary in the opinion of the City to determine the accurate amount of direct and indirect costs, job site, area and home office overhead, delay and impact costs, however characterized, and shall include the original bid and all documents related to the bid and its preparation, as well as the as-planned Contract Schedule and all related documents.

Such access shall include the right to examine and audit such records, and make excerpts, transcriptions, and photocopies at the City's cost.

Section 6.27. Liability of City.

Neither the City, nor any of its officers, agents, employees, or representatives shall be responsible for any liability arising under this Contract, except such obligations as are specifically set forth herein.

Section 6.28. No Verbal Agreements.

No verbal agreement or conversation with any officer, agent, or employee of the City, either before, during, or after the execution of the Contract Documents shall affect or modify any term or condition contained in the Contract Documents, nor shall such verbal agreement or conversation entitle the Contractor to any additional payment or time to perform whatsoever under the terms of this agreement.

Section 6.29. Unenforceability of any Clause.

If any clause or provision of the Contract Documents is held to be unenforceable or invalid, then that provision of the Contract shall be stricken and the remaining portion shall remain in full force and effect.

ARTICLE 7. PROSECUTION OF THE WORK

Section 7.01. Beginning Work

The return of the executed contract, together with the prescribed bonds and certification of insurance, and when required, advance on incidental expenses and acquisitions, shall constitute authority for the Contractor to enter upon the Project Site and to begin operations. Should the Contractor start work in advance of receiving notice that the Contract has been executed by the City, any work performed by the Contractor shall be at the Contractor's own risk.

The pre-construction conference must be conducted before any work shall commence.

Should the Contractor desire to begin work prior to the execution of the Contract, the Contractor shall furnish to the City insurance certificates covering said operations in the type and amount set forth in the Contract Documents.

The Contractor shall give the City at least five (5) Working Days' notice of its intention to start work, specifying the time, date and location at which the Contractor intends to begin.

The counting of Working or Calendar Days shall begin ten (10) Calendar Days from the date the Contractor receives the Notice to Proceed. The Notice to Proceed will be sent by certified mail or hand delivered to the Contractor. In no event shall there be a period of time greater than thirty (30) Calendar Days from the time the Contract forms are first received by the Contractor and the commencement of the Contract Time, regardless of the receipt or lack thereof of signed documents or completion or lack thereof of provisions regarding required bonds and certificates.

When the Contractor has started work on the Project, the Contractor shall diligently prosecute the work to completion within the time limit provided in the Contract Documents.

Section 7.02. Pre-Construction Conference and Progress Meetings.

Prior to beginning work a pre-construction conference shall be held for the purpose of reviewing the Work. The Contractor must attend this pre-construction conference, and shall invite Subcontractors and others necessary to ensure all topics are adequately covered. Topics discussed include, but are not limited to, mobilization, access, temporary facilities, utilities, Subcontractors, schedules, procedures, correspondence, progress payments, payroll records, storm water pollution prevention plans (SWPPP), coordination, safety, after-hour contacts for Contractor and City personnel, quality control/quality assurance, personnel assignments, and other topics as appropriate.

Progress meetings, as stipulated in the Special Provisions or as required by the City, will be conducted throughout the duration of the Contract. The purpose of these meetings is to inform, discuss, and resolve issues related to the Work; the Contractor or the Contractor's agent shall attend. Topics discussed include, but are not limited to, progress, schedules, safety, SWPPP, Requests for Information, Change Orders, Field Instructions, field coordination, Submittals, quality control/quality assurance, testing, startup, safety, and other topics related to the Work.

Section 7.03. Initial Contract Schedule.

No later than seven (7) Calendar Days after receiving Notice to Proceed, the Contractor shall furnish to the Owner's Representative one hard copy and one copy in electronic format (CD or 3-1/2" Windows-format floppy disk) of an Initial Contract Schedule.

The Initial Contract Schedule shall be based on and incorporate the Contract Milestone and Completion Dates specified in the Contract Documents.

The Initial Contract Schedule shall indicate the detailed plan for the work to be completed in the first ninety (90) days of the Contract; details of planned mobilization of plant and equipment; sequence of early operations; and procurement of materials and equipment. Work beyond ninety (90) days shall be shown in summary form.

- A. The Initial Contract Schedule shall be a time-scaled Critical Path Method (CPM) type schedule, prepared in Microsoft Project or Primavera software, or equal software subject to City acceptance.
- B. Overall time of completion and time of completion for each milestone shown on the Initial Contract Schedule shall adhere to the times in the Special Provisions, unless an earlier (advanced) initial time of completion is requested by Contractor and agreed to by the Owner's Representative. Any such agreement shall be formalized by a Change Order.

The Owner's Representative will review the Initial Contract Schedule for conformance with the requirements of the Contract and will return the Initial Contract Schedule with comments within seven (7) Calendar Days after receiving it from Contractor.

Section 7.04. Contract Schedule Development.

Within 21 Calendar Days after receiving the Notice to Proceed, the Contractor shall submit a detailed Proposed Contract Schedule presenting an orderly and realistic plan for completion of the Work, in conformance with the requirements of this specification. The Proposed Contract Schedule shall be in hard copy and electronic format (CD or 3-1/2" Windows-format floppy disk).

The Contract Schedule shall furnish or comply with the following requirements:

- A. A time scaled CPM type schedule, prepared in Microsoft Project or Primavera software, or equal software subject to City acceptance.
- B. No activity on the schedule shall have a duration longer than fourteen (14) Working Days, with the exception of fabrication and procurement activities, unless otherwise approved by the City. Activity durations shall be the total number of actual days required to perform that activity including consideration of weather impact on completion of that activity.
- C. Procurement of major equipment, through receipt and inspection at the job site, identified as a separate activity.
- D. Owner furnished materials and equipment if any, identified as separate activities.
- E. Dependencies (or relationships) between activities.
- F. Processing/approval of submittals and shop drawings for major equipment. Activities that are dependent on submittal acceptance and/or material delivery shall not be scheduled to start earlier than the expected acceptance or delivery dates.

G. Separate buildings and other independent project elements shall be individually identified in the network.

H. Fourteen (14) Working Days for developing punch list(s), completion of punch list items, and final clean up for the work or any designated portion thereof. No other activities shall be scheduled during this period.

I. Interface with the work of other Contractors (or entities).

Each activity shown on the Contract Schedule shall have the following minimum information:

- Unique number(s) for each activity
- Activity description
- Activity relationships and dependencies (logic)
- Activity duration in Working Days
- Early start, early finish, late start, late finish dates (calendar date, i.e., day, month, year)
- Total float, free float
- For completed activities: actual start dates, actual finish dates, duration, and logic
- Interim milestone dates and completion dates
- Detailed list of work contained within each activity
- Manpower loading for each item of work for unit price contracts
- Cost loading for each item of work for lump sum contracts

The Owner's Representative will review the Proposed Contract Schedule for conformance with the requirements of the Contract and, within seven (7) Calendar Days after receipt, will approve the Contract Schedule or will return it with comments. If the Proposed Contract Schedule is not approved, the Contractor shall revise the schedule to incorporate comments and resubmit the schedule for approval within seven (7) Calendar Days after receiving it. The approved schedule shall become the Contract Schedule.

The Contract Schedule shall be the basis for evaluating job progress, payment requests, and time extension requests. The responsibility for developing the Contract Schedule and monitoring actual progress as compared to the schedule rests with the Contractor.

Failure of the Contract Schedule to include any element of the work or any inaccuracy in the Contract Schedule will not relieve Contractor from responsibility for accomplishing all the Work in accordance with the Contract.

Approval of the Contract Schedule will not relieve the Contractor of the responsibility for accomplishing the Work in accordance with the Contract and the Contract Time.

Failure to obtain the approved Contract Schedule within forty (40) Calendar Days of the Notice to Proceed may result in the City withholding each progress payment until an approved Contract Schedule is obtained.

Section 7.05. Monthly Updates.

Contractor shall submit to the Owner's Representative each month with its payment application an electronic and hard copy up-to-date status report of the Work. The status report shall include:

- A. Contractor's estimated percentage complete and remaining duration for each activity not yet complete.
- B. Actual start/finish dates for activities as appropriate.
- C. Identification of processing errors, if any on the previous update reports.
- D. Revisions, if any, to the assumed activity durations including revisions for weather impact for any activities due to the effect of the previous update on the schedule.
- E. Identification of activities that are affected by requested or proposed changes to the Work.
- F. Resolution of conflict between actual work progress and schedule logic. When out of sequence activities develop in the Contract Schedule because of actual construction progress, the Contractor shall submit revisions to schedule logic to conform to current status and direction.

The Owner's Representative will review the updated information and meet with Contractor each month at the Site to determine the status of the Work. If agreement cannot be reached on any issue, the Contractor will use the Owner's Representative's determination in the processing of the update.

Progress payments pursuant to the Contract will be based on the update of the Contract Schedule. No progress payments will be made without the required monthly update of the Contract Schedule.

Section 7.06. Schedule Revisions.

If the sequence of construction differs significantly, as determined by the Owner's Representative, from the Contract Schedule, Contractor shall submit within fifteen (15) Calendar Days a revised schedule to the Owner's Representative for approval.

When a requested or proposed change to the Work will have an impact on the critical path, the Contractor shall submit a schedule fragnet showing this impact. If the requested or proposed change is accepted by the City, the schedule fragnet shall be incorporated into the Contract Schedule. Time extensions will be considered only to the extent there is insufficient remaining float to accommodate these changes, and pursuant to this Article 7 of these General Conditions. No additional cost beyond that provided in Article 9 will be allowed for the incorporation of approved changes into the Contract Schedule. Should the Contractor, after approval of the Contract Schedule, intend to change its plan of construction, it shall submit its requested revisions to the Owner's Representative, along with a written statement of the revision, including a description of the logic for rescheduling the work, methods of maintaining adherence to Intermediate milestones and other specific dates and the reasons for the revisions. If the requested changes are acceptable to the Owner's Representative, they will be incorporated into the Contract Schedule in the next reporting period.

Schedule revisions shall be submitted at least seven (7) Calendar Days prior to the date of submission of update information. The City will have seven (7) Calendar Days to review the revisions.

Section 7.07. Short Interval Schedules.

Contractor shall prepare a Short Interval Schedule (SIS) to be used throughout the duration of Work. The SIS shall include all current activities and projected activities for the succeeding two (2) weeks. The SIS shall include actual start/finish dates for the preceding one (1) week. The SIS shall be submitted to the Owner's Representative prior to the weekly construction meeting. The Contractor shall participate in short interval scheduling coordination during the weekly construction meetings.

Section 7.08. Owner's Right to Revise Schedule.

In the event of a delay affecting the occupancy date of the Project and not the fault of the Contractor, the Owner's Representative may elect to re-sequence work or otherwise modify the schedule in an attempt to maintain the Date of Completion. It shall be the responsibility of the Contractor to cooperate in this effort. It is not the City's responsibility to ensure the Contractor the ability to use "optimal" crew size throughout the Project and no adjustment of the Contract Sum will be made for minor variations in crew size or claimed loss of efficiency or disruption that result from schedule adjustments. However, overtime work or weekend work required by the Owner's Representative to meet schedule objectives other than those of the individual contractor will be reimbursed per the provisions of Article 9, provided that Contractor has not contributed to the delay which the Owner's Representative is seeking to overcome. If the Contractor contends that a schedule adjustment will cause a significant disruption of its work sequence or ability to perform work efficiently, it shall notify the Owner's Representative within forty-eight (48) hours of receipt of the adjustment. Failure to provide timely notice constitutes a waiver by Contractor of any claim for compensation arising out of the schedule adjustment.

Section 7.09. Time of Essence.

Time is of the essence of this agreement. The Contractor shall, to the fullest extent possible, carry on the various classes or parts of the Work concurrently, and shall not defer construction of any portion of the Work in favor of any other portion of the Work, without the express approval of the Owner's Representative.

Section 7.10. Date of Completion.

The Contractor shall fully and satisfactorily complete the Work within the Contract Time. The Date of Completion is defined in Article I.

Section 7.11. No Right to Early Completion.

Any intent or plan on the part of the Contractor to complete the Work earlier than the Contract Time shall be at the Contractor's sole risk. Absent a Change Order signed by the City, the Contractor shall not be entitled to any additional compensation of any kind, including, without limitation, extended overhead, based on a claim that it intended to complete the Work earlier than the Contract Time but that it was unable to so complete early, regardless of the cause of the Contractor's failure to complete the Work earlier than the Contract Time.

Section 7.12. Responsibility for Completion.

The Contractor shall furnish sufficient manpower, materials, facilities and equipment and shall work sufficient hours, including night shifts, overtime operations, Sundays and holidays as may be necessary to insure the prosecution and completion of the Work in accordance with the Contract Time. If work on the critical path is seven (7) days or more behind the currently updated Contract Schedule and it becomes apparent that the Work will not be completed within the Contract Time, the Contractor will implement

whatever steps it deems necessary to make up all lost time at no additional cost to the City. If the Contractor's solution is not successful, it will make further attempts using the following sequence of events:

A. Reschedule activities to achieve maximum practical concurrence of accomplishment of activities.

B. If the above cannot be achieved then;

1. The Contractor shall increase manpower in such quantities and crafts as will substantially eliminate, in the judgment of the City, the backlog of work; or increase the number of working hours, shifts per working day, working days per week or the amount of equipment or any combination of the foregoing sufficiently to substantially eliminate in the judgment of the City the backlog of work.
2. In addition, the City may require the Contractor to submit a recovery schedule demonstrating its program and proposed plan to make up a lag in scheduled progress and to ensure completion of the Work within the Contract Time. If the City finds the proposed recovery schedule unacceptable, it may require the Contractor to submit a new plan. If the actions taken by the Contractor or the second plan proposed are unsatisfactory, the City may require the Contractor to take any of the actions set forth in the previous paragraph without additional cost to the City to make up the lag in scheduled progress.

Failure of the Contractor to comply with the requirements of this Section shall be considered grounds for a determination by the City, pursuant to Article 5, Section 5.25, that the Contractor is failing to prosecute the Work with such diligence as will ensure its completion within the time specified.

Section 7.13. Daily Reports.

The Contractor shall submit a Daily Activity Report to the Owner's Representative for each workday including weekends and holidays, when worked. The Daily Activity Report shall indicate, at a minimum, the Subcontractors on Site, the number of people on site for each trade, the weather conditions, the number of hours worked, the activities performed, any problems encountered, and any other information relevant to the work performed on each day.

Section 7.14. Payments Withheld.

Progress Payments may be withheld in whole or in part should the Contractor fail to comply with the requirements of this Article.

Section 7.15. Extensions of Time; Unavoidable Delays.

The Contractor shall not be granted an extension of time except on the issuance of a Change Order by the City, upon a finding of good cause for such extension.

A. As used herein, the following terms shall have the following meanings:

1. "Excusable Delay" means any delay in completion of the Work beyond the expiration of the Contract Time caused by conditions beyond the control and without the fault or negligence of the Contractor. These events may include strikes, embargoes, fire, unavoidable casualties, national emergency, and stormy and inclement weather conditions in which the Owner's Representative

and Project Inspector agree that work on the critical path cannot continue. The financial inability of the Contractor or any Subcontractor or supplier and any default of any Subcontractor, without limitation, shall not be deemed conditions beyond the Contractor's control. An Excusable Delay may entitle the Contractor to an extension of the Contract Time, in accordance with this Section, but shall not entitle the Contractor to any adjustment of the Contract Sum.

2. "Compensable Delay" means any delay in the completion of the Work beyond the expiration date of the Contract Time caused solely by the wrongful acts of the City and which delay is unreasonable under the circumstances and not within the contemplation of the parties. A Compensable Delay may entitle the Contractor to an extension of the Contract Time, in accordance with this Section and/or an adjustment of the Contract Sum. Except as provided herein, the Contractor shall have no claim for damage or compensation for any delay, interruption, hindrance, or disruption.
3. "Inexcusable Delay" means any delay in completion of the Work beyond the expiration of the Contract Time resulting from causes other than those listed in Subparagraphs A1 and A2, above. An Inexcusable Delay will not entitle the Contractor to an extension of the Contract Time or an adjustment of the Contract Sum.

B. The Contractor may make a claim for an extension of the Contract Time, for an Excusable Delay or a Compensable Delay, subject to the following:

1. If an Excusable Delay and a Compensable Delay occur concurrently, the maximum extension of the Contract Time shall be the number of days from the commencement of the first delay to the cessation of the delay which ends last. Any adjustment of the Contract Sum shall be in accordance with Article 9 and shall be based only on the non-concurrent portion of any Compensable Delay.
2. If an Inexcusable Delay occurs concurrently with either an Excusable Delay and/or a Compensable Delay, the maximum extension of the Contract Time shall be the number of days, if any, by which the duration of the Excusable Delay and/or the Compensable Delay calculated in accordance with subparagraph B1, if applicable, exceeds the Inexcusable Delay. The duration of the concurrence is non-compensable.

Delays in the prosecution of parts or classes of the Work which do not prevent or delay the completion of the whole Work within the Contract Time are not to be considered Excusable or Compensable.

Float or slack time is the amount of time between the earliest start date and the latest start date or between the earliest finish date and the latest finish date of activities on the Contract Schedule. No time extensions or delay costs will be allowed for delays caused by the City on paths of activities containing float, providing such delay does not exceed the float time per the latest updated version of the approved Contract Schedule.

Whenever the Contractor foresees any delay in the prosecution of the Work, and in any event immediately upon the occurrence of any delay which the Contractor regards as good cause for an extension, the Contractor shall notify the Owner's Representative in writing of the delay. The notice shall specify with detail the cause asserted by the Contractor to constitute good cause for an extension together with a

detailed schedule analysis showing the effect of the delay on the critical path of the Contract Schedule and a quantification of the length of the requested extension of time. Failure of the Contractor to submit such a notice within seven (7) Calendar Days after the initial occurrence of the event giving rise to the delay shall constitute a waiver by the Contractor of any request for extension, and no extension shall be granted as a consequence of such delay.

The City shall have no obligation to consider any time extension request unless the Contractor has complied with the requirements of the Contract Documents, including, without limitation, giving the required seven (7) days' notice and submitting the detailed supporting schedule analysis. The City shall not be responsible or liable to the Contractor for any constructive acceleration due to failure of the City to grant time extensions under the Contract Documents, should the Contractor fail to comply with the submission and justification requirements of the Contract Documents for time extension requests. The Contractor's failure to perform in accordance with the Contract Schedule shall not be excused because the Contractor has submitted time extension requests, unless and until such requests are approved by the City.

Upon receipt of a request for extension, the Owner's Representative shall conduct an investigation of the facts asserted by the Contractor to constitute good cause for an extension. The Owner's Representative shall report the results of this investigation, as well as the propriety of the time extension requested, to the Contractor in writing within ten (10) Calendar Days of receipt of the request and shall indicate whether it will recommend for or against the extension. Upon receiving the Owner's Representative's recommendation, the Contractor may either concur in the recommendation, or reject the recommendation and proceed with a notice of potential claim and claim as provided for in Article 9.

Section 7.16. Discretionary Time Extensions for Best Interest of the City.

The City reserves the right to extend the time for completion of the Work if the City determines that such extension is in the best interest of the City. In the event that a discretionary extension is granted at the request of the Contractor, the City shall have the right to charge to the Contractor all or any part, as the City may deem proper, of the actual cost of construction management, engineering, inspection, supervision, incidental and other overhead expenses that accrue during the period of the extension, and to deduct all or any portion of that amount from the final payment for the Work.

In the event a discretionary time extension is ordered over the objection of the Contractor, and the decision rests solely with the City and is not legally compelled for any cause, the Contractor shall be entitled to a contract change pursuant to Article 9 adjusting the price paid to reflect the actual costs incurred by the Contractor as a direct result of the delay, upon its written application therefor, accompanied with such verification of costs as the Owner's Representative requires. The decision of the City on any discretionary time extension and the costs thereof shall be final and binding.

Section 7.17. Temporary Suspension or Delay of Work.

The City has the authority to suspend or delay the Work, wholly or in part, for any period the City deems necessary. The Contractor shall immediately comply with the City's written order to suspend or delay the Work. The suspended or delayed work shall be resumed only when conditions are favorable or methods are corrected, as ordered or approved in writing by the City. Public safety and convenience must be maintained throughout the suspension or delay in accordance with the Contract Documents.

Delays due to suspension of work shall be classified as Excusable or Inexcusable Delays. Such suspension shall not relieve the Contractor of the Contractor's responsibilities as described in the Contract

Documents.

Section 7.18. Suspensions Exceeding One Year.

Should the Work be suspended for a period exceeding one calendar year due to war conditions, labor conditions, legal actions, or for other conditions constituting the legal defense of impossibility of performance, the Contractor and City agree to enter into an agreement terminating the agreement upon the following terms and conditions.

The City shall be responsible only to pay the Contractor the actual value of the work performed from the Date of Commencement or from the date of the last progress payment, whichever is later, plus the ten percent (10%) retention from prior progress payments, less any deductions authorized by the Contract Documents.

As between the Contractor and the City, it shall be conclusively presumed that the actual value for the Contractor's work to the date of the last progress payment is no more than the actual amount of prior progress payment plus the ten percent (10%) retention from those progress payments; provided, however, that this Section shall not preclude the City from deducting charges for work or materials which do not meet the requirements of the Contract Documents.

Section 7.19. Liquidated Damages.

If the Work is not completed by the Contractor in the time specified in the Contract Documents, or within any period of extension authorized pursuant to this Article, the Contractor acknowledges and admits that the City will suffer damage, and that it is impracticable and infeasible to fix the amount of actual damages. Therefore, it is agreed by and between the Contractor and the City that the Contractor shall pay to the City as fixed and liquidated damages, and not as a penalty, the sum specified in the Contract Documents for each Calendar Day of delay until the Date of Completion, and that both the Contractor and the Contractor's surety shall be liable for the total amount thereof, and that the City may deduct Liquidated Damages from any monies due or that may become due to the Contractor. If it appears during the course of construction that the Contractor is behind schedule and the imposition of liquidated damages is likely, or if liquidated damages begin to accrue prior to the time for final payment, the amount accrued shall be withheld from any progress payment that would otherwise be due. This right to withhold funds is intended to complement the City's other rights under the Contract Documents.

This liquidated damages provision shall apply to all delays of any nature whatsoever, save and except only delays found to be excusable or compensable pursuant to this Article, or time extensions granted by the City.

Pursuant to Government Code Section 4215, the Contractor shall not pay fixed and liquidated damages for delay in completing the project caused by the failure of the City or the owner of utility facilities located on the Project Site to provide for removal or relocation of such facilities.

Payment by the City of any progress payments after expiration of the Contract Time shall not constitute a waiver by the City of its right to claim liquidated damages in accordance with this Section.

If the Contract is terminated after the Contract Time, as adjusted by any extensions of time that the City may have granted, the Contractor shall remain liable to the City for liquidated damages for all periods of time from such termination date until the Date of Completion.

Section 7.20. Extension of Time Not a Waiver.

Any extension of time granted the Contractor pursuant to this Article shall not constitute a waiver by the City of, nor a release of the Contractor from the Contractor's obligation to perform this Contract in the Contract Time, as modified by the particular extension in question.

The City's decision to grant a time extension due to one circumstance set forth in one request, shall not be construed as a grant of an extension for any other circumstance or the same circumstance occurring at some other time, and shall not be viewed by the Contractor as a precedent for any other request for extension.

Section 7.21. Pursuance of Work During Inclement Weather.

During inclement or unsuitable weather or other unfavorable conditions, the Contractor shall pursue only such portions of the Work that will not be damaged by the weather or unfavorable conditions. When the weather or unfavorable conditions create hazardous travel or working conditions, as determined by the City, the Contractor may be directed to stop that portion of the Work, in accordance with Section 7.17 until the weather clears or the conditions are no longer unfavorable.

The Contractor must keep roads safe and inspect and maintain storm water pollution prevention and erosion control devices during inclement weather or unfavorable conditions. Lane and road closures may not be allowed if the City determines that the traffic controls will create unnecessary risk to the traveling public, the Contractor, and/or City employees.

Section 7.22. Effect of Stop Work Notice.

If the City orders a suspension of the Work pursuant to Article 5, Section 5.19, the days on which the suspension is in effect shall be included in determining the required completion date, and shall not otherwise modify or extend the time within which the Contractor is to perform. In such event, the Contractor shall not be entitled to any damages or compensation on account of such suspension or delay, unless the Contractor can establish that stop work notice was not warranted.

Section 7.23. Weekend, Holiday and Night Work.

No work shall be done between the hours of 6:00 p.m. and 7:00 a.m., or on Sundays or legal holidays except with written permission of the City. Request to work between 6:00 p.m. and 7:00 a.m. or on Sundays or legal holidays must be submitted in writing to the Owner's Representative at least two (2) Working Days in advance of the intended work. In case of an emergency the Contractor will be allowed to work at night or on Sundays or legal holidays but must notify the Owner's Representative immediately. An emergency shall be considered an unforeseen event that poses a danger to the public or to the uncompleted work.

It is understood that two (2) or three (3) shift operations may be established as a regular procedure by the Contractor upon written permission from the City. Such permission may be revoked if the Contractor fails to maintain adequate force and equipment for reasonable prosecution and inspection of the Work, or fails to provide sufficient artificial light to permit the Work to be carried out safely and appropriately and to permit inspection.

The Contractor shall give the Owner's Representative one (1) Working Day prior written notice of any work to be done on a Saturday, with the location and type of work to be done specified. Any work done

without such notice and without the supervision of an inspector may be ordered removed and replaced at the Contractor's expense.

Section 7.24. Use of Completed Portions.

The City has the right during the progress of the Work to take over and place in service any completed or partially completed portion of the Work. Taking possession shall not be deemed acceptance of any other portions of the Work, nor of any work on those portions not completed in accordance with the Contract.

Prior to the Date of Completion, the Contractor shall make all repairs or renewals in the portion of the Work occupied by the City made necessary due to defective material or workmanship, or the operations of the Contractor, ordinary wear and tear excepted.

Section 7.25. Coordination with Other Activities.

The Contractor shall conduct its operations so as not to interfere unreasonably with the City's use of the occupied portions of the Site. The Contractor shall submit periodic schedules to the Owner's Representative proposing the times, areas, and types of work to be done within such areas.

If the Work produces conditions rendering the occupied portions of building, the Site, or other areas uninhabitable, either because of noise, dust, vibration, smoke, fumes, or for any other cause whatsoever, the Owner's Representative may suspend the Work or direct the Contractor to modify the Contract Schedule, and the Contractor shall comply.

Except as provided by Change Order, the Contractor shall not be entitled to a time extension or increase in the Contract Sum by virtue of conflicts between the Contractor's work and the City's occupancy.

Section 7.26. Periodic Cleaning of Project.

The Contractor shall properly clean its work and the Site and maintain its work area in an orderly manner. The Contractor shall remove all dirt, debris, waste, rubbish, and implements of service from the Project, the adjacent sidewalks and streets, and the working area daily or as directed by the Owner's Representative. Debris, waste, or unused construction materials shall not be left under, in, or about the Project, nor allowed to accumulate on the Site or in the working area.

The Contractor, at its sole cost, shall contract with a disposal company to remove all rubbish, and shall have the refuse containers emptied at frequent enough intervals so that waste does not overflow the containers.

If the Contractor fails to clean up during progress or upon completion of the Work, the City may do so at the Contractor's expense.

Section 7.27. Final Cleaning of Project.

At completion of the Work and prior to final acceptance/inspection and occupancy by the City, the Contractor shall thoroughly clean the interior and exterior of the buildings, and the Site and adjacent areas, of all material related to its performance of the Work. In the event the Contractor fails to do so, the City may cause this work to be done at the Contractor's expense.

Prior to final completion or City occupancy, the Contractor shall conduct an inspection of sight-exposed surfaces, and all work areas, to verify that the entire work is clean. In the event the Contractor fails to do so, the City may cause this work to be done at the Contractor's expense.

Section 7.28. Notice of Punch List Inspection.

When the Contractor believes that a phase of its Work is complete, it shall request in writing a punch list inspection. Within five (5) Working Days of the receipt of such request, the Owner's Representative, the Project Inspector and the Architect or Consulting Engineer shall make a punch list inspection or inform the Contractor that the work is not ready for punch list inspection; upon completion of the deficient work, the Contractor shall again request a punch list inspection. The Contractor or its representatives shall be present at the punch list inspection. The purpose of the punch list inspection is to determine whether the Work has been completed in accordance with the Contract Documents, including all Change Orders, all interpretations and instructions previously issued.

If the Contractor requests a punch list inspection when the Work is not ready for the inspection, the Contractor shall pay all costs associated with the inspection.

If Contractor fails to attend any punch list inspection, the Contractor shall be charged for the cost of the Owner's Representative, the Project Inspector, Architect or Consulting Engineer, and other design professionals who attended the punch list inspection.

Completion of any phase of the Work does not result in final completion, or in any way alter the payment provisions after final completion.

Section 7.29. Punch List.

The Owner's Representative, the Project Inspector and the Architect or Consulting Engineer shall notify the Contractor in writing of any deficiencies to be remedied prior to final acceptance, by preparing a written list, known in the industry as a punch list. The Contractor shall remedy all items shown on the punch list prior to final acceptance by the City.

No one is authorized to amend the Contract Documents by use of the punch list; it is provided solely for the benefit of the Contractor to enable it to determine what items must be corrected before final acceptance will be recommended by the Owner's Representative, the Project Inspector and the Architect or Consulting Engineer. The City reserves the right to require compliance with the Contract Documents, notwithstanding the issuance of a punch list or the completion by the Contractor of all items on the punch list.

In the event that the Work still does not comply with the Contract Documents, the City reserves the right to issue such further punch lists as may be required, or to deduct from the final payment the cost of correcting any work not completed in accordance with the Contract Documents, but accepted by the City, without the issuance of further punch lists.

If punch list work needs to be performed after the City has taken occupancy of any portion of the Work, the work shall be conducted at the direction of the Owner's Representative.

Section 7.30. Completion; Acceptance of Contract; Notice of Completion.

The Contractor acknowledges and agrees that completion for purpose of final payment shall mean the Contractor's complete performance of all Work required by the Contract Documents, amendments, Change Orders, Construction Change Directives and punch lists, and the City's formal acceptance of the Work, without regard to prior occupancy, substantial completion doctrine, beneficial occupancy or otherwise.

Acceptance of the Work shall be made only by formal written acceptance by the City. Recordation of a Notice of Completion shall be in the manner prescribed by law, provided that the Work shall then be fully and satisfactorily completed and the provisions of the Contract Documents fully and satisfactorily performed in all respects.

ARTICLE 8. MEASUREMENT AND PAYMENT

Section 8.01. Schedule of Values.

Within ten (10) days after Notice to Proceed, the Contractor shall submit to the City a schedule of values broken down by phase in sufficient detail to evaluate progress at any point in the Work. In no event shall an individual line item on a schedule of values exceed five percent of the Contract Sum unless so approved in advance by the Owner's Representative. Labor, material, and subcontract costs shall be shown separately. Cost of contract closeout shall be shown as an individual line item.

The schedule of values, when approved, shall be used as a basis for the Contractor's applications for payment.

Section 8.02. Basis and Measurement of Payment Quantities.

It is the Contractor's responsibility to measure and/or compute the quantities of work completed, subject to verification by the City, under the terms of the Contract Documents. In computing quantities, the length, area, solid contents, number, weight, or time as specified in the Contract Documents or the Schedule of Values shall be used.

A. Unit Price Contracts.

Payment for all work bid at a price per unit of measurement will be based upon the actual quantities of work as measured upon completion. The Estimated Quantities provided in the Bid Documents are for comparative bidding only. The City does not expressly or by implication agree that the actual amount of work or materials will correspond to the Estimated Quantities. The Contractor shall make no claim nor receive any compensation for anticipated profits, loss of profit, damages or any extra payment due to any difference between the amount of work actually done or materials furnished and the Estimated Quantities.

B. Lump Sum Contracts.

Items bid on a "Lump Sum" or "Job" basis shall result in a complete structure, operating plant or system in satisfactory working condition in respect to the functional purposes of the installation, and no extra compensation will be allowed for anything omitted but fairly implied. Progress payments will be based on the approved schedule of values.

C. Mobilization

Mobilization shall consist of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to the Site; for the establishment of all offices, buildings, and other facilities necessary for the Work; and for all other work and operations which must be performed, or costs incurred, prior to beginning the Work.

Payment for mobilization will be as follows:

1. When the Contract does not include a separate pay item for mobilization, full compensation for mobilization will be included in the Contract lump sum price or in the prices paid for the various items of work in a unit price contract, and no additional compensation will be paid.

2. When the Contract or proposed Schedule of Values includes a separate item for mobilization, payment for mobilization will include full compensation for the furnishing of all labor, materials, tools, equipment, administrative costs, and incidentals for mobilization. The City will pay no greater than five percent (5%) of the total Contract Sum as a separate pay item for mobilization. In the event the Contractor submits a mobilization pay item greater than five percent (5%) of the total Contract Sum, the City will pay any excess mobilization amount with the final Progress Payment.

Payment for mobilization will be prorated as follows:

- a. When the Progress Payment request is five percent (5%) or more of the original total Contract Sum (excluding mobilization), fifty percent (50%) of the contract item price for mobilization or two and one-half percent (2.5%) of the total Contract Sum, whichever is less, will be paid for mobilization.
- b. When the Progress Payment request is ten percent (10%) or more of the original total Contract Sum (excluding mobilization), seventy percent (70%) of the contract item price for mobilization or three and one-half percent (3.5%) of the total Contract Sum, whichever is less, will be paid for mobilization.
- c. When the Progress Payment request is twenty percent (20%) or more of the original total Contract Sum (excluding mobilization), ninety percent (90%) of the contract item price for mobilization or four and one-half percent (4.5%) of the total Contract Sum, whichever is less, will be paid for mobilization.
- d. When the Progress Payment request is fifty percent (50%) or more of the original total Contract Sum (excluding mobilization), one hundred percent (100%) of the contract item price for mobilization or five percent (5%) of the total Contract Sum, whichever is less, will be paid for mobilization.
- e. After final acceptance of the Contract, the amount, if any, of the Contract item price for mobilization in excess of five percent (5%) of the original total Contract Sum will be included for payment in the final estimate.

3. The City will not pay additional mobilization compensation for work under a Contract Change Order. Payment for mobilization shall be subject to retention.

Section 8.03. Application for Payment.

A. On the 25th of each month, the Contractor shall submit to the Owner's Representative its progress payment application, with an estimate of the total amount and value of work done, including that done under approved Change Orders or signed written directives, and the acceptable materials furnished and incorporated in the work through the 25 day of the month. The Bid Form or schedule of values shall be used to prepare the progress payment application. The Owner's Representative, Architect or Consulting Engineer and Project Inspector will review the Contractor's proposed percentages of completion and agree on a final percentage to be paid

for that month. After deducting all previous payments, retention and other withholdings as specified or allowed in the Contract Documents from the estimated total value, the City will pay the Contractor the balance.

No progress payment will be made unless all general conditions items demonstrate satisfactory progress.

B. Release of Liens: For each monthly application for payment, following agreement, the Contractor shall submit a conditional lien release warranting that title to all work, labor, materials and equipment covered by the application is free and clear of all liens, claims, security interests or encumbrances. Additionally, the Contractor shall submit unconditional lien releases for all work through the prior progress payment. For final payment, the Contractor and all of its Subcontractors and material suppliers shall submit final conditional and final unconditional lien releases.

C. No progress payment will be released until the Owner's Representative has received all of the following items in acceptable form: as-built updates, schedule updates, certified payroll and other required pay records, and lien releases.

D. Neither the payment, the withholding, nor the retention of all or any portion of any progress payment claimed to be due and owing to the Contractor shall operate in any way to relieve the Contractor from its obligations under this agreement; shall not constitute acceptance of the Work or any portion thereof; and shall in no way reduce the liability of the Contractor to replace unsatisfactory work or material, though the unsatisfactory character of such work or material may not have been apparent or detected at the time such payment was made. The Contractor shall continue diligently to prosecute the Work without reference to the payment, withhold, or retention of any progress payment. The payment, withhold, or retention of any progress payment shall not be grounds for an extension of the Contract Time.

Section 8.04. Work Done Without Direct Payment.

Compensation for any portion of the Work not specifically identified in the Bid Form or schedule of values is understood to be included in the price for other items, unless specified in the Special Provisions as extra work. No additional compensation is allowed for additional shifts or premium pay necessary to ensure that the Work is completed within the time limits specified in the Contract Documents.

Section 8.05. Payment for Stored Materials.

Payments may be made by the City, at its discretion, on account of materials or equipment not incorporated in the Work but delivered to the Site and suitably stored by the Contractor. Payments for materials or equipment stored shall only be considered upon submission by the Contractor of satisfactory evidence demonstrating that it has acquired title to such material, that the material will be used in the Work, that it is satisfactorily stored, protected and insured, and that the Contractor has undertaken such other procedures satisfactory to the Owner's Representative, Project Inspector, and Architect or Consulting Engineer, to protect the City's interests. Materials stored off-site, to be considered for payment, shall, in addition to the above requirements, be stored in a bonded warehouse, fully insured, and available to the Architect or Consulting Engineer and Owner's Representative for inspection. The Owner's Representative shall have complete discretion as to the amount of material and equipment that may be stored on the Site at any given time.

Section 8.06. Payment; Retention.

There shall be reserved from the monies earned by the Contractor on estimates a sum equal to ten percent of such estimates.

Section 8.07. Posting Securities in Lieu of Withholds.

Pursuant to Public Contract Code Section 22300, at the request and expense of the Contractor, securities equivalent to the amount withheld pursuant to Section 12.04 shall be deposited with the City, State Treasurer or with a state or federally chartered bank in California as the escrow agent, who shall then pay the retainage to the Contractor. Upon satisfactory completion of the Contract, the securities shall be returned to the Contractor.

Alternatively the Contractor may request, pursuant to Public Contract Code Section 22300, and the City shall make payment of retentions under Section 12.04 directly to the escrow agent. The Contractor shall receive the interest earned on the investments upon the same terms provided for in Section 22300 for securities deposited by the Contractor. Upon satisfactory completion of the Contract, the Contractor shall receive from the escrow agent all securities, interest and payments received by the escrow agent from the City.

Either alternative under this Section may be exercised only if requested in writing by the Contractor within five (5) Calendar Days after its execution of the Contract. The Contractor shall notify its Subcontractors in writing within fifteen (15) Calendar Days of exercising this option.

Securities eligible for investment under this Section shall include those listed in Government Code Section 16430 or bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, stand-by 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 monies withheld and shall receive any interest thereon.

Section 8.08. Withholding Additional Amounts; Grounds.

In addition to the retention amounts to be withheld, the City may withhold a sufficient amount from any payment or payments otherwise due to the Contractor as in the City's sole discretion may be necessary to protect the City in the event of the following:

- A. Third party claims filed or reasonable evidence indicating probable filing of such claims;
- B. Defective work not remedied;
- C. Failure of the Contractor to make proper payments to any of its Subcontractors or for labor, materials or equipment;
- D. The occurrence of reasonable doubt that the Contract can be completed for the balance of payments then unpaid to the Contractor, or in the time remaining until expiration of the Contract Time;

- E. Failure of the Contractor to comply with any lawful or proper direction concerning the Work given by any City representative authorized to have given such instruction;
- F. Claims and/or penalties which state law assesses against the Contractor for violation of such law;
- G. Any claim or penalty asserted against the City by virtue of the Contractor's failure to comply with the provisions of all governing laws, ordinances, regulations, rules, and orders;
- H. Any reason specified elsewhere in the Contract Documents as grounds for a retention or withholding, or that would legally entitle the City to a set-off.

In order to adequately protect the City, the Contractor agrees that the basic standard to determine the amount to be withheld pursuant to this Section shall be one hundred fifty percent (150%) of the amounts claimed or the value of the work not done or defectively done; provided, however, that City reserves the authority to retain greater sums should such sums be necessary in the City's discretion to adequately protect it.

Section 8.09. Disbursement of Withheld Amounts.

The City, in its sole discretion, may apply any withheld amount or amounts to the payment of any claim resulting in a withhold. The Contractor agrees and hereby designates the City as its agent for such purposes, and any payment so made by the City shall be considered as a payment made under this Contract by the City to the Contractor. The City shall not be liable to the Contractor for any payments made in good faith. Such payments may be made without a prior judicial determination of the claim or claims. The City shall render to the Contractor a proper accounting of any funds disbursed on behalf of the Contractor.

Prior to disbursing any amounts, the City shall afford the Contractor an opportunity to present good cause, if it has any, why the claim or claims in issue are not valid or just claims against the Contractor. The City reserves the right then to take such further steps as are appropriate, in its sole discretion, including, but not limited to, seeking a judicial resolution of the controversy.

Section 8.10. Correction of Statement and Withholding of Payment.

No inaccuracy or error in any statement provided by the Contractor shall operate to release the Contractor or any surety from the error, or from damages arising from such work, or from any obligation imposed by the Contract Documents. The City shall retain the right subsequently to correct any error made in any previously issued claim for the progress payment, or progress payment issued, by adjustments to subsequent payments.

Section 8.11. Final Payment.

When the Contractor determines that all of the Work on the Project is complete and all items on the punch list have been satisfied, or contends that such items are not required by the Contract Documents, the Contractor shall submit an application for final payment. Simultaneously with the Contractor's request for final payment, the Contractor shall submit the following items to the Owner's Representative:

- A. Record Documents.
- B. All O&M submittals not previously submitted and approved
- C. Hazardous material documentation if required.
- D. Other items as required in the Special Provisions.

No payment will be processed unless accompanied by the listed documents in acceptable form.

A. Final Payment Process.

Upon receipt of the submittals required by this Article and the Contractor's final payment application, and upon verification that all of the Work is complete, including all punch list items, the Owner's Representative shall either (1) recommend to the City that the payment application be accepted, which recommendation shall be made within five (5) business days of receipt of the Contractor's final payment application, or (2) send a notice to the Contractor rejecting the payment application, stating the basis therefor, and submitting a written estimate of the sum due to the Contractor, which written estimate shall be provided to the Contractor within twenty (20) Calendar Days of the Owner's Representative's receipt of the Contractor's final payment application. The Owner's Representative's estimate shall take into account the Contract Sum, as adjusted by any Change Orders; amounts already paid; and sums to be retained for incomplete work, liquidated damages, and for any other cause under the Contract Documents. Any protest by the Contractor of the Owner's Representative's estimate shall be as set forth below.

The Architect or Consulting Engineer shall prepare a statement of final inspection, stating that the Work has been given a final inspection, that the Contractor has submitted the required documents, setting forth with detail any deviations in the Work as completed from the Contract Documents, and estimating the cost of correction of such deviations.

The Architect's or Consulting Engineer's statement shall be transmitted to the City, along with the Contractor's application for final payment approved by the Owner's Representative, Architect or Consulting Engineer and Project Inspector. The Owner's Representative shall provide a copy of the Architect's or Consulting Engineer's statement of final inspection to the Contractor.

B. Protest of the Owner's Representative's Estimate.

If the Contractor contests the estimate of sums due prepared by the Owner's Representative, the Contractor may file a claim in writing with the Owner's Representative in accordance with Article 9 and setting forth in detail all grounds alleged by the Contractor to justify an adjustment to the Owner's Representative's estimate. The Contractor's claim shall be certified under penalty of perjury and in compliance with the California False Claims Act. Failure to include these required certifications will constitute grounds for immediate rejection of the claim. Failure to file a timely claim shall constitute a waiver and acceptance by the Contractor of the Owner's Representative's estimate, which shall then become final and be forwarded to the City for approval of payment.

C. Approval of Final Payment.

Following acceptance of the Work, the City shall authorize final payment to the Contractor of the undisputed sums found due, subject to retentions for stop notices. This final payment shall be

made within sixty (60) Calendar Days after completion, as defined in Section 7.30 above, and recordation of the Notice of Completion.

Section 8.12. Withholding for Stop Notices.

The City may, in its sole discretion, and at any time, withhold from the Contractor any unpaid claims alleged in Stop Notices filed pursuant to Civil Code Section 3179 et seq. The City reserves all remedies it may have in the event of a stop notice dispute. The basic standard to determine a sufficient withholding in the event of a Stop Notice shall be one hundred fifty percent (150%) of the total of all stop notices filed; provided, however, the City reserves the right to withhold different or greater sums in its discretion.

Section 8.13. Non-Waiver.

Neither acceptance of, nor payment for, the Work or any part thereof, nor any extension of time, nor any possession taken by City shall operate as a waiver of any of the provisions of this Contract, nor shall a waiver of any breach of this Contract be held to be a waiver of any other or subsequent breach. In addition, recordation of a Notice of Completion shall not be deemed an acceptance of latent defects, nor shall it constitute a waiver of any of the provisions of this agreement.

ARTICLE 9. CHANGES AND CLAIMS

Section 9.01. No Changes Without Consent.

No extra work shall be performed, and no change shall be made, except pursuant to a written Change Order or Proposed Change Order signed by the City, or by CCD signed by either the City or the Owner's Representative, stating that the extra work or change is authorized, and no claim for any addition to the Contract Sum or Contract Time shall be valid unless so authorized; provided, however, that nothing in this Article shall excuse the Contractor from proceeding with the prosecution of the work so changed. The Contractor shall, when required by the Owner's Representative, furnish an itemized breakdown of the quantities and prices used in computing the value of any change requested by the Contractor, or that may have been ordered by the City.

Change Orders shall specify the cost adjustments associated therewith, and in no case shall the City pay or become liable to pay any sums different than those specified or those established under Sections 9.04 and 9.05.

Substitutions are considered change orders.

Section 9.02. Change Orders.

Subject to legal requirements relating to competitive bidding, the City may require changes in, additions to, or deductions from the work to be performed or the materials to be furnished pursuant to the Contract Documents. Changes may be made pursuant to a written Change Order signed by the City, which shall state the agreement of the City, the Contractor, and the Architect or Consulting Engineer upon all of the following:

- A. The scope of the change in the Work;
- B. The amount of the adjustment in the Contract Sum, if any; and
- C. The extent of the adjustment in the Contract Time, if any.

All adjustments to the Contract Sum or the Contract Time must be approved by the City.

Signature by the Contractor on the Change Order constitutes its agreement with and acceptance of the adjustments in the Contract Sum and Contract Time, if any, set forth in the Change Order as full and complete satisfaction of any direct or indirect additional cost and/or time incurred by the Contractor in connection with performance of the change work.

Section 9.03. Construction Change Directive/CCD.

Changes also may be made pursuant to a CCD, which shall direct a change in the Work and state a proposed basis for adjustment, if any, in the Contract Sum or Contract Time, or both. A CCD shall be used in the absence of total agreement on the terms of a Change Order, or when time does not permit processing of a Change Order prior to implementation of the change. CCD's shall be approved by the City and the Architect or Consulting Engineer, but need not be signed by the Contractor. Upon receipt of a CCD, the Contractor shall promptly proceed with the change in the work involved. It is the intent of the City that all CCD's will be converted into a Change Order. When a CCD is used because time does not

permit processing of a Change Order prior to implementation of the change, signature by the Contractor on the CCD constitutes its agreement with and acceptance of the adjustments in the Contract Sum and Contract Time, if any, set forth in the CCD as full and complete satisfaction of any direct or indirect additional cost and/or time incurred by the Contractor in connection with performance of the change work.

Section 9.04. Pricing of Changes.

If a Change Order or CCD provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

A. Lump Sum Price.

The Contractor shall submit a lump sum price proposal with a detailed cost breakdown on all labor and materials proposed to be provided by the Contractor's forces or the forces of Subcontractors or material suppliers. The proposal shall include labor surcharges of twenty-six percent (26%), sales tax and markups as specified in Section 9.05 of these General Provisions.

B. Unit Prices.

If payment for Contract work is based on unit prices, payment for changed work will be made based on actual quantities of work done at the unit prices contained in the Contract or unit prices otherwise agreed upon by the City and Contractor if none are contained in the Contract. Payment will be for actual quantities furnished, as described above. Payment for changed work based on Contract or agreed upon unit prices includes the full cost of the item of work, including profit and overhead, and no additional payment or adjustment will be allowed. If the final quantity of any item of work required under the Contract varies from the Estimated Quantity by twenty-five percent (25%) or more, compensation will be adjusted in accordance with State Specification section 4-1.03B, "Increased or Decreased Quantities."

C. Force Account.

In the absence of either an agreed lump sum price or unit prices for the change, the City may direct the Contractor to proceed with the changed work on a force account basis. The Contractor shall be paid for labor, materials and equipment actually used during the performance of the changed work as set forth below, plus the markups specified in Section 9.05 of these General Provisions.

The Contractor shall keep and present daily, in such form as the Owner's Representative may prescribe, an itemized accounting together with appropriate invoices and other supporting data of the labor, materials, and equipment used during that day. All labor shall be recorded on separate time sheets clearly identified with the CCD number and scope of extra work involved. These time sheets shall be signed daily by the Project Inspector or the Owner's Representative. No costs will be allowed for time not recorded and signed the same day the work takes place. The Contractor and the Owner's Representative shall discuss and attempt to resolve any disputes concerning the Contractor's daily records at the time the report is submitted.

The Contractor shall on a monthly basis accompanying the progress payment request submit a reconciliation for all work performed on a force account basis during the period of the progress payment. A final reconciliation shall be submitted within 30 days after the force account work is completed. The reconciliation shall recap all costs and appropriate markups for the period. No

costs will be allowed for work not included in a reconciliation within the time periods specified.

To facilitate agreement on direct craft labor hours, construction equipment hours, and material quantities, the Contractor shall notify the Owner's Representative not less than four (4) hours prior to starting force account work.

Allowable costs for force account work are as follows:

1. Labor.

The Contract will be paid the cost of direct labor (foreperson and below) used in the actual and direct performance of the changed work, including working foreman when authorized by the City. Except as otherwise provided, the Contractor will receive no additional compensation for overtime work without prior written authorization of the City. The cost of the labor will be the sum of the following:

- a. Actual Wages: Charges for labor will be the Contractor's actual payroll costs for labor of any classification, including employer payments to or on behalf of the workers for health and welfare, pension, vacation and similar purposes.
- b. Labor Surcharge: A twenty-six percent (26%) surcharge for taxes, insurance, and all other payments made to or on behalf of the employee shall be added to the actual wages.
- c. Subsistence and Travel: The City will pay the Contractor for actual subsistence and travel allowance costs associated with the changed work required by labor agreements or acceptable to the City. Supporting documentation must be provided to the City.

2. Materials.

Payment will be for the purchaser's actual cost of supplier or vendor furnished materials. If the Contractor does not furnish satisfactory evidence of the cost of such materials, the cost will be the lowest current wholesale price at which such quantities of material are available and delivered to the job site. The City reserves the right to purchase materials for changed work, and the Contractor shall have no claims for costs or profit on such materials.

3. Equipment.

The prices paid for equipment directly and solely required for performance of the changed work will be those listed in the current edition of the Caltrans publication, "Labor Surcharge and Equipment Rental Rates". If the equipment is not shown in this publication, the Contractor shall be paid such hourly rental rates as are agreed upon by the Contractor and the Agency prior to use of the equipment, plus thirty-three and one-third percent (33-1/3%) for the cost of fuel, oil, lubrication, and field repairs and maintenance. In no case shall the hourly rental rates exceed those of established distributors or equipment rental agencies serving the area.

The rate paid for the use of equipment constitutes full compensation to the Contractor for all costs, including fuel, power, oil, lubrication, supplies, small tools, small equipment, necessary attachments, repairs and maintenance of any kind, depreciation, storage, insurance, labor (except for equipment operators) and any and all costs to the Contractor incidental to the use of such equipment for the changed work.

Payment will not be made for the equipment while it is inoperative due to breakdowns or for time in which no changed work was performed. Payment for rentals will include time required to move equipment to the changed work from the nearest available rental source and to return it to the source. However, no moving, loading, or transportation costs will be paid if the equipment is used for any other portion of the Work.

Individual pieces of equipment having replacement value of five hundred dollars (\$500) or less shall be considered tools or small equipment and no payment will be made for those pieces of equipment.

4. Subcontracts.

Subcontract costs shall be the actual cost to the Contractor for work performed by a Subcontractor. The provisions set forth above for pricing of force account work apply to the computation of subcontract costs. Subcontractors shall compute markups as set forth in Section 9.05 of these General Provisions.

Section 9.05. Markups for Changed Work.

Only direct costs directly attributable to the performance of the changed work shall be allowed. All other costs shall be included in the allowed markups, including, but not limited, to overhead and profit; preparation of all paperwork related to changes in the Work, including field review, estimating and cost breakdown; coordination and supervision, both office and field, including the project superintendent; vehicles including gas and maintenance; small tools, incidentals and consumables; engineering, detailing, and revisions to shop drawings and as-built drawings; general office and administrative expense; extended and unabsorbed home office overhead; warranty; costs of bonds, liability insurance, and all taxes.

The Contractor's combined overhead and profit for work performed by its own forces shall not exceed twenty-five percent (25%) for labor, fifteen percent (15%) for materials, fifteen percent (15%) for equipment and two percent (2%) for bonds and insurance.

If the changed work is performed by a Subcontractor, the Subcontractor shall be entitled to an allowance of fifteen percent (15%) of its actual labor, material and rental costs for overhead and profit.

The Contractor shall be allowed to mark-up the Subcontractor's price five percent (5%) for its overhead and profit. Cumulative total markup for all tiers of contractors and subcontractors shall not exceed thirty percent (30%). If the net value of a change results in a credit from the Contractor or Subcontractor, the credit shall be the actual net cost, plus ten percent (10%) for overhead and profit. When both additions and credits covering related work or substitutions are involved in any one change, the allowance for overhead and profit shall be figured on the basis of the net increase or decrease, if any, with respect to the change.

Section 9.06. Construction Incentive Change Proposal (CICP).

A. General.

The Construction Incentive Change Proposal (CICP) Program provides a program for the Contractor to use its expertise to improve Contract performance to create an overall reduction in the total cost of the Contract. Proposing to delete work is not a CICP. Deleted work is addressed in Section 4.11 of these General Provisions. The CICP Program shall not apply to City contracts which have a cost of less than \$100,000. The Contractor and subcontractors may participate in the CICP Program. Participation of Subcontractors shall be through the Contractor; the Contractor and Subcontractor must agree upon the sharing agreement; and evidence of such agreement must be submitted with the CICP.

While a CICP is being considered or processed, the Contractor shall proceed with the Work as scheduled.

B. Description

A CICP is a formally written proposal for a Change Order. A CICP must be initiated, developed and identified as such by the Contractor or Subcontractor. A CICP must result in a net capital cost reduction while causing no increase in the total life cycle cost of the Project and shall comply with the following conditions:

1. Required function, reliability and safety of the Project will be maintained without detracting from the life expectancy or increasing maintenance requirements.
2. The proposed change shall not cause undue interruption of the Work, nor shall it extend the Contract Time.
3. The proposed change shall comply with all applicable permits, regulations and code requirements, and any other requirements set forth in the Contract Documents. The proposed change shall not involve payment of royalties by the City to the Contractor.

C. Submittal.

The Contractor shall submit a brief description of the proposed CICP prior to preparing the detailed submittal as outlined below.

A CICP submittal must contain pertinent information in supporting documents for City evaluation. As a minimum, the following information shall be submitted:

1. Name of individuals associated with the development and preparation of the CICP.
2. A detailed description and duly signed plans and specifications showing work as presently designed and the proposed changes.
3. A clear identification of all advantages and disadvantages for each proposed change.

4. A detailed procedure and schedule for implementing the proposed change. This detailed procedure and schedule shall include all necessary Contract amendments. Also indicated must be the latest date that the CICP can be approved for implementation.
5. A summary of estimated costs, including the following:
 - a. Project construction costs before and after the CICP. This shall be a detailed estimate identifying the following items for each trade involved in the CICP: (i) quantities of material and equipment; (ii) unit prices of materials and equipment; (iii) labor hours and rates for installation; (iv) Contractor and Subcontractor markups; (v) operation and maintenance costs before and after the CICP; and (vi) cost for implementing the CICP not included elsewhere.
 - b. Contractor's share of savings based on the sharing provision below.
 - c. Other data as required by local permits and regulations and code requirements set forth in the Contract.
6. Time required for execution of the proposed change.

To the extent indicated herein, the Contractor may restrict the City's use of any CICP or the supporting data submitted pursuant to this Program. Suggested wording for inclusion in CICP's is as follows:

"This data furnished pursuant to the construction incentive clause of the Contract shall not be disclosed or duplicated in whole or in part beyond what is necessary to accomplish the review. This restriction does not limit the City's right to use the information if it is available from any source without limitations. The City has the right to duplicate, use and disclose any information if the CICP is accepted."

The City may modify, accept or reject the CICP. However, if the CICP is modified or not acted upon with the time allotted in the proposal, the City will not be liable for the Contractor's cost of developing the CICP if it is withdrawn or rejected.

D. Acceptance.

If the CICP is accepted by the City, the processing procedure specified for Change Orders shall be used. Approval of the CICP by the Architect or Consulting Engineer is required. If the CICP is rejected, the Contractor may not, and shall not, appeal the decision.

E. Sharing Provisions.

Upon acceptance of the CICP, the Contractor shall received fifty percent (50%) of the net capital savings based on the following formula:

Net Capital Savings = (Contract Cost Prior to CICP + City's cost incurred in reviewing,

redesigning and processing the CICP) – (Revised Contract Cost After CICP + CICP Development Cost + CICP Implementation Cost)

The Contractor's development cost is limited to that directly associated with the preparation of the CICP package. Development costs will be reimbursed after approval. However, the City will reject costs that cannot be satisfactorily substantiated.

Section 9.07. Effect on Sureties.

All changes authorized by the Contract Documents may be made without notice to or consent of the sureties on the contract bonds, and shall not reduce the sureties' liability on the bonds.

The City reserves the right to require additional payment or performance bonds to secure a Change Order.

Section 9.08. Unforeseen Site Conditions.

The Contractor shall promptly, and before the condition is disturbed, notify the Owner's Representative, in writing, of any:

1. Material that the Contractor believes may be material that is hazardous waste, as defined in Section 25117 of the 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 materially 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.

Upon receipt of notice from the Contractor, the Owner's Representative and the Architect or Consulting Engineer shall promptly investigate the conditions, and if it is determined that the conditions do materially so differ or do involve hazardous waste, and cause a decrease or increase in the Contractor's cost of, or the time required for, performance of any part of the work shall issue a Change Order or CCD under the procedures described in the Contract Documents.

In the event that a dispute arises between the City and the Contractor as to whether 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 Documents, but shall proceed with all work to be performed under the Contract Documents. 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. No contract adjustment which results in a benefit to the Contractor will be allowed unless the Contractor has provided the required written notice under this Section

No contract adjustment will be allowed under the provisions specified in this Section for any effects caused on unchanged work.

Section 9.09. Notice of Potential Claim.

The Contractor shall not be entitled to payment of any additional compensation for any cause, including any disagreement, protest or change, any act or failure to act by the City, or the happening of any event, thing or occurrence, unless the Contractor first has given the City due advance written notice of potential claim as hereinafter specified. The written notice of potential claim shall set forth the reasons for which the Contractor believes additional compensation and/or time will or may be due, the nature of the costs and/or time involved, and, insofar as possible, the amount of the potential claim. The notice must be given to the Owner's Representative prior to the time the Contractor performed the work giving rise to the potential claim for compensation, if based on an act or failure to act by the City, or in all other cases, within fifteen (15) Calendar Days of the happening of the event, thing, occurrence or other cause giving rise to the potential claim.

See Article 7, Section 7.15 for additional notice requirements related to time extensions.

The Contractor hereby agrees that the Contractor shall have no right to additional compensation for any claim that may be based on any such fact, failure to act, event, thing, occurrence or other cause for which no written notice of potential claim as required herein was filed.

Section 9.10. Claims in Excess of \$375,000.

For all claims in excess of \$375,000, Contractor shall give written notice of claim to the Owner's Representative within thirty (30) Calendar Days of the date of the Owner's Representative's estimate of sums due under Section 8.11 of these General Provisions, stating in detail all grounds alleged by the Contractor to justify an adjustment to the Owner's Representative's estimate and submitting all supporting documents and schedules. Thereafter, Contractor must comply with the requirements of the California Government Code regarding claims against public entities (Government Code Sections 900 and following).

The Contractor's notice of claim shall be certified under penalty of perjury and in compliance with the California False Claims Act, as set forth in Section 9.12 below. Failure to include these required certifications will constitute grounds for immediate rejection of the claim and shall be deemed a waiver and absolute bar of the claim, including any right to pursue the claim further.

Failure to comply with these notice and/or time requirements shall constitute a waiver of the claim and an absolute bar against further pursuing the claim.

Section 9.11. Claims of \$375,000 or Less.

All claims under this Contract of \$375,000 or less shall be resolved in accordance with Section 20104 et seq. of the Public Contract Code, except that the claim must be submitted no later than thirty (30) Calendar Days of the date of the Owner's Representative's estimate of sums due under Section 8.11 of these General Provisions. The Contractor's claim shall be certified under penalty of perjury and in compliance with the California False Claims Act, as set forth in Section 9.12 below. Failure to include these required certifications will constitute grounds for immediate rejection of the claim and shall be deemed a waiver and absolute bar of the claim, including any right to pursue the claim further.

Section 9.12. Claim Certification.

Contractor acknowledges that it has read and is familiar with the provisions of the False Claims Act (California Government Code §12650 et seq.). Submission by Contractor of any claim (as the term “claim” is defined in False Claims Act) to the City in connection with the Project, whether on its behalf or on behalf of a Subcontractor or material supplier, shall constitute a representation by Contractor to the City that submission of the claim does not in any respect, violate the False Claims Act. Any party with an interest in the claim, including Contractor and any Subcontractor or material supplier, shall certify under penalty of perjury the validity and accuracy of any claim submitted to the City, as provided below. Compliance with this claims certification requirement shall be a condition precedent to any obligation City might otherwise have to review the claim and failure to provide such certification shall constitute a waiver of the claim.

The claim certification required by this section shall provide as follows:

CLAIM CERTIFICATION

Under penalty of perjury, and with specific reference to the California False Claims Act, Government Code sections 12650, et seq. I certify that submission of the attached claim is made in good faith; that the supporting data prepared by the undersigned company are accurate and complete to the best of my knowledge and belief; that submission of the claim to the City does not violate the False Claims Act; and that I am duly authorized to certify the claim on behalf of the claimant.

Dated: _____ Company _____

Signature _____

Title _____

ARTICLE 10. SAFETY, CONFINED SPACES, TRAFFIC CONTROL, UTILITIES AND TRENCHING

Section 10.01. General Safety Requirements.

The Contractor shall comply with all safety requirements in the General Provisions, as well as with all applicable occupational safety and health standards and rules set up to help eliminate or limit workplace hazards proven or suspected by research or experience to be harmful to personal safety and health

The Contractor shall have on record with the City the following twenty-four (24) hour emergency contact numbers:

- A. Traffic control device supplier: Supplier of barricades, steel plates, delineators, channelizers, construction signs, and other traffic control equipment to be used during construction.
- B. Contractor representative: An employee of the Contractor having the authority to make decisions and the ability to respond to an emergency on the project at any time.
- C. Safety Representative: The Contractor's Safety Representative shall have the authority to make decisions regarding safety and health concerns on the project and to direct the Contractor's personnel to abate any hazard identified by the City.

Section 10.02. Work During Hours of Darkness.

Working areas utilized by the Contractor during the hours of darkness shall be illuminated to conform to the minimum illumination intensities established by California Occupational Safety and Health Administrational Construction Safety Orders.

Section 10.03. Sewers and Appurtenances/Contaminations.

The Contractor is warned that when the work involves existing sewers and appurtenances that have been exposed to sewage and industrial wastes, these facilities shall be considered contaminated with disease-causing organisms. Personnel in contact with contaminated facilities, debris, wastewater or similar items shall be advised by the Contractor of the necessary precautions that must be taken to avoid becoming diseased. It is the Contractor's responsibility to urge its personnel to observe a strict regiment of proper hygienic precautions, including any inoculations recommended by the local public health officer.

Because of the potential danger of solvents, gasoline, and other hazardous material in the existing sewer and storm drain pipes, these areas shall be considered hazardous. The Contractor shall be aware of these dangers and shall comply with Article 108, "Confined Spaces", of the General Industrial Safety Orders (Cal-OSHA) contained in the California Administrative Code, Title 8.

Section 10.04. Confined Spaces.

When working in a confined space, the Contractor shall comply with all requirements of Article 108, "Confined Spaces", of the General Industrial Safety Orders (Cal-OSHA), contained in the California Administrative Code, Title 8, sections 5156 through 5159 ("Article 108"). The Contractor shall provide all monitoring and safety equipment necessary to perform pre-entry checks of all confined spaces. The Contractor shall also provide all monitoring, safety and communications equipment required for operations in those confined spaces requiring conformance to Article 108.

Identified on the Contract Drawings are those confined spaces for which the City has determined, based upon experience or knowledge that an environment free of dangerous air contamination and/or oxygen deficiency cannot be ensured through the implementation of the applicable provisions of Article 108. The Contractor shall be provided with information regarding known hazards and known or potential permit spaces.

For entry into designated confined spaces, as well as permit-required confined spaces, the Contractor shall follow all procedures required for conformance with Article 108.

To assure compliance with the above, the Contractor shall submit for review to the Owner's Representative:

- A. The Contractor's detailed procedures for confined space operation, including without limitation, operating, rescue and surveillance of surrounding areas procedures.
- B. Copies of all documents and certificates that qualify the Contractor to safely perform work in confined spaces. The Contractor shall also submit all applicable Materials Safety Data Sheets (MSDS) and hazard information on chemicals, products, materials or procedures.
- C. Sufficient documentation and evidence that a confined space entry can be made in accordance with Article 108. Documentation shall include, but not be limited to the following:
 - Equipment availability, suitability and integrity
 - Personnel training
 - Experience
 - Supervision
 - Safety
 - Accident experience
 - Permit-required confined space policy
 - Lock-out/tag-out procedures (if applicable)
 - Hot work procedures (if applicable)

The Contractor's submittal shall be made at least ten (10) Calendar Days prior to any confined space entry in accordance with the requirements of Article 5, Section 5.10 of the General Provisions of the City's Standard Specifications and must be determined to be satisfactory by the City before such work will be allowed to proceed. The Contractor shall conform to the procedures established by its submittal at all times during operations in all confined space operations.

After the City has reviewed the Contractor's submittal to perform confined space entry work, the Contractor will be provided with the following:

- A. Notification of the location, physical characteristics, known hazards, etc. regarding the confined space the Contractor anticipates entering.
- B. Information regarding safety items (e.g., nearby emergency equipment), precautions, procedures, safeguards, etc. installed or implemented and that may be available to the

Contractor's employees in or near the confined space.

A debriefing session will be held with the Contractor at the conclusion of the entry operation to ascertain if any hazards were encountered or created and remain.

Failure of the City to identify a confined space shall not relieve the Contractor of its responsibility to conform to the requirements of Article 108 and this Section of the General Provisions.

Section 10.05. Public Convenience and Safety.

A. Public Convenience.

All work within public streets and/or roadway rights-of-way shall be done in an expeditious manner and cause as little inconvenience to the traveling public as possible. All public traffic shall be permitted to pass through the Work, and the Contractor shall conduct operations so as to offer the least possible obstruction and inconvenience to the public. Vehicles, bicycles, and pedestrians must be allowed to pass at all times except during an emergency closure.

In addition to the requirements for furnishing facilities for public safety as specified in Section 10.06 of these General Provisions, the Contractor shall erect such warning and directional signs as necessary or as directed by the Engineer for expediting the passage of public traffic through or around the Work and the approaches thereto. All warning and directional signs shall comply with Section 10.06, "Public Safety and Traffic Control", of these General Provisions and the Caltrans Manual of Traffic Controls. The Owner's Representative shall be notified at least twenty-four (24) hours in advance of the Contractor's desire to change any existing traffic patterns. No changes shall be made until approved by the Owner's Representative.

In addition to the requirements for furnishing facilities for public safety as specified in Section 10.06 of these General Provisions, the Contractor shall erect such warning and directional signs as necessary or as directed by the Engineer for expediting the passage of public traffic through or around the Work and the approaches thereto. All warning and directional signs shall comply with Section 10.06, "Public Safety and Traffic Control", of these General Provisions and the Caltrans Manual of Traffic Controls. The Owner's Representative shall be notified at least twenty-four (24) hours in advance of the Contractor's desire to change any existing traffic patterns. No changes shall be made until approved by the Owner's Representative.

When traffic control signals are shut down as provided in Section 86-1.05 of the State Specifications, the Contractor shall control traffic by the use of flaggers, as directed by the Engineer, at those locations set forth in the Special Provisions. No STOP signs will be permitted at these locations. The flaggers required for this operation shall be paid for as extra work as set forth in Article 8 of the General Provisions of the City's Standard Specifications.

When pipelines, to be installed under the Contract, cross certain streets or highways, as noted on the plans, the Contractor will be permitted to open the trench for only a portion of the width of the pavement at any one time so that one-way traffic can be maintained.

Water or dust palliative shall be applied if ordered by the City for the alleviation or prevention of dust nuisance caused by the Contractor's operations.

Fire hydrants on or adjacent to the Work shall be kept accessible to fire-fighting equipment at all times.

B. Pedestrian and Bicyclist Access.

The Contractor shall not block the movement of pedestrian or bicycle traffic. The Contractor shall provide for pedestrian and bicycle traffic by phasing construction operations or by providing alternative pedestrian and bicyclist access through or adjacent to construction areas. Effort must be made to separate the pedestrian or bicycle traffic from the work area. Proper advance notice signage with reasonable detours shall be installed and maintained through all phases of construction. Access to pedestrian and bicycle devices at traffic signals shall be maintained at all times. At no time shall pedestrians be diverted into a portion of the street used for vehicular traffic or on to private property unless adequate lane closure signage is in place. Walkways in construction areas shall be maintained smooth and be free of abrupt changes in grade. Pedestrian and bicycle access shall consist of four-foot (4') wide bridges across trenches and four-foot (4') wide passageways through construction areas. Hand railings for pedestrians shall be provided when required by Cal-OSHA Regulations or the Americans with Disabilities Act (ADA) on each side of each bridge or passageway to protect pedestrians from hazards caused by construction operations or adjacent vehicular traffic.

Railings or barricades, which border passageways located in roadway areas, shall be reflectorized on the side facing oncoming traffic.

C. Written Notification to Residences and Businesses

The Contractor shall notify, in writing, residents and business establishments along the route of the Work at least ten (10) Working Days prior to road closures and at least three (3) Working Days prior to disruption of ingress and egress. The notice provided to the residences or businesses shall include, at a minimum, schedule of closures and/or parking restrictions with estimated closure and/or parking restriction times, closure and/or parking restriction location, alternate route or detour, and name and twenty-four (24) hour phone number of a contact person employed by the Contractor.

D. Access to Driveways, Houses and Buildings.

Access and passable grades shall be maintained at all times for business establishments during construction. Safe and passable pedestrian, bicyclist, and vehicular access shall be provided and maintained to fire hydrants, homes, commercial and industrial establishments, churches, schools, parking lots, service stations, motels, fire and police stations, hospitals, and establishments of similar nature. Access to these facilities shall be continuous and unobstructed unless otherwise approved. Ramps and driveways shall not have "lips" or elevation differences greater than three-eighths of an inch (3/8") or one (1) cm.

When abutting property owner's access across the right-of-way line is to be eliminated, repaired, or replaced under the Contract, the existing access shall not be closed until the replacement access facilities are completed and functional.

E. Property Damage.

Any property damage caused by the Contractor shall be repaired at the Contractor's expense to the satisfaction of the City.

F. Work On Private Property.

The Contractor must obtain written permission from the owner of any privately owned property prior to beginning any work, storing materials or otherwise conducting any operations on said property. The written approval from the property owner must be on file with the City before any operations will be permitted on said property.

G. Hazardous Conditions Created.

Whenever the Contractor's operations create a condition hazardous to pedestrians, bicyclists, or the traveling public, the Contractor shall, at the Contractor's own expense, furnish, erect and maintain any fences, temporary railing (Type K), barricades, lights, signs and other devices necessary or as directed by the City to prevent accidents or damage or injury to the public or property.

If needed for public use, roadway excavation shall be conducted to maintain a smooth and even surface satisfactory for use by public traffic at all times. The surface of the roadbed shall be kept in a smooth, even condition free of humps and depressions, satisfactory for the use of public traffic as determined by the City.

Temporary facilities that the Contractor uses to perform the Work or store or stage material or equipment shall not be installed or placed where they will interfere with the free and safe passage of public vehicular, bicycle, or pedestrian traffic, and at the end of each day's work and at other times when construction operations are suspended for any reason, the Contractor shall remove all equipment and other obstructions from the portion of the roadway open for use by public traffic. Spillage resulting from hauling operations along or across any public traveled way shall be removed promptly, before the end of the working day.

Section 10.06. Public Safety and Traffic Control.

A. Responsibility for Safety.

It is the Contractor's responsibility to provide for public safety and traffic control. The Contractor shall furnish, erect and maintain such warning devices as are necessary to protect the public. The Engineer may review the Contractor's operations and/or warning devices and inform the Contractor if an unsafe or hazardous condition is observed. The Contractor may be directed by the Engineer to abate the hazard. The Contractor must comply with all directives for hazard abatement immediately and within the timeframe imposed by the Engineer. However, the Contractor shall not be relieved of its responsibility to protect the public by any approval given by the Engineer or by the Engineer's failure to point out any deficiency.

B. Passage of Emergency Vehicles.

The Contractor shall provide for the uninterrupted passage of emergency vehicles through the Work zone at all times regardless of the controlled traffic conditions in place at the time.

C. Traffic Controls.

The protection and maintenance of existing signs and the removal, protection, storage and

resetting of City traffic signs that are affected by the Work shall be the responsibility of the Contractor, as directed by the Engineer, or as specified in the Special Provisions. The Contractor shall inventory all existing signs prior to the start of work. The Engineer shall confirm the inventory in writing prior to the start of work. Traffic signs and traffic control facilities existing within the limits of the Project shall not be moved except as necessary to prevent them from being damaged by construction operations. When a sign needs to be removed because it interferes with the Contractor's work, it shall be done in one of the following prescribed manners:

1. Stop signs and other traffic control signs and facilities necessary for the control of traffic during the project shall be maintained in their original positions, as noted in the inventory, except for temporary repositioning necessitated by the Contractor's work. No signs shall be moved from their original positions without prior approval of the Engineer. Temporary sign positions must be equivalent to the original positions for driver visibility. The standard sign position is seven (7) to ten (10) feet from the edge of pavement. Stop signs should not normally be located more than thirty (30) feet from the roadway painted centerline (unless they are supplemental signs), more than forty (40) feet in advance of the limit line, or more than twenty (20) feet beyond the limit line. When the intersection approach width for one direction of traffic is thirty (30) feet or more, the Engineer may require that stop signs be erected both on the left and right sides of that approach.

Stop signs and other traffic control signs in temporary positions may be mounted on portable supports only during working hours when the Contractor's workers are available to maintain the signs in proper position at all times. The position and mounting devices for temporary signs shall be subject to the approval of the Engineer.

Outside of working hours, and at all other times when no Contractor's workers are available to maintain signs on portable temporary supports, all temporary stop signs and other traffic control signs must be mounted on their original or equivalent posts. The posts must be set in the ground with compacted backfill, to a depth of at least thirty-two (32) inches, in the same way that permanent signs are installed. The bottom of the sign plate must be at least five (5) feet but not more than seven (7) feet above the ground, and must be seven (7) feet above the ground if subject to pedestrian traffic adjacent to the post.

2. Traffic signs and traffic control facilities not necessary for the control of traffic during the Project shall be removed and salvaged by the Contractor. When signs are removed and salvaged as provided herein, they shall be stockpiled as noted in Section 15-2.04 of the State Specifications, in an upright position, and the City Traffic Sign Maintenance Section shall be notified within twenty-four (24) hours of such stockpiling.

The project sign inventory shall indicate which of the above categories applies to each sign, subject to approval by the Engineer.

No additional payment shall be made for the above-described work. It shall be included in the unit prices for other activities.

The cost of work incurred by the City sign maintenance forces as a result of the failure of the Contractor to satisfactorily protect, maintain and reinstall City signs within the construction Project as set forth herein shall be subject to deduction from contract progress payments due to the Contractor.

The Contractor shall, forty-eight (48) hours in advance of beginning any work, notify the Engineer in writing of the name, location and twenty-four (24) hour per day telephone number of the company which will supply barricade and warning devices for the Project. Said supplier must be approved by the Engineer and must be available on a twenty-four (24) hour basis for maintaining, placing, and replacing barricades and warning devices. If the Engineer is unable to contact the Contractor or its superintendent, the supplier will be called directly, and the Contractor shall accept charges made by the supplier for service performed, as a result of the Engineer's call.

Reference is made to the requirements of California Vehicle Code, section 21400 et seq. regarding traffic control devices and barricades. All signs, barricades, delineators, and other traffic control devices used for the detouring or routing of traffic in, around, and through the construction area, shall conform to those standards set forth in the latest edition of the State of California, Department of Transportation "Manual of Traffic Controls for Construction and Maintenance Work Zones." Delineators shall have a Type III reflective sheeting surface of not less than 3" x 12". Barricades and delineators shall be maintained so that the reflective materials are clean and visible during hours of darkness.

A high level warning device is required for use on major streets at the direction of the Engineer, when a lane is closed or work encroaches in a lane of traffic or when barricades are placed in a moving lane of traffic. A single barricade shall not be placed alone in the traveled way.

Use of flashing arrow signs is required on major (four or more lanes) streets for lane closures during hours of darkness and for all lane closures lasting more than two (2) hours.

On major streets, opposing traffic is separated by delineators, traffic striping, or raised pavement markers. Where traffic is diverted to the left of an existing double yellow centerline into a painted median, or into a left-turn lane, delineators are to be utilized beyond the work and to return traffic to normal lanes.

All delineators used during hours of darkness must be stabilized by being nailed or fastened to the pavement.

Unless specifically set forth in the Special Provisions, all marked lanes of traffic shall be open on all major streets in each direction during the peak traffic hours of 7:00 a.m. to 8:00 a.m. and 3:30 p.m. to 6:00 p.m.

During the first Friday after Thanksgiving and the last twenty-four (24) Calendar Days of December, the Contractor shall not close any traffic lanes on a major street except as provided in

the Special Provisions. The Engineer may grant permission to close traffic lanes on a major street when the Contractor submits a written request two (2) Working Days in advance, and the Contractor receives written permission from the Engineer. The directional flow of traffic, the proximity to retail business, the total flow of traffic related to the capacity of the roadway, and the interference to public safety will be conditions the Engineer considers in determining whether to grant or deny permission.

If, for an emergency, the Contractor is required to close a lane on a major street during peak traffic hours or during the last twenty-four (24) Calendar Days of December, the Contractor shall immediately notify the City Construction Inspection office.

A traffic lane shall be considered open if it is surfaced with asphalt at least ten (10) feet wide.

Major streets are those roadways with two or more marked traffic lanes in each direction or other street as determined by the Engineer.

A detailed traffic plan, prepared by a qualified Engineer will be required for lane closures during the hours of darkness or lasting more than one (1) day and shall be submitted for approval by the Engineer at least ten (10) Working Days prior to the proposed lane closure.

The Engineer may approve in writing traffic restrictions necessary for public safety or emergency conditions during peak traffic hours, and during the month of December.

The Contractor shall maintain traffic cones, barricades, temporary striping, or yellow delineators (reflectorized or illuminated) within and on the approaches to the Project to properly indicate to the motorist the driving centerline of the roadway. (The motorist shall be permitted to drive to the right of these devices as provided in the California Vehicle Code.) At least one barricade or delineator shall be placed approximately each fifty (50) feet and a C30 sign approximately each five hundred (500) feet adjacent to the work area. The cone spacing in the tapers shall be in accordance with Section 7-1.09 of the State Standard Specifications. The Contractor may remove the barricades at the direction of the Engineer if they interfere with the movement of traffic, under special conditions; however, the barricades shall be replaced when the Engineer determines the special conditions no longer apply. In lieu of barricades, temporary paint striping, or traffic cones may be used. To delineate the centerline of the roadway, the Contractor may use construction grade pavement striping tape (reflectorized). Six-inch (6") by four-inch (4") minimum pieces of tape shall be placed on the centerline at 25-foot (25') (maximum) intervals.

The Contractor shall not remove from the Project barricades or other traffic control devices placed within the Project limits, or on the approaches to the Project, for the direction and protection of the traveling public, until the Contractor has given three (3) Working Days' advance written notice to the Engineer. Such notice shall also constitute the Contractor's request for City installation of permanent directional and control signs, striping, and markings on public roads. Neither the notice nor the placing of signs, striping, and/or markings shall in any way relieve the Contractor of its responsibility under the terms of the Contract.

Should the Contractor desire the City to do signing and striping on public roads and streets in advance of the timing set forth herein, a separate letter agreement may be made between the

City and the Contractor.

On new developments, the Contractor will be required to maintain a Type III barricade eight (8) feet in length in the center of the road indicating that the road is closed except to construction personnel. The barricade is not to be removed until the Project is accepted by the City, and the City has provided any necessary signs and striping.

The Contractor shall do all traffic control work without direct payment as specified in Article 8, Section 8.04 of the General Provisions of the City's Standard Specifications, except as directed by the Engineer during times when traffic signals are out of service, as set forth in Section 10.05 of these General Provisions.

D. Inadequate Traffic Controls and After-Hour Maintenance and Repairs.

Should the Contractor appear negligent in furnishing and maintaining sufficient traffic control devices or protective measures or fail to provide flaggers as necessary to control traffic, the Engineer may direct the Contractor, at the Contractor's expense, to abate the hazard.

Should the Engineer point out the inadequacy of warning devices and protective measures, that action shall not relieve the Contractor from responsibility for public safety or abrogate the obligation to furnish and pay for these devices and measures.

Should the Contractor fail to properly furnish or maintain traffic controls, or correct a hazard caused by inadequate or inappropriate traffic control, the City will abate the hazard. All City costs to abate the hazard shall be reimbursed by the Contractor or deducted from the progress payment.

E. Competent Flaggers.

Whenever the Contractor's operations require one-way traffic or create a condition hazardous to the public traffic, or whenever requested by the Engineer, the Contractor shall provide competent and courteous flaggers whose sole duties shall consist of directing the movement of public traffic through or around the Work. All flaggers shall be trained as required by Cal-OSHA Regulations and shall be prepared to provide verification of such training to the City when requested.

F. Construction Signs.

The Contractor is responsible for supplying, installing and maintaining all construction signs and posts. Construction signs used in the City shall conform to the following minimum sizes:

<u>Sign Code</u>	<u>Minimum Size</u>	<u>Sign Code</u>	<u>Minimum Size</u>
W1 (Rt or Lt)	30" x 30"	C1	36" x 36"
W2 (Rt or Lt)	30" x 30"	C2	36" x 24"
W3 (Rt or Lt)	30" x 30"	C3	40" x 20"
W5 (Rt or Lt)	30" x 30"	C3A	40" x 20"
W6	24" x. 24"	C4	24" x 24"
W11	30" x 30"	C5 (Rt or Lt)	36"x 12"
W15	30" x 30"	C6	24" x 24"
W18	30" x 30"	C7	20" x 12"

W19	30" x 30"	C8	30" x 30"
W33	30" x 30"	C9A	36" x 36"
W44	36" x 36"	C10	24" x 24"
W50	30" x 30"	C11	48" x 30"
W58	36" x 36"	C13	48" x 18"
SW42	30" x 30"	C14	28" x 12"
SW43 (Rt or Lt)	30" x 30"	C16	36" x 36"
SW44 (Rt or Lt)	30" x 30"	C18	36" x 36"
Type K Marker	15" x 6"	C19	36" x 36"
Type L Marker	8" x 24"	C20 (Rt or Lt)	36" x 36"
Type N Marker	18" x 18"	C21	36" x 36"
Type P Marker	12" x 36"	C22B	24" x 24"
Other Warning		C22C	24" x 12"
Signs	0" x 30"	C23	24" x 24"
		C24	24" x 24"
		C25	24" x 24"
		C27	24" x 24"
		C28A	18" x 18"
		C28B	18" x 18"
		C29	24" x 7"
		C30	36" x 24"
		C32	36" x 24"
		C36	36" x 36"
		Other Construction	
		Signs	30" x 30"

<u>Sign Code</u>	<u>Minimum Size</u>
R1	30"
R7	24" x 30"
R7A	24" x 18"
R10 (Rt or Lt)	36" x 12"
R11	30" x 30"
R11A	30" x 18"
R16	24" x 24"
R16A	24" x 18"
R17	24" x 24"
R17A	24" x 18"
R18-1 (Rt or Lt)	20" x 32"
R18-2 (Rt or Lt)	36" x 36"
R41	24" x 30"
R42	24" x 30"
Other Regulatory	
Signs	30" x 30"

G. Temporary Bridging of Excavations and Trenches.

Whenever necessary or requested by the City, trenches and excavations shall be bridged to allow an unobstructed flow of traffic.

1. Bridging shall be secured against displacement by using adjustable cleats, angle, bolts or other devices.
2. Bridging shall be placed and secured to work within the minimum noise levels in accordance with City Code, Section 8.24, "Notice Control".
 3. Steel plates used for bridging shall extend at least one (1) trench width on each side beyond the edges of the trench. Temporary paving materials shall be used to feather the edges of the plates to minimize wheel impact.
 4. Depending upon the depth of the excavation, soil type, vibration and other variables, the trench may require shoring to support bridging. The Contractor should confer with a California Licensed Engineer or other appropriate professional if there is any question about the capability of the excavation and bridging to support the forces of traffic.

WIDTH OF EXCAVATION	MINIMUM THICKNESS OF STEEL PLATES
2.0 ft. or less (0.6 m or less)	7/8 inch (22mm)
3.0 ft. (0.9 m)	1 inch (26 mm)
4.0 ft. (1.2 m)	1-1/4 inch (32 mm)

Whenever the work area is adjacent to a traffic lane and there is a pavement cut, ditch or trench over two (2) inches deep, the Contractor shall maintain continuous barricades spaced at approximately twenty-foot (20') intervals for the first one hundred (100) feet from the beginning of the cut, ditch or trench and at approximately fifty-foot (50') intervals thereafter. If the cut, ditch or trench is more than ten (10) feet from a traffic lane, the spacing may be greater but must not exceed two hundred (200) feet.

H. Entering and Leaving the Construction Zone.

Construction equipment shall enter and leave the roadway by moving in the direction of public traffic. All movements of workmen and construction equipment on or across lanes open to public traffic shall be performed in a safe manner that will not endanger the workmen or the public. When leaving a work area and entering a roadway carrying public traffic, the Contractor's equipment operator shall yield to public traffic.

I. Bus Stops.

If construction operations will obstruct a bus stop, the Contractor shall notify Folsom Stage Line (FSL) via the Folsom Public Works Department at 355-7272, forty-eight (48) hours in advance of beginning that portion of the Work and make provisions agreeable to FSL to provide an alternate location where people can safely board the bus.

Section 10.07. Barricading Open Trenches.

Any excavation permitted by the City to be left open shall be barricaded with Type II or Type III barricades with flashers. Signs stating "OPEN TRENCH" shall be posted when requested by the City. All open excavated areas shall be barricaded with at least two (2) Type III barricades at the end of the excavation

that faces oncoming traffic. Any excavation within four feet (4') of the traveled way, not protected by K-rail or a similar traffic control barrier approved by the City, shall be backfilled at the end of the work shift or plated in accordance with Section 10.06(G), "Temporary Bridging of Excavations and Trenches", of these General Provisions.

Section 10.08. Existing Utilities.

A. General.

The Contractor shall coordinate and fully cooperate with the City and utility owners for the location, relocation, and protection of utilities. The Contractor's attention is directed to the existence of utilities, underground and overhead, necessary for all buildings in the work area. The Contractor shall arrange with utility owners for the location of service lines in advance of the actual construction and for the relocation of such facilities, if necessary, by the utility owner or the Contractor.

B. Maintenance and Protection.

Unless otherwise shown or specified in the Contract, the Contractor shall maintain in service all drainage, water, gas, sewer lines, power, lighting, telephone conduits, and any other surface or subsurface utility structure that may be affected by the Work. However, the Contractor, for convenience, may arrange with individual owners to temporarily disconnect service lines of other facilities along the line of the Work. The cost of disconnecting and restoring such utilities shall be borne by the Contractor.

Unless otherwise specified in the Special Provisions, the Contractor shall protect all existing utilities on all projects being constructed, whether inside or outside of highway rights-of-way. The utility owner in these cases may elect to provide the necessary protective measures and bill the Contractor for the cost. "Existing utilities" further includes traffic control devices, conduits, streetlights, and related appurtenances.

Existing utility facilities that are to be relocated, including traffic signals and light poles, shall be relocated prior to paving. No paving shall be performed around existing utility facilities that are to be relocated.

The public utility, where it is the owner, shall have the sole discretion to perform repairs or relocation work, or to permit the Contractor to do such repairs or relocation work.

C. Exact Locations Unknown.

It is recognized by the City and the Contractor that the location of existing utility facilities shown on the Contract Drawings and Specifications are approximate and that their exact locations are unknown. Recognition is given to the fact that there may be additional utilities existing on the property unknown to either party to the Contract. Location of utilities as shown on the Contract Drawings and Specifications represent the best information obtainable from utility maps and other information furnished by the various utility owners involved. The City warrants neither the accuracy nor the extent of actual installations as shown on the Contract Drawings and/or Specifications

Because of this uncertainty, it may become necessary for the Engineer to make adjustments in

the line or grade of sewers or storm drains. Installation of such adjusted lines shall be made at the regular unit price bid for the work, and no additional compensation will be paid therefore, unless the scope and character of the work has been changed.

In accordance with Government Code section 4215, the City shall make provisions to compensate the Contractor for the costs of locating, repairing damage not due to the failure of the Contractor to exercise reasonable care, removing, relocating or protecting existing main or trunk line utility facilities not indicated in the Contract Drawings and Specifications with reasonable accuracy, and for equipment on the Project necessarily idled during such work. In no event shall the City be liable for any further or additional costs resulting directly or indirectly from any such occurrence. Compensation will be in accordance with Article 9, "Changes and Claims", of the General Provisions of the City's Standard Specifications, and in accordance with Section 8-1.09 of the State Specifications. Nothing herein shall be deemed to require the City to indicate the presence of existing utility services, laterals, or appurtenances whenever their presence can be inferred from other visible facilities such as buildings, meters, junction boxes, valves, service facilities, identification markings, and other indicators on or adjacent to the Work.

If the Contractor discovers utilities not identified in the Contract Drawings or Specifications, the Contractor shall immediately notify the Engineer and the utility owner by the most expeditious means available and later confirm in writing.

If the completion of the Work is delayed by failure of the City or the utility owner to remove, repair, or relocate the utility, such delay may be an excusable delay as defined and provided for in Article 7, Section 7.15 of the General Provisions of the City's Standard Specifications. Nothing herein shall preclude the City from pursuing any appropriate remedy against the utility for delays that are the responsibility of the utility. The Contractor, on a street, road, channel or pipeline construction project shall not be assessed liquidated damages for delay in completion of the project for that portion of such delay as is caused by failure of the City or the owner of a utility to provide for the removal or relocation of existing utilities.

D. Underground Service Alert (USA).

The City is a member of the Underground Service Alert (U.S.A.) one-call program. Except in an emergency, the Contractor and any Subcontractor planning to conduct any excavation shall notify the U.S.A. at least two (2) Working Days, but no earlier than fourteen (14) Calendar Days, in advance of performing excavation work. U.S.A. can be reached by calling the toll free number – 800-227-2600. U.S.A. does not accept emergency calls. The provisions of Government Code section 4216 shall be followed.

Each phase of a project shall be called into U.S.A. and continuing excavation reported every fourteen (14) Calendar Days. The U.S.A. will provide an inquiry identification number to the person contacting the center. The U.S.A. inquiry identification number shall be available to the Project Inspector at the job site along with the date U.S.A. was called. If the U.S.A. notifications are not kept up-to-date, the excavation may be stopped and a new forty-eight (48) hour notice will be required before continuing the excavation. If, at any time during an excavation for which there is a valid inquiry identification number, the field markings are no longer reasonably visible, the Contractor shall contact the appropriate U.S.A. notification center to have the area re-marked.

Prior to calling U.S.A., the Contractor shall clearly mark the excavation site with white, water-

soluble paint in paved areas or flags, stakes, whickers, or some other approved method, in unpaved areas. This paint shall be applied as white dots located inside the excavated area so that when construction is completed there will be no remnants of the paint. At those locations where the excavation is not known, the Contractor shall make an attempt to closely identify and outline the areas to be explored. The Contractor shall determine the exact location (twenty-four inches (24”) from outside edge on either side of the facility) of utilities in conflict with the proposed excavation by exposing the subsurface installation with hand tools before using any power-operated or power-driven equipment. The Contractor shall not call in to U.S.A. the entire project boundaries or, on road construction projects, the entire length of the project. The Contractor shall only request the marking of facilities within the area to be excavated within fourteen (14) Calendar Days of the call.

E. Damage to Existing Utilities.

The Contractor shall notify the affected utility of any contact, scrape, dent, nick, or damage to their facility. Any operator or excavator who negligently violates Government Code section 4215 is subject to a civil penalty in an amount not to exceed ten thousand dollars (\$10,000). Any operator or excavator who knowingly and willfully violates Government Code section 4214 is subject to a civil penalty in an amount not to exceed fifty thousand dollars (\$50,000).

Markings.

The following table designates color codes and symbols that shall be used by the Contractor and the utility owners to identify utilities.

FIELD MARKINGS COLOR CODES AND SYMBOLS		
COLOR	SYMBOL	NAME
Safety Precaution Blue	W	Water
Safety Alert Orange	FA	Fire Alarm
	Tel	Telephone/Communication
	R	Railroad
	TV	Television/CATV
Safety Green	WU	Western Union
	S	Sewer
Safety Red	D	Storm Drain
	L	Street Lighting
	E	Electric
High Visibility Safety Yellow	T	Traffic Signals
	G	Gas
Purple	Company Name	Oil or Chemical
Pink/Fuchsia	RW	Steam
White	TSM	Reclaimed Water
	USA	Temporary Survey
		Proposed Excavation – Paint outline of proposed excavation area with white dotted line

A. Permit.

The Contractor must obtain a permit from the Division of Industrial Relations per Labor Code Section 6500, as specified in California Code of Regulations, Title 8, Article 6, Section 1539 "Permits" of the Construction Safety Orders, for all excavations five feet (5') or deeper to which an employee is required to descend. The permit shall be kept at the construction site at all times.

B. Shoring, Bracing, Shielding and Sheeting.

In accordance with Labor Code Section 6705, at least five (5) Working Days in advance of excavation of any trench or trenches five feet (5') or more in depth, with a total value of twenty-five thousand dollars (\$25,000) or more, the Contractor shall submit to the City a detailed plan showing the design of shoring, bracing, sloping, or other provisions for worker protection from the hazard of caving ground during the excavation of such trench or trenches. If such plan varies from the shoring system standards, the plan shall be prepared by a California registered civil or structural engineer. A signed copy of the detailed plan shall be on the site at the time of the excavation. Nothing in this Section shall be deemed to allow the use of a shoring, sloping, or protective system less effective than that required by the Construction Safety Orders. Nothing in this Section shall be construed to impose tort liability on the City or any of its employees. These systems must support the sides of the excavation and prevent soil movement that could cause injury to any person or structure. Any damage resulting from a lack of adequate shoring, bracing, shielding or sheeting shall be repaired at the Contractor's expense.

The Contractor shall immediately replace or repair any unsafe ladder, scaffolding, shoring, or bracing, or correct any other dangerous or hazardous situation that exists.

A Competent Person, as defined in California Code of Regulations, Title 8, Construction Safety Orders, Section 1504, "Definitions", shall be on site at all times when the Contractor's employees are working within the trench. A "Competent Person" is one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measure to eliminate them.

The price bid for work that will require an excavation of five feet (5') or deeper (or less if conditions warrant) shall include the cost of adequate sheeting, shoring and bracing, or equivalent method conforming to applicable safety orders, unless a separate bid item for such work is included in the bid form.

Section 10.10. Preservation of Property.

Roadside and/or on-site trees and shrubbery that are to remain, pole lines, fences, signs, traffic control devices, striping, survey markers and monuments, buildings and structures, conduits, under or above ground pipelines, and any other improvements and facilities shall be protected from injury or damage. If such objects are injured or damaged by reason of the Contractor's operations, said objects shall be replaced or restored at the Contractor's expense to a condition as good as when the Contractor entered upon the Work. The Contractor shall receive the Engineer's approval before the removal of any road sign or permanent traffic control device that interferes with the Work.

ARTICLE 11. CULTURAL RESOURCES

Section 11.01. Responsibility.

In the event cultural resources are discovered during subsurface excavations at locations of the work, the Contractor shall cease all construction operations at the location of such cultural resource find until such time that a qualified archeologist can be called to assess the value of these resources and make recommendations to the State Historic Preservation Officer for further direction. If the State Historic Preservation Officer or the Engineer directs the work be temporarily ceased at the location of the cultural find the Contractor shall temporarily suspend the work at the location.

Section 11.02. Controlling Operation.

If the Engineer or the State Historic Preservation Officer directs that the work be temporarily suspended for cultural purposes on a portion of the work which is the current controlling operation or operations on the Contract, the total number of days for which the suspension is in effect shall be added to the number of allowable contract days in computing the total number of allowable contract days.

Section 11.03. Non-Controlling Operation.

If a portion of the work at the time of such suspension is not a controlling operation, but subsequently does become the current controlling operation, the determining of contract time will be made on the basis of the current controlling operation or operations.

Section 11.04. Compensation Determination.

If, as a result of a temporary suspension of the work at a location or locations, the Contractor sustains a loss which could not have been avoided by his judicious handling of forces, equipment, and plant, to perform other work on the contract, there shall be paid to the Contractor such amount as the Engineer may find to be fair and reasonable compensation for such part of the Contractor's actual loss, as, in the opinion of the Engineer, was unavoidable, to be determined 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:

- A. The right of way delay factor for each classification of equipment shown in the State of California Department of Transportation publication entitled "Labor Surcharge Equipment Rental Rates" will be applied to such equipment rental rate.
- B. 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.
- C. The days for which compensation will be paid shall be for all or portion of calendar days, excluding Saturdays, Sundays, and legal holidays, during the existence of such delay.

Actual loss shall be understood to include no items of expense other than idle time of equipment and necessary payments for idle time of men and the cost of extra moving of equipment. Compensation for idle time of equipment will be determined by the Engineer and compensation for idle time of men will be determined by the Engineer as "Labor", and no markup will be added in either case for

overhead or profit. Compensation for the cost of moving equipment shall be the actual cost without markup for overhead or profit.

ARTICLE 12. PROTECTION OF EXISTING TREES

Section 12.01. Protection of Existing Trees.

Protection of existing trees not authorized for removal shall be given special attention. The Contractor shall comply with the provisions of the City's Tree Preservation Ordinance. Every reasonable effort shall be made to avoid creating conditions adverse to the tree's health. The natural ground within the dripline of saved and protected trees shall remain as undisturbed as possible.

- A. Prior to initiating project construction, in order to avoid damage to the trees and their root systems, Contractor shall install an approved 4' high protective barrier fence completely around any existing tree that is not authorized for removal. The protective fencing shall not be moved or removed without written permission from the City Arborist.
- B. No signs, ropes, cables, or any other items shall be attached to any existing tree that is not authorized for removal, except those cables that may be recommended by a certified arborist for limb support.
- C. No vehicles, construction equipment, mobile home/office, supplies, materials, or facilities shall be driven parked, stockpiled, or located within the dripline of any existing tree that is not authorized for removal.
- D. Grade cuts or fills within the dripline of existing trees not authorized for removal shall not be permitted without authorization from the City, including issuance of an approved tree permit issued by the City Arborist if necessary. Cuts or fills that are necessary beyond the dripline but near the trees shall be contoured to drain away from the tree's dripline.
- E. No trenching whatsoever shall be allowed within the driplines of existing trees not authorized for removal without authorization from the City, including issuance of an approved tree permit issued by the City Arborist if necessary. If it is necessary to install underground utilities within the dripline of an existing tree not authorized for removal, the utility line shall be either bored or drilled. If the boring or drilling is determined to be impossible by the Engineer, the utility line trench may be hand dug under the direct supervision of a certified arborist.
- F. Roots which are approved to be severed or which fall within the structural section of the facility to be constructed shall be cut cleanly and treated with "root sealer" compound and covered with earth as soon as possible. Support roots that are inside the dripline of existing trees not authorized for removal shall be protected. The Contractor is required to hand-dig in the vicinity of major trees to prevent root cutting and mangling which may be caused by heavy equipment. Roots one inch (1") or greater in diameter encountered within the tree's dripline shall not be cut without the Engineer's approval, and shall be kept moist, as approved by the Engineer, and covered with earth within twenty-four (24) hours.
- G. All existing trees on the Site not authorized for removal and which require pruning shall be pruned prior to grading the Site. Native oak trees which require major pruning (branches and/or roots 2 inches in diameter or larger) shall be pruned by an International Society of Arboriculture certified arborist.

- H. Any tree, regardless of species, that, in the opinion of the City Arborist, is irreparably damaged by the Contractor to the point of affecting the tree's long term health and longevity shall be mitigated for in according to the standards set forth in Folsom Municipal Code Section 12.16.070 – Mitigation.

ARTICLE 13. CUTTING AND PATCHING

Section 13.01. Section Includes

- A. Execute cutting, fitting or patching of Work, required to:
 - 1. Make parts fit properly.
 - 2. Uncover Work to provide for installation of ill-timed Work.
 - 3. Remove and replace Work not conforming to requirements of Contract Documents.
 - 4. Remove and replace defective Work.
 - 5. Remove samples of installed Work as specified for testing.
 - 6. Remove existing materials (demolition) required prior to installation of specified Work.
 - 7. Uncover Work to provide for Architect's or Consulting Engineer's observation of covered Work.
- B. Do not endanger structural integrity of any Work by cutting or altering any part of it.
- C. The Contractors with structural responsibility within their scope of Work shall solely execute structural cutting and patching required for this Project.
- D. Minor cutting and patching of finishes and/or trim will be performed by the Contractor where required for the execution of its Work. Locations of all cutting and patching (core boring, etc.) shall be reviewed and approved by the Architect or Consulting Engineer prior to the start of Work.
- E. The Contractor shall make the field measurements necessary for its Work and be responsible for their accuracy. Also, should any structural difficulties prevent a Contractor from installing its material properly, the Owner's Representative and Architect or Consulting Engineer shall be notified in writing within twenty-four (24) hours. Cutting into the walls, ceilings and floors, if necessary, shall be carefully and neatly performed and then be repaired as specified in the Contract Documents. The Architect or Consulting Engineer shall be consulted prior to the start of Work in all cases where cutting into a structural portion of the building is either desirable or necessary so that satisfactory reinforcement may be provided.
- F. Patching of all exposed architectural finishes shall be performed under the supervision of the Project Inspector. Cutting and patching of existing architectural finishes shall be minimized to the extent possible through careful routing and placement of new Work. The Architect, Consulting Engineer or Project Inspector shall have the authority to reject substandard or unacceptable patching.

- G. Patching of openings that are cut in any fire rated walls or membranes shall be sealed tightly using approved materials only. Verify that fire rating envelopes are maintained and inspections provided prior to concealing Work. Cutting and patching, if required by Agencies to verify adequacy of protection after concealment, shall be performed at no cost to the City.

Section 13.02. Related Sections.

- A. Special Provisions.
- B. Article 14 - Alteration Project Procedures.
- C. Article 16 - Quality Control.
- D. Article 17 - Construction Facilities and Temporary Controls.

Section 13.03. Submittals.

- A. Prior to cutting which affects structural safety of Project, submit written notice to Architect or Consulting Engineer requesting consent to proceed with cutting. See items "C" and "E", Section 13.01.
- B. Should conditions of Work or schedule require change of materials or methods, submit written recommendation to Architect or Consulting Engineer, within forty-eight (48) hours, including:
 - 1. Conditions requiring change.
 - 2. Recommendations for alternative materials or methods.
 - 3. Submittals as required for substitutions.
 - 4. Quotations of charges or credits.
- C. Submit forty-eight (48) hour advance written notice to the Architect or Consulting Engineer, with a copy to the Owner's Representative, designating the time Work will be uncovered.
- D. Submit all materials to be used in cutting and patching in accordance with Article 5 of the General Provisions of the City's Standard Specifications.

Section 13.04. Materials.

- A. Primary Products: Materials for replacement of Work removed are to comply with Technical Specifications and are required to match original installation.
- B. Product Substitution: For any proposed change in materials, submit request for substitution in accordance with Article 5 of the General Provisions of the City's Standard Specifications.

Section 13.05. Examination.

- A. Examine existing conditions prior to commencing Work, including elements subject to movement or damage during cutting and patching.

- B. After uncovering existing Work, examine conditions affecting installation of new products and performance of Work.
- C. Beginning of cutting or patching operations means acceptance of existing conditions.

Section 13.06. Preparation.

- A. Provide means of shoring, bracing and temporary supports as required to maintain structural integrity of the Work.
- B. Provide devices, enclosures and methods to protect adjacent surfaces and areas of the property from damage, dust or disruption.
- C. Provide protection from the elements for areas, which may be exposed during cutting or patching.
- D. Maintain excavations free of water.

Section 13.07. Cutting.

- A. Execute cutting, fitting and adjustment of products to permit finished installation to comply with specified tolerances and finishes.
- B. Perform cutting and demolition by methods, which will prevent damage to other Work, and will provide proper surfaces to receive installation of repairs and new Work.
- C. Uncover Work to install improperly sequenced Work.
- D. Remove and replace defective, rejected or non-conforming Work.
- E. Remove samples of installed Work for testing when requested.
- F. Provide openings in the Work for penetration of Mechanical and Electrical Work.
- G. Employ only experienced installers to perform cutting for weather exposed, moisture resistant and sight-exposed surfaces.
- H. Cut concrete, tile plaster and other rigid materials using masonry/concrete saws and core drills. Pneumatic tools are not allowed without prior approval.

Section 13.08. Patching.

- A. Execute patching to match adjacent Work.
- B. Fit products together to integrate seamlessly with adjacent Work.
- C. Execute patching by methods to avoid damage to adjacent Work, and which will provide appropriate surfaces to receive finishing Work.

- D. Employ only experienced installers to perform patching for weather exposed, moisture resistant and sight-exposed surfaces.
- E. Restore Work with new products in accordance with requirements of the Contract Documents.
- F. At penetrations of fire rated walls, partitions, ceiling or floor construction, completely seal voids with approved fire rated material in accordance with the manufacturers installation instructions and applicable Codes.
- G. Fit Work to pipes, sleeves, ducts, conduits and other penetrations through affected surfaces neatly and leave in finished condition.
- H. All patched surfaces are to match adjacent finishes in all respects: Type, texture, thickness and color. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit or area.

ARTICLE 14. ALTERATION PROJECT PROCEDURES

Section 14.01. Section Includes

- A. Products and installation for patching and extending Work.
- B. Transition and adjustments.
- C. Repair of damaged surfaces, finishes, and cleaning.
- D. Salvage materials.

Section 14.02. Related Sections.

- A. Article 13 - Cutting and Patching.

Section 14.03. Alterations, Cutting and Protection.

Assign the work of moving, removal, cutting and patching, to trades qualified to perform the work in manner to cause least damage to each type of work, and provide means of returning surfaces to appearance of new work.

- A. Perform cutting and removal work to remove minimum necessary, and in a manner to avoid damage to adjacent work.
- B. Cut finish surfaces such as concrete, masonry, drywall, plaster or metals, by methods to terminate surfaces in a straight line at a natural point of division, or where indicated.
- C. Protect existing finishes, equipment, and adjacent work, which are scheduled to remain, from damage.
- D. Protect existing and new work from extremes of temperature.
 - 1. Maintain existing Interior work above 60 degrees F.
 - 2. Provide heat and humidity control as needed to prevent damage to remaining existing work and to new work.
- E. Provide temporary enclosures to separate work areas from existing building rooms/office spaces and from areas occupied by the City, whether for storage or human occupation. Temporary enclosures shall be suitable for preventing dust, over-spray and odors from penetrating areas occupied by the City. Failure to adequately protect existing improvements, causing cleaning shall be at the Contractor's expense.

Section 14.04. Products for Patching and Extending Work.

- A. New Materials. As specified in product sections; match new materials to existing work.
 - 1. Provide same products or types of construction as that in existing structure, as needed to patch, extend or match existing work.
 - 2. Presence of a product, finish, or type of construction, requires that patching, extending or matching shall be performed consistent to, or better than, existing standards of quality.
- B. Type and Quality of Existing Products: Determine by inspection and testing existing products where necessary, referring to existing Work as a standard.

Section 14.05. Examination.

- A. Verify that demolition is complete, and areas are ready for installation of new Work.
- B. Beginning of restoration Work means acceptance of existing conditions.

Section 14.06. Preparation.

- A. Cut, move, or remove items as necessary for access to alterations and/or renovation Work. Replace and restore at completion. The full extent of cutting and patching is not shown or specified. The Contractor shall perform all cutting and patching as required.
- B. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.
- C. Remove debris and abandoned items from area and from concealed spaces and dispose of properly and legally.
- D. Prepare surface and remove surface finishes to provide for proper installation of new work and finishes.

Section 14.07. Installation.

- A. Coordinate work of alterations and renovations to expedite completion and to accommodate City occupancy. Patch and extend existing work using skilled mechanics that are capable of matching existing quality of workmanship. Quality of patched or extended work shall be not less than that Specified for new work.
- B. Room Finishes. Complete in all respects consistent with the Contract Documents.
- C. Remove, cut, and patch Work in a manner to minimize damage and to provide a means of restoring Products and finishes to specified condition.
- D. Install Products as specified in individual sections.

Section 14.08. Transitions.

- A. Where new work abuts or aligns with existing, perform a smooth and even transition.
- B. Patch Work to match existing adjacent Work in texture and appearance, without breaks, steps or bulkheads.
- C. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.

Section 14.09. Adjustments.

- A. Where change of plane of 1/4 inch or more occurs, submit recommendation for providing a smooth transition.
- B. Where extreme change of plane of two inches or more occurs, request Instructions from Architect or Consulting Engineer as to method of making transition.
- C. Trim existing doors as necessary to clear new threshold Installation. Refinish trim as required.
- D. Fit work at penetrations of surfaces as shown on Drawings.

Section 14.10. Salvaged Materials.

- A. Salvaged Materials from existing facilities, which are specified in the Special Provisions or tagged in the field prior to the pre-bid walk-through to be salvaged, shall remain the property of the City. The Contractor shall include the removal, disassembly, preparation, marking, bundling, packaging, tagging, hauling, and stockpiling of salvaged materials or facilities to the location specified in the Special Provisions, or as directed by the Owner's Representative. Materials include parts, articles, and equipment of assembled facilities. Salvaging does not include the preparation of existing material that is to be reused in the work.
- B. When only specific materials from the facility are designated to be salvaged, the remaining materials from that facility shall be removed and disposed of as provided for elsewhere in the Contract Documents. Materials to be salvaged shall not be removed until their use in the existing facility is no longer required, as determined by the Owner's Representative.
- C. When practicable, salvaged materials shall be hauled directly to the location specified in the Special Provisions and stockpiled; however, salvaged materials may be temporarily stored at a location selected by the Contractor and approved by the Owner's Representative and later hauled to and stockpiled at their final location. Materials which are lost before stockpiling at their final location shall either be replaced by the Contractor, at the Contractor's expense, or, at the discretion of the Owner's Representative, the estimated cost of replacement may be deducted from any moneys due or to become due to the Contractor.
- D. Materials designated to be salvaged that are damaged, as determined by the Owner's Representative, shall be segregated from undamaged material. After review of the damaged materials by the Owner's Representative, all damaged materials that are rejected by the Owner's Representative shall become the property of the Contractor and shall be disposed of

as provided elsewhere in the Contract Documents.

- E. Materials to be salvaged that are damaged as a result of the Contractor's operations shall be repaired by the Contractor, at the Contractor's expense, to the satisfaction of the Owner's Representative. Materials that are damaged beyond repair as a result of the Contractor's operations shall be disposed of as provided elsewhere in the Contract Documents and replaced at the Contractor's expense; or, at the discretion of the Owner's Representative, the estimated cost of replacement may be deducted from any moneys due or to become due to the Contractor.
- F. Replacements for lost or damaged materials shall be of the same kind and of the same or better quality and condition as the lost or damaged materials were prior to their removal. Replacement materials should also be of the same size, color, weight etc. of the original materials. Matching or exceeding quality and condition alone may not permit the reuse of material.

Section 14.11. Repair of Damages Surfaces.

- A. Patch or replace portions of existing surfaces, which are damaged, lifted, discolored, or showing other imperfections.
- B. Repair substrate prior to patching finish.

Section 14.12. Finishes.

- A. Finish surfaces as specified in individual product sections.
- B. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest Intersections.
- C. Unless otherwise specified or shown, subsurface shall be prepared as recommended by finish material manufacturers for project conditions for the proper application of new finishes.

Section 14.13. Cleaning.

- A. Clean adjacent Owner occupied areas of work soiled by work of this Contract.

ARTICLE 15. PROJECT MEETINGS & PROCEDURES

Section 15.01. Section Includes

- A. The Owner's Representative will schedule and administer a preconstruction meeting, regular progress meetings, and specially called meetings throughout progress of the Work, and will:
 - 1. Prepare agenda for meetings.
 - 2. Make physical arrangements for meetings.
 - 3. Preside at meetings.
 - 4. Record the minutes; include significant proceedings and decisions.
 - 5. Reproduce and distribute copies of minutes after each meeting to participants in the meeting and to parties affected by decisions made at meeting.
- B. Representatives of the Contractor, Subcontractors and suppliers attending meetings shall be experienced supervisory staff with written authorization to act on behalf of the entity each represents.

Section 15.02. Preconstruction Meeting.

- A. Timing: Prior to start of construction.
- B. Attendance: Architect or Consulting Engineer and consultants as appropriate, Owner's Representative, Contractors as requested.
- C. Purpose: Discuss and familiarize Contractors with construction administrative procedures to be used on Project.

Section 15.03. Progress Meetings.

- A. Timing: Frequency, day and time to be determined by the Owner's Representative, Architect or Consulting Engineer and the City.
- B. Attendance: Owner's Representative and each Contractor on site; Architect or Consulting Engineer, consultants, and Subcontractors when required.
- C. Purpose: To provide a formal and regular forum for the City, the Owner's Representative, Architect/Engineer, Contractor and Subcontractors to present questions, problems or issues that need to be addressed. It will also provide an opportunity to review the progress on previous issues and action items along with submittal and schedule review.

Section 15.04. Specially Called Meetings.

- A. The Owner's Representative may call a special meeting at any time during the course of the Project. Special Project meetings shall include representatives of the Project as requested in order to discuss problems and/or solutions that are common to the Project.

ARTICLE 16 - QUALITY CONTROL

Section 16.01. Section Includes

- A. Quality assurance and control of installation.
- B. References.
- C. Field samples.
- D. Mock-up.
- E. Inspection and testing laboratory services.
- F. Manufacturers' field services and reports.

Section 16.02. Related Sections.

- A. General Provisions and Special Provisions - Submittals
- B. Technical Specifications

Section 16.03. Quality Assurance/Control of Installation.

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply fully with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect or Consulting Engineer before proceeding.
- D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce workmanship of specified quality.
- F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.
- G. Contractor's Line of Authority: The Contractor shall provide one person who shall be both knowledgeable and responsible for all work to be performed on this Project. In the Contractor's absence, the Contractor's appointed representative shall be responsible for all directions given him/her and said directions shall be binding as if given to the Contractor. The Contractor's representative shall be responsible to coordinate all work to be performed.

- H. Shop and fieldwork shall be performed by mechanics skilled and experienced in the fabrication and installation of the work involved. All work on this Project shall be done in accordance with the best practices of the various trades involved and in accordance with the drawings, approved shop drawings and these specifications.
- I. I. All work shall be erected and installed plumb, level, square and true and in proper alignment and relationship to the work of other trades. All finished work shall be free from defects. The City reserves the right to reject any materials and workmanship which are not considered to be up to the highest standards of the various trades involved. Such inferior material or workmanship shall be replaced by the Contractor at no additional cost to the City and without an extension of the Contract Time.
- J. All work shall be installed by a knowledgeable contractor and defined "certified to install" by the specified materials manufacturers. The specifications and recommendations of the manufacturer whose materials are used shall be strictly adhered to during the application or installation of materials.
- K. Any additional work beyond that specified or illustrated, or any modification thereto, that is necessary for the furnishing of guarantee shall be provided by the Contractor without additional cost to the City.

Section 16.04. References.

- A. Conform to reference standards by date of issue current on date of the Contract Documents.
- B. Should specified reference standards conflict with Contract Documents, request clarification from Architect or Consulting Engineer before proceeding.
- C. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.
- D. The Contractor shall be responsible for being current and knowledgeable of all building codes involved for all trades under its direction.

Section 16.05. Field Samples.

- A. Install field samples at the Site as required by individual specification sections for review.
- B. Acceptable samples represent a quality level for the Work.
- C. Where field sample is specified in individual sections to be removed, clear area after field sample has been accepted by Architect or Consulting Engineer.

Section 16.06. Mock- Up.

- A. Assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals, and finishes.
- B. Where mock-up is specified in individual sections to be removed, clear area after mock-up has been accepted by Architect or Consulting Engineer.

Section 16.07. Manufacturers' Field Services and Reports.

- A. Submit qualifications of observer to Architect or Consulting Engineer thirty (30) Calendar Days in advance of required observations.
- B. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance of equipment as applicable, and to initiate instructions when necessary.
- C. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- D. Submit report in duplicate within thirty (30) Calendar Days of observation to Architect for review.

ARTICLE 17. TEMPORARY FACILITIES AND CONTROLS

Section 17.01. Work Included

Temporary Facilities and controls required for this Work include, but are not necessarily limited to:

- A. Temporary water, power, light, heat and Project Identification Sign.
- B. Field office and associated telephone and utilities.
- C. Temporary weather protection.
- D. Parking and storage areas.
- E. Site fencing and security.
- F. Sanitary facilities.
- G. Dewatering.
- H. Emergency power and water shut-off.

Section 17.02. Project Identification Sign

Unless otherwise provided in the Special Provisions, the Contractor shall provide and install one eight foot by four foot (8' x 4') Project Identification Sign. The City shall establish the location for the Sign. The Sign shall be fabricated from exterior grade, 5/8" plywood with four inches by four inches (4" x 4") posts of sufficient length to provide appropriate and sage sign height for its location and soil embedment. The Sign shall be prepared by a professional sign manufacturer and shall include an opaque white background, opaque white posts, die-cut fabricated lettering with no more than two (2) letter fonts, and no more than two (2) letter colors. The Contractor shall provide an eight and one-half inch by eleven inch (8.5" x 11") mock-up of the Sign for approval by the City prior to fabrication. List the title of the Project, names of City of Folsom, architectural/engineering firm, Contractor and major Subcontractors. The Contractor shall allow no other signs to be displayed on the Project site.

Section 17.03. Temporary Utilities.

General: Charges for the use of utility services other than those associated with individual field offices or planned electrical service interruptions will be paid for by the City. The Contractor shall provide temporary heating, or ventilating, or cooling when permanent services are interrupted due to performance of the Work. The Contractor shall provide temporary means of operation for existing storm, water, sewer, gas, mechanical, electrical, and low voltage systems during construction. Any planned interruption of permanent services, facilities, or operations must be coordinated and approved in advance with the Owner's Representative.

A. Temporary Power.

The Contractor shall construct all temporary power facilities required to complete the Work and maintain in accordance with Division of Industrial Safety "Electrical Safety Orders" (ESO), Public Utilities Commission "Rules of Overhead Line Construction" (G.O. 95), and Cal-OSHA. Materials, devices and equipment used for these facilities shall be in good and safe condition but need not

be new. The Contractor is responsible for the removal of the temporary power. Existing electric outlets may be utilized, if permitted by the City and authorized by the Owner's Representative. Any additional power required shall be provided and paid for by the Contractor.

B. Temporary Lighting.

The Contractor shall provide, maintain, and remove temporary lighting necessary to complete the Work.

C. Temporary Heat.

The Contractor shall provide, maintain, and remove temporary heat necessary to complete the Work.

D. Temporary Water.

The Contractor shall provide sufficient hoses to carry water to every required part of construction and allow use of water facilities to Subcontractors engaged in the Work. The Contractor is also responsible for the removal of the temporary water. Existing water outlets may be utilized, except that no water may be drawn from fire hydrants without prior written approval of the City for such a connection. Any additional water required beyond that available from existing water outlets and/or as approved by the City shall be provided by the Contractor.

E. Temporary Telephone.

The Contractor shall provide its own telephone system. Use of City telephones will not be allowed.

F. Temporary Fire Protection.

The Contractor shall provide and maintain fire extinguishers and first aid kits in accordance with Cal-OSHA and federal requirements to be used in the event of an emergency.

G. Temporary Weather Protection.

The Contractor shall provide and maintain protection measures to ensure that damage(s) will not occur to City property during course of construction.

H. Temporary Dewatering.

The Contractor shall provide and maintain a dewatering system as required to perform its work. This temporary dewatering system may, and should, be reviewed by the Architect or Consulting Engineer and/or the Owner's Representative.

Section 17.04. Field Office/Storage Containers.

If desired, the Contractor may provide a temporary field office(s) or storage container(s). Locate field office(s)/storage container(s) consistent with the City's Standard Specifications and as directed by the Owner's Representative. Upon completion of Work, Contractor shall remove any and all temporary field office(s) and storage container(s).

Section 17.05. Parking of Vehicles.

The Contractor shall assume **all** responsibility for job site vehicle parking of its and its Subcontractors' vehicles. Locations of parking shall be as directed by the Owner's Representative. The Project Site may not accommodate on-site parking of construction personnel vehicles. The Contractor shall assure

compliance with all applicable requirements for on-street vehicle parking.

Section 17.06. Storage and Laydown Areas.

Only areas designated by the City can be used by the Contractor for laydown areas. The Contractor is responsible for providing its own fenced storage facilities (trailers or cargo containers). The use of storage and laydown areas shall be consistent with the provisions of the City's Standard Specifications.

Section 17.07. Temporary Site Fencing and Security.

The Contractor shall provide and maintain temporary fencing surrounding the buildings and/or areas under construction, and staging areas. The Contractor is responsible for the security of all equipment, material, and completed construction items. The Contractor is also responsible for securing any breeches to existing security system/buildings caused by its Work. Temporary measures may include watchman, temporary doors, temporary alarm, etc.

Section 17.08. Sanitary Facilities.

The necessary sanitary conveniences for the use of the workers on the project, properly obscured from public observance, shall be constructed and maintained by the Contractor in such manner and at such points as shall be approved by the Engineer, and their use shall be strictly enforced.

Section 17.09. Temporary Construction, Equipment and Protection.

Contractor shall provide, maintain and remove upon completion of Work, all temporary rigging, scaffolding, hoisting equipment, rubbish chutes, ladders, barricades, lights and all other protective structures or devices necessary for safety of workers and public property as required to complete the Work.

Safety: The contractor is responsible for the complete safety of City personnel, consultants, and the general public at all times.

Protection: The Contractor must protect all workers and equipment from power lines by maintaining safe distances and by providing protective devices where and as required by Industrial Safety Commission and Cal-OSHA.

Temporary construction and equipment: All temporary construction and equipment shall conform to all regulations, ordinances, laws and other requirements of the State of California and any other authorities having jurisdiction (including insurance companies), with regards to safety precautions, operations and fire hazards.

ARTICLE 18 – OPERATIONS AND MAINTENANCE DATA

Section 18.01. Qualified Personnel.

The Contractor shall insure that personnel experienced in maintenance and operation of described products prepare instructions and data.

Section 18.02. Format and Required Information for Instructions and Data.

Unless otherwise provided in the Special Provisions, the Contractor shall prepare data in the form of an instructional manual (Operations and Maintenance Manual) including, at a minimum, the following information:

- Drawings
- Illustrations
- Parts lists
- Wiring diagrams of systems
- Internal wiring diagrams and circuit board schematics and layout drawings
- Manufacturer's recommended spare parts lists
- Name, address and phone number of nearest parts and service agency
- Systems balance data
- Maintenance and service instructions
- Operation instructions
- Software including annotated source lists and programs

The data shall be presented to the following standards:

- A. Binders: Commercial quality, 8 and one-half inch by eleven inch (8.5" x 11") three-ring binders with hardback, cleanable, plastic covers; four inch (4") maximum rings size; when multiple binders are used, correlate data into related construction groupings.
- B. Cover: Identify each binder with typed or printed title "OPERATION AND MAINTENANCE INSTRUCTIONS"; list title of Project; identify subject matter of contents.
- C. Arrangement: Arrange content by systems, under specification section numbers; provide tabbed section divider for each separate product and system, with typed description of product and major component parts of equipment.
- D. Text: Manufacturer's printed data, or typewritten data on 20-pound paper as required to supplement product data. Provide logical sequence of instruction for each procedure, incorporating manufacturer's instructions.
- E. Drawings:
 1. Provide with reinforced punched binder tab.
 2. Bind in with text; fold larger drawings to size of text pages.
 3. Supplement product data to illustrate relations of component parts of equipment and systems,

to show control and flow diagrams.

4. DO NOT use Project Record Documents as maintenance drawings.
 - F. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of design consultants and Contractor with name(s) of responsible parties; schedule of products and systems, indexed to content of volume.
 - G. For Each Product or System: List names, addresses and telephone numbers of Subcontractors and suppliers, including local source of supplies and replacement parts.
 - H. Product Data: Mark each sheet to clearly identify specific products, component parts and data applicable to installation; delete inapplicable information.
 - I. Warranties: Bind in copy of each.

Section 18.03. Additional Information.

In addition to the requirement to submit additional information as set forth in Section 18.04, the Contractor shall provide the following additional information:

- A. Instructions for Care and Maintenance to include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- B. Operating procedures for equipment and systems to include start-up, break-in, routing and normal operating instructions and sequences; include regulation, control, stopping, shut-down, and emergency instructions; include summer, winter, and any special operating instructions.
- C. Maintenance requirements to include routing procedures and guide for trouble-shooting; disassembly, repair and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

Section 18.04. Training.

Before final inspection, the Contractor shall instruct the City's designated personnel in operation, adjustment, and maintenance of products, equipment, and systems at agreed upon times.

For equipment requiring seasonal operation, perform instructions for other seasons within six (6) months.

The Contractor shall instruct City personnel using the Operations and Maintenance Manuals as the basis for instruction and shall review the contents of the Manuals with City personnel in detail to explain all aspects of operation and maintenance.

The Contractor shall prepare and insert additional data in Operations and Maintenance Manuals when the need for such data becomes apparent during instruction.

Section 18.05. Submission of the Operations and Maintenance Manuals.

The Contractor shall submit two copies of preliminary draft Operations and Maintenance Manuals for review by the City as soon as possible.

The Contractor shall submit one copy of completed Operations and Maintenance Manuals in final form fifteen (15) Calendar Days prior to final inspection. The copy will be returned after final inspection with the City's comments. The Contractor shall review the content of the Operations and Maintenance Manuals as required prior to final submittal to the City.

The Contractor shall submit two copies of revised Operations and Maintenance Manuals in final form within ten (10) Calendar Days after final inspection.

SPECIFICATION FORMS

AGREEMENT SF-1

THIS AGREEMENT, dated for identification as of _____, 20____, between the CITY OF FOLSOM, a municipal corporation, (hereinafter call "City"), and (hereinafter call the "Contractor").

The parties hereto mutually agree to the terms and condition set forth herein.

1. CONTRACT DOCUMENTS

Each of the items hereinafter referred to is incorporated herein by reference as if set forth in full in this contract.

Work called for in any one Contract Document and not mentioned in another is to be performed and executed as if mentioned in all Contract Documents. The table of contents, titles and headings contained herein and in said documents are solely to facilitate reference to various provisions of the Contract Documents and in no way affect or limit the interpretations of the provisions to which they refer.

The Contract Documents, sometimes also referred to as "the Contract", consist of the Notice to Contractors, the completed Proposal Form submitted by Contractor to whom the Contact is awarded, the Instruction to Bidder insofar as they relate to events which occur or actions to be taken after the submission of the Proposal, this Agreement, the Standard Construction Specification, the Special Provisions, Plans and Technical Specifications, and drawings and other data and all developments thereof prepared by City pursuant to the Contract, and any modifications of any of the foregoing in the form of Addenda or otherwise effected in accordance with the terms of the Contract.

The Standard Specifications shall mean and refer to the current Standard Specifications of the City of Folsom, which are incorporated herein by this reference as if set forth herein.

2. DEFINITIONS

Unless otherwise specifically provided herein, all works and phrases defined in the Standard Specifications shall have the same meaning and intent in this Agreement.

3. AGREEMENT CONTROLS

In the event of a conflict between the terms and conditions as set forth in this Agreement and the terms and conditions set forth in other Contract Documents, the terms and Conditions set forth in this Agreement shall prevail.

4. SCOPE OF CONTRACT

Contractor agrees to furnish all tools, equipment, apparatus, facilities, labor and material and transportation necessary to perform and complete in a good and workman like manner to the satisfaction of City, all the work called for, and in the manner designated in, and in strict conformity with the Contract Documents entitled:

Including the following alternative bid items described in the Proposal Form:

5. CONTRACT AMOUNT AND PAYMENTS

City agrees to pay and Contractor agrees to accept, in full payment for the above work, the sum computed in accordance with the actual amount of each item of work performed or material furnished, at the unit price which Contractor bid for each such item in his Proposal Form, said unit price to be determined as provided in the Standard Specifications.

6. PROGRESS AND FINAL PAYMENTS

Progress and final payments shall be in accordance with Articles 7 and 8 of the General Provisions.

7. RETENTION OF SUMS CHARGED AGAINST CONTRACTOR

When, under the provisions of this contract, City shall charge any sum of money against Contractor, City shall deduct and retain the amount of such charge from the amount of the next succeeding progress estimate, or from any other moneys due or that may become due to the Contractor from City. If, on completion or termination of the Contract, sums due contractor are insufficient to pay City's charges against him, City shall have the right to recover the balance from Contractor or his sureties.

8. TIME OF COMPLETION

The entire work shall be brought to completion in the manner provided for in the Contract Documents on or before ____, () **Working or Calendar Days** in accordance with Article 7 of the General Provisions.

Failure to complete the work by the completion Date and in the manner provided for by the Contract Documents shall subject Contractor to liquidated damages as hereinafter provided in this Agreement. Time is and shall be of the essence in these Contract Documents.

9. NO WAIVER OF REMEDIES

Neither the inspection by City or its agents, nor any order or certificate for the payment of money, nor any payment for, nor acceptance of the whole or any part of the work by City, nor any extensions of time, nor any position taken by City or its agents shall operate as a waiver of any provision of this Agreement or of any power herein reserved to City or any right to damages herein provided, nor shall any waiver of any breach of the Agreement be held to be a waiver of any other or subsequent breach. All remedies provided in this Agreement shall be taken and construed as cumulative; that is, in addition to each and every other remedy herein provided, and City shall have any and all equitable and legal remedies which it would in any case have.

10. DETERMINATION OF DAMAGES

The actual fact of the occurrences of damages and the actual amount of the damages which City would suffer if the work were not completed within the specified times set forth are dependent upon many circumstances and conditions which could prevail in various combinations, and, from the nature of the case, it is impracticable and extremely difficult to fix the actual damages. Damages which City would suffer in the event of delay include loss of the use of the project, and, in addition, expenses of prolonged employment of an architectural and engineering staff; costs of administration, inspection, and supervision; and the loss suffered by the public within the City of Folsom by reasons of the delay in the completion of the project to serve the public at the earliest possible time. Accordingly, the parties hereto agree, and by execution of this Agreement, Contractor acknowledges that he understands, has ascertained and agrees, that the amounts set forth herein as liquidated damages shall be presumed to be that amount of damages sustained by the failure of Contractor to

complete the entire work within the times specified.

11. LIQUIDATED DAMAGES

The amount of the liquidated damages to be paid by Contractor to City for failure to complete the entire work in the specified number of Working or Calendar Days (as extended, if applicable) will be **(\$___)** for each **calendar day**, continuing to the time at which the work is completed. Such amount is the actual cash value agreed upon as the loss to City resulting from Contractor's delay.

12. TERMINATION AFTER ALLOTTED WORKING OR CALENDAR DAYS

In addition to any rights it may have, City may terminate this Contract at any time after the allotted number of Working or Calendar Days as adjusted by any extensions of time for excusable delays that may have been granted. Upon such termination Contractor shall not be entitled to receive any compensation for services rendered by him before or after such termination, and he shall be liable to City for liquidated damages for all periods of time beyond such termination date until the work is completed.

13. CONTRACTOR BANKRUPT

If Contractor should commence any proceeding under the Bankruptcy Act, or if Contractor be adjudged a bankrupt, or if Contractor should make any assignment for the benefit of creditors, or if a receiver should be appointed on account of Contractor's insolvency, then the City Council may, without prejudice to any other right or remedy, terminate the Contract and complete the work by giving notice to Contractor and his surety according to the provisions of Article 3. Contractor's Surety shall have the right to complete the work by commencing within thirty (30) days as specified in Article 3; and, in the event Contractor's Surety fails to commence work within thirty (30) days as specified in Article 3, City shall have the right to complete, or cause completion of the work, all as specified in Article 3.

14. PERFORMANCE AND PAYMENT BONDS

The Contractor shall, before beginning said work, file two bonds with the City, each made payable to the City. These bonds shall be issued by a Surety Company authorized to do business in the State of California, and shall be maintained during the entire life of the Contract at the expense of the Contractor. One bond shall be in the amount of one hundred percent (100%) of the Contract and shall guarantee the Faithful Performance of the Contract. The second bond shall be the Payment Bond required by Part 4, Title 15, Chapter 7, Division Three of the Civil Code of the State of California and shall be in the amount of one hundred percent (100%) of the Contract. Any alteration or alterations made in any provision of this Contract shall not operate to release any surety from liability on any bond required hereunder and the consent to make such alterations is hereby given, and any surety on said bonds hereby waives the provisions of Section 2819 of the Civil Code.

15. SUBSTITUTION OF SECURITIES OF MONEY WITHHELD

At any time prior to final payment, Contractor may request substitution of securities for any money withheld by the City to ensure performance of the Contract. At the expense of the Contractor, securities equivalent to the money withheld may be deposited with the City or with an approved financial institution as escrow agent according to a separate Security Agreement. Securities eligible for substitution shall include those listed in Section 16430 of the Government Code or bank or savings and loan certificates of deposit. A fee set by the City Council shall be charged for such substitution.

16. LABOR CODE COMPLIANCE

Contractor and its subcontractors shall fully comply with all the provision of the California Labor Code governing the performance of public works contracts including, but not limited to, payment of prevailing wages, limitations on time worked, compliance with apprentice requirements, maintenance of payroll records and prohibitions against discrimination.

17. UNFAIR COMPETITION

The following provision is included in this agreement pursuant to California Public Contract Code §7103.5.

"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 assigning 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, with further acknowledgment by the parties."

18. MISCELLANEOUS PROVISIONS

- A. Assignment - Neither this Agreement nor any rights herein of Contractor shall be assigned without the written consent of City first obtained.
 - B. Attorney's Fees - In the event an action or proceeding is instituted by either party for the breach of any of the provisions of this Agreement, the prevailing party shall be entitled to a reasonable attorney's fee.
 - C. Time - All times stated herein or in the Contract Documents are of the essence hereof.
 - D. Binding - This Agreement shall bind and insure to the heirs, devisees, assignees, and successors in interest of "Contractor" and to the successors in interest of "City" in the same manner as if such parties had been expressly named herein.
-

IN WITNESS WHEREOF, the parties hereto have signed the Agreement on the date set forth opposite their names.

DATE: _____

BY: _____

Title

Tax I.D. Number

CITY OF FOLSOM
A Municipal Corporation

DATE: _____

BY: _____

ATTEST:

City Clerk

ORIGINAL APPROVE AS TO CONTENT:

Director of Public Works

ORIGINAL APPROVED AS TO FORM:

City Attorney

FUNDING AVAILABLE:

Accounting Officer

NOTICE: SIGNATURE(S) ON BEHALF OF "SUBDIVIDER" MUST BE NOTARIZED
Certificate of Acknowledgement pursuant to Civil Code, Section 1189, must be attached.



**PERFORMANCE BOND
SF-2**

BOND NO.: _____

PREMIUM: _____

City of Folsom

KNOW ALL PERSONS BY THESE PRESENTS:

THAT WHEREAS, the CITY OF FOLSOM (hereinafter referred to as "CITY") has awarded to _____, hereinafter designated as the "Principal" a contract for _____ (hereinafter referred to as the "Project").

WHEREAS, the work to be performed by Principal is more particularly set forth in the Contract Documents for the Project dated _____, (hereinafter referred to as "Contract Documents"), the terms and conditions of which are expressly incorporated herein by reference; and

WHEREAS, said Principal is required by said Contract Documents to perform the terms thereof and to furnish a bond for the faithful performance of said Contract Documents.

NOW, THEREFORE, we, the undersigned Principal and

_____ as Surety, a corporation organized and duly authorized to transact business under the laws of the State of California, are held and firmly bound unto the CITY in the sum of _____ DOLLARS, (\$ _____), said sum being not less than one hundred percent (100%) of the total amount of the Contract, for which amount well and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that, if said Principal, his or its heirs, executors, administrators, successors or assigns, shall in all things stand to and abide by, and well and truly keep and perform the covenants, conditions and agreements in the Contract Documents and any alteration thereof made as therein provided, on its part, to be kept and performed at the time and in the manner therein specified, and in all respects according to their intent and meaning; and shall faithfully fulfill all obligations including the two-year guarantee of all materials and workmanship; and shall indemnify and save harmless the CITY, its officers and agents, as stipulated in said Contract Documents, then this obligation shall become null and void; otherwise it shall be and remain in full force and effect.

As a part of the obligation secured hereby and in addition to the face amount specified therefore, there shall be included costs and reasonable expenses and fees including reasonable attorneys' fees, incurred by CITY in enforcing such obligation.

The obligations of Surety hereunder shall continue so long as any obligation of Principal remains. Nothing herein shall limit the CITY's rights or Principal's or Surety's obligations under the Contract, law or equity, including, but not limited to, California Code of Civil Procedure section 337.15.

Whenever Principal shall be, and is declared by the CITY to be, in default under the Contract Documents, the Surety shall remedy the default pursuant to the Contract Documents, or shall promptly, at the CITY's option:

(1) Take over and complete the Project in accordance with all terms and conditions in the Contract Documents; or

(2) Obtain a bid or bids for completing the Project in accordance with all terms and conditions in the Contract Documents and upon determination by Surety of the lowest responsive and responsible bidder, arrange for a Contract between such bidder, the Surety and the CITY, and make available as work progresses sufficient funds to pay the cost of completion of the Project, less the balance of the contract price, including other costs and damages for which Surety may be liable. The term "balance of the contract price" as used in this paragraph shall mean the total amount payable to Principal by the CITY under the Contract and any modification thereto, less any amount previously paid by the CITY to Principal and any other set offs pursuant to the Contract Documents.

(3) Permit the CITY to complete the Project in any manner consistent with California law and make available as work progresses sufficient funds to pay the cost of completion of the Project, less the balance of the contract price, including other costs and damages for which Surety may be liable. The term "balance of the contract price" as used in this paragraph shall mean the total amount payable to Principal by the CITY under the Contract and any modification thereto, less any amount previously paid by the CITY to Principal and any other set offs pursuant to the Contract Documents.

Surety expressly agrees that the CITY may reject any design-builder, contractor or subcontractor which may be proposed by Surety in fulfillment of its obligations in the event of default by Principal. Surety shall not utilize Principal in completing the Project nor shall Surety accept a bid from Principal for completion of the Project if the CITY, when declaring Principal in default, notifies Surety of the CITY's objection to Principal's further participation in the completion of the Project.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract Documents or to the Project to be performed there under shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract Documents or to the Project.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this _____ day of _____, 20____, then names and corporate seals of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to the authority of its governing body.

Principal: _____

By: _____

Surety: _____

Address: _____

Telephone: _____

Attorney in Fact: _____

APPROVED AS TO FORM

City Attorney

(Attach Attorney-In-Fact Certificate, Corporate Seal and Surety Seal. This bond must be accompanied by a current Power of Attorney Appointing the Attorney-in-Fact)

NOTICE:

A CERTIFICATE OF ACKNOWLEDGMENT IN ACCORDANCE WITH THE PROVISIONS OF CIVIL CODE SECTION 1189 MUST BE ATTACHED FOR EACH PERSON EXECUTING THIS AGREEMENT ON BEHALF OF PRINCIPAL AND SURETY.



**PAYMENT BOND
SF-3**

BOND NO.: _____

PREMIUM: _____

City of Folsom

KNOW ALL PERSONS BY THESE PRESENTS:

THAT WHEREAS, the CITY OF FOLSOM (hereinafter referred to as "CITY") has awarded to _____, (hereinafter designated as "Principal") an agreement for _____ (hereinafter referred to as the "Project").

WHEREAS, the work to be performed by Principal is more particularly set forth in the Contract Documents for the Project dated _____, (hereinafter referred to as the "Contract"), the terms and conditions of which are expressly incorporated herein by reference; and

WHEREAS, said Principal is required to furnish a bond in connection with said Contract providing that if Principal or any of its subcontractors shall fail to pay for any materials, provisions, or other supplies, or terms used in, upon, for or about the performance of the Work contracted to be done, or for any work or labor done thereon of any kind the Surety on this bond will pay the same together with a reasonable attorney's fee in case suit is brought on the bond.

NOW, THEREFORE, we, the undersigned Principal and

_____ as Surety, a corporation organized and duly authorized to transact business under the laws of the State of California, are held and firmly bound unto the CITY in the sum of _____ DOLLARS, (\$_____), said sum being not less than one hundred percent (100%) of the total amount of the Contract, for which amount well and truly to be made, we bind ourselves, our heirs, executors and administrators, successors and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH that if the Principal, his or its subcontractors, heirs, executors, administrators, successors, or assigns, shall fail to pay for any materials, provisions, or other supplies or machinery used in, upon, for or about the performance of the Work contracted to be done, or for work or labor thereon of any kind, or fail to pay any of the persons named in California Civil Code Section 9100, or amounts due under the Unemployment Insurance Code with respect to work or labor performed by any such claimant, or for any amounts required to be deducted, withheld, and paid over to the Employment Development Department from the wages of employees of Principal and his subcontractors pursuant to Section 13020 of the Unemployment Insurance Code with respect to such work and labor, and all other applicable laws of the State of California and rules and regulations of its agencies, then said Surety will pay the same in or to an amount not exceeding the sum specified herein. In case legal action is required to enforce the provisions of this bond, the prevailing party shall be entitled to recover reasonable attorneys' fees in addition to court costs, necessary disbursements and other consequential damages. In addition to the provisions hereinabove, it is agreed that this bond will inure to the benefit of any and all persons, companies and corporations entitled to make claims under Section 9100 of the California Civil Code, so as to give a right of action to them or their assigns in any suit brought upon this bond.

The said Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or additions to the terms of the said Contract or to the work to be performed thereunder or the specification accompanying the same shall in any way affect its obligations on this bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work or to the specifications.

IN WITNESS WHEREOF, we have hereunto set our hands and seals this _____ day of _____, 20____, then names and corporate seals of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to the authority of its governing body.

Principal: _____

By: _____

Surety: _____

APPROVED AS TO FORM

Address: _____

City Attorney

Telephone: _____

Attorney in Fact: _____

(Attach Attorney-In-Fact Certificate, Corporate Seal and Surety Seal. This bond must be accompanied by a current Power of Attorney Appointing the Attorney-in-Fact)

NOTICE:

A CERTIFICATE OF ACKNOWLEDGMENT IN ACCORDANCE WITH THE PROVISIONS OF CIVIL CODE SECTION 1189 MUST BE ATTACHED FOR EACH PERSON EXECUTING THIS AGREEMENT ON BEHALF OF PRINCIPAL AND SURETY.

**BIDDER'S BOND
SF-4**

**City of Folsom
Department of Public Works**

We, _____ as principal, and

_____ as Surety are bound unto the City of Folsom, Department of Public Works, hereafter referred to as "Obligee", in the penal sum of ten percent (10%) of the total amount of the bid of the Principal submitted to the Obligee for the work described below, for the payment of which sum we bind ourselves jointly and severally,

THE CONDITION OF THIS OBLIGATION IS SUCH, THAT:

WHEREAS, the Principal is submitting a bid to the obligee, for _____
(Copy here the exact description of work, including location, as it appears on the proposal)

_____ for which; bids are to be opened at Folsom, CA on _____
(Insert date of bid opening)

NOW, THEREFORE, if the Principal is awarded the contract and within the time and manner required under the specification, after the prescribed forms are presented to him for signature, enters into a written contract, in the prescribed form, in accordance with the bid, and files two bonds with the Obligee, one to guarantee faithful performance of the contract and the other to guarantee payment for labor and materials as provided by law, then this obligation shall be null and void; otherwise, it shall remain in full force.

In the event suit is brought upon this bond by the Obligee and judgment is recovered, the Surety shall pay all costs incurred by the Obligee in such suit, including a reasonable attorney's fee to be fixed by the court.

Dated: _____, 20____

BY: _____

Principal

Surety

Address

Telephone

Attorney-in-Fact

NOTICE: SIGNATURE(S) ON BEHALF OF "SUBDIVIDER" MUST BE NOTARIZED

Certificate of Acknowledgement pursuant to Civil Code, Section 1189, must be attached.

**CHANGE ORDER
SF-5**



City of Folsom
Department of Public Works

CHANGE ORDER

Contract:

Dated:

Budget No.:

To: _____, Contractor

Upon mutual acceptance and execution of this document by the City of Folsom, hereinafter referred to as "City", and your firm, herein after referred to as "Contractor", your are hereby directed to make the following change or changes for the consideration set forth below:

Description:

Original Contract Amount

Estimated:

1. Net Change by previous Change Orders	\$0.00
2. Contract sum prior to this Change Order	\$0.00
3. Contract sum will be decreased by this Change Order	
4. New contract sum including all Change Orders	\$0.00

We, the undersigned Contractor, have given careful consideration to the change proposed and hereby agree, if this proposal is approved, that are will provide all the equipment, furnish all materials, except as may otherwise be noted above, and perform all services necessary for the work above specified, and will accept as full payment therefore, the prices shown above.

The time for performance of the contract will be changed by 0 calendar days by reason of the performance of the work required by this Change Order. Except as herinabove expressly provided, Contractor further agrees that the performance of the work specified in this Change Order or the rescheduling of other project 'work made necessary by this Change Order, shall not constitute a delay which will extend the time limit for compleieon of the work as said term is used in the contract between the City and Contractor for the project.

Public Works:

Approval Recommended by _____ Approved by: _____
Project Engineer Date Date

Contractor:

Approved by: _____
Contractor Date

Escrow No.

**ESCROW AGREEMENT FOR DEPOSIT OF
SECURITIES IN LIEU OF CASH RETENTION
ON PUBLIC WORKS PROJECT
SF-6**

THIS AGREEMENT, made this _____ day of _____, 20__, by and between the _____, a political subdivision of the State of California (hereinafter referred to as Owner), _____ (hereinafter referred to as Contractor), and _____, a state or federally chartered bank (hereinafter referred to as Escrow Agent).

WHEREAS, California Public Contract Code, Section 22300 provides that a Contractor on a Public Works contract may deposit with an escrow agent securities having a value equivalent to or greater than the amount to be held by the public agency owner for retention payments, and, under appropriate circumstances, receive the withheld retention payments;

NOW, THEREFORE, in consideration of the mutual promises herein contained, the parties hereto agree as follows:

1. Owner has let to Contractor Contract No. _____, for the construction of _____, said construction contract being dated _____. That said construction contract provides that the Owner shall retain from each progress payment a specified portion of the progress payment until the lapse of a specified period of time following acceptance by the Owner of the completed construction project. That said construction contract further provides that the Contractor may substitute a deposit of securities in lieu of the Owner withholding such monies from the total amount of the performance by the Contractor provided such deposit of securities complies with the terms of the Construction contract and law. That said construction contract and law alternately provides that the owner may make payment of retentions earned directly to the escrow agent after Contractor request.

2. Contractor may deposit with Escrow Agent securities eligible for investment under California Public Contract Code, Section 22300 as security in lieu of any monies withheld by the Owner to ensure performance under the aforesaid construction contract. Alternately, the owner may make payment of retentions earned directly to the Escrow Agent after contractor request. Such direct payment of retentions earned shall hereinafter be included in the term "securities".

3. Escrow Agent shall, upon deposit by the Contractor of eligible securities, determine the value of the securities so deposited and certify in the form attached as Exhibit "A" to the Department of Public Works, City of Folsom, 50 Natoma Street, Folsom, California 95630 that eligible securities have been deposited with the Escrow Agent by the Contractor on account for release of retention by the City of monies withheld to ensure performance of the aforesaid construction contract. Such certification shall state minimum value of the securities. The securities shall not be released by the Escrow Agent until the City Public Works Director (hereinafter referred to as Engineer) has instructed the Escrow Agent in writing that the said securities may be released to the Contractor. The form of such instruction in writing is annexed hereto as Exhibit "B".

4. Escrow Agent shall hold the aforesaid securities until such time Escrow Agent is instructed in writing by the Owner's Engineer that Escrow Agent may release the securities to the Contractor. In the event the Owner's Engineer submits a written demand and certification, in the form attached hereto as Exhibit "C", stating that the Contractor has failed to perform all or part of the construction agreement after notice and demanding the payment of a specified amount of cash to be delivered by the Escrow Agent to the Owner, the Escrow Agent shall, seven (7) days following receipt of such demand and certification, cause sufficient of the securities deposited by Contractor to be sold and shall immediately deliver to the Owner's Engineer the amount of cash specified in the said demand and certification. No proof or documents, other than the demand and certification, shall be required of the Engineer by the Escrow Agent in order to accomplish the sale and delivery as specified herein. Any excess cash or securities remaining after satisfaction of the Engineer's demand shall be retained by the Escrow Agent until further instructed by the Engineer.

5. Upon receipt by Owner of an appropriate certification as set forth in Paragraph 3 above, Owner shall release to Contractor all monies withheld by Owner to ensure performance of the aforesaid construction contract, but only to the extent that such monies have been earned by the Contractor and do not exceed the value of the securities deposited as set forth in the certification. Further, Owner shall not release to the Contractor any monies required to be withheld pursuant to a valid stop notice filed by any person so authorized and with respect to the said construction contract. Owner shall be the sole judge of the validity of all such stop notices and shall retain one hundred percent (125%) of the amount claimed in the stop notice. At such time as in the opinion of the Owner's Engineer, the Contractor has failed to perform all or part of the construction agreement, the Engineer may give 10 days' written notice to the Contractor to adequately commence or complete such performance, or the Engineer shall make demand upon the Escrow Agent for sale of securities deposited by the Contractor and for the delivery of cash proceeds to the Engineer. Upon failure of the Contractor to adequately commence or complete performance within the time specified by the Engineer, the Engineer may submit to the Escrow Agent a written demand and certification in the form attached hereto as Exhibit "C", specifying the amount to be paid to the Owner, and the Escrow Agent shall comply with the terms thereof. The Owner's Engineer shall be the sole judge of the failure of performance by the Contractor, the adequacy of commencement or completion of performance by the Contractor and the value of the failure of performance by the Contractor.

6. This escrow agreement is a third party beneficiary contract to the extent that it provides security to the Owner. The Contractor shall be the beneficial owner of any securities substituted for monies withheld and shall receive any interest thereon. The Owner shall have the right to have any such securities sold by the Escrow Agent and the cash value thereof delivered to the Owner as set forth above. In the event the sale of the securities does not realize sufficient cash to pay to the Owner the amount demanded by the Engineer, Contractor shall be obligated to immediately pay to the Owner any deficiency, and the Owner shall be further entitled to withhold any such deficiency from any payments then due from the Owner to the Contractor or to become due.

7. Contractor shall pay all fees and costs required to establish and maintain the escrow and to carry out the terms of this agreement.

8. Both the Contractor and the Escrow Agent shall indemnify and hold harmless the Owner from any loss suffered by the Owner as a result of any act or omission of Escrow Agent or Contractor or any of their officers, employees, or agents. Further, the Contractor shall indemnify and hold harmless the Owner from any loss suffered by the Owner resulting from the acts or omissions of the Escrow Agent or any of its officers, employees, or agents. Further, the Contractor shall indemnify and hold harmless the Escrow Agent from any loss The Escrow Agent may suffer as a result of the acts or omissions of the Contractor or any of its officers, employees, or agents.

IN WITNESS WHEREOF, the parties hereto have executed this agreement the day and year first above stated.

_____ a political subdivision of the State of California

By _____ OWNER

_____ CONTRACTOR

_____ ESCROW AGENT

Name of Bank _____

Address _____

NOTICE: SIGNATURE(S) ON BEHALF OF "SUBDIVIDER" MUST BE NOTARIZED

Certificate of Acknowledgement pursuant to Civil Code, Section 1189, must be attached.



"EXHIBIT A"
SF-6

To: Department of Public Works
City of Folsom
50 Natoma Street
Folsom, CA 95630

Escrow #

Re: CERTIFICATION OF DEPOSIT OF SECURITIES

_____, as Escrow Agent in that certain Escrow Agreement for Deposit of Securities in Lieu of Cash Retention on Public Works Project between the City of Folsom (referred to as City), _____ (referred to as Contractor and _____, a state or federally chartered bank (referred to as Escrow Agent), dated _____, hereby certifies to the City of Folsom that the said Escrow Agent has received from the specified Contractor, securities eligible for investment of not less than \$_____. The said Escrow Agent agrees to hold said securities in accordance with the term of the aforesaid escrow agreement, and shall not release the said securities to the said Contractor until such time as the said Escrow Agent has received notification from the City Public Works Director that the construction contract has been accepted the Escrow Agent further certifies that written demand by the City Public Works Director the Escrow Agent shall cause sufficient securities to be sold from those so deposited by the said Contractor and shall pay to the City the amount specified in the demand, provided such demand does not exceed the amount specified as the minimum value of the securities herein.

Dated: _____ at _____, California.

_____,
a state or federally chartered bank

By _____
Escrow Agent

Name of Bank _____

Address _____



EXHIBIT B
SF-6

Escrow #

To: Escrow Agent

Re: AUTHORIZATION TO RELEASE SECURITIES DEPOSITED BY CONTRACTOR

You, as Escrow Agent in that certain Escrow Agreement for Deposit of Securities in Lieu of Cash Retention on Public Works project between the _____, a political subdivision of the State of California (referred to as Owner), _____, (referred to as Owner), and _____, a state or federally chartered bank (referred to as Escrow Agent), dated _____ are hereby authorized to release to the aforesaid Contractor all securities deposited with you with respect to the aforesaid escrow agreement, except that you shall be required to retain as security and pursuant to the terms of the said escrow agreement securities having a value of not less than \$____, until such time as you may be further notified by the Owner's Engineer as to further release or as to sale.

Dated: _____

a political subdivision of the State of California

By _____
Engineer

OWNER

EXHIBIT C
SF-6

Escrow #

NOTIFICATION OF FAILURE OF PERFORMANCE
DEMAND FOR SALE OF SECURITIES AND
DEMAND FOR PAYMENT

You, as Escrow Agent in that certain Escrow Agreement for Deposit of Securities in Lieu of Cash Retention on Public Works Project between the _____, a political subdivision of the State of California (referred to as Owner), _____ (referred to as Contractor) and _____, a state or federally chartered bank (referred to as Escrow Agent), dated _____, are hereby notified that the said Contractor has failed to perform all or part of that certain construction contract described in the said escrow agreement after having been given written notice of lack of performance. You are hereby directed to cause to be sold securities deposited by the said Contractor with you and in accordance with the escrow agreement, said securities having a minimum value of \$_____, and to deliver forthwith to the Owner's Engineer the sum of \$_____. Any remaining securities deposited pursuant to the terms of the said escrow agreement shall be retained by you pursuant to further written notice by the City of Folsom Public Works Director.

Dated: _____

a political subdivision of the State of California

By _____
Engineer

OWNER

**WORKMEN'S COMPENSATION INSURANCE CERTIFICATION
SF-7**

TO THE CITY OF FOLSOM:

The undersigned does hereby certify that he is aware of the provisions of Section 3700 et seq. of the Labor Code which require every employer to be insured against liability for workmen's compensation claims or to undertake self-insurance in accordance with the provisions of said Code, and that he will comply with such provisions before commencing the performance of work on this contract.

Bidder

By _____

Title _____

Address _____

Date _____

PLEASE READ CAREFULLY BEFORE SIGNING

To be signed by authorized corporate officer or partner or individual submitting the bid. If bidder is: (example)

1. An individual using a firm name, sign: "John Doe, an individual doing business as Blank Company."
 2. An individual doing business under his own name, sign: your name only.
 3. A co-partnership, sign: "John Doe, and Richard Doe, co-partners doing business as Blank Company, by, John Doe, Co-Partner."
 4. A corporation, sign: "Blank Company, by John Doe, Secretary." (or other title)
-

SUB-BIDDER FORM

SF-08

As of March 1, 2015 Contractors (and sub-contractors) wishing to bid on public works contracts shall be registered with the State Division of Industrial Relations and certified to bid on Public Works contracts. Please register at:

<https://efiling.dir.ca.gov/PWCR/ActionServlet?action=displayPWCRegistrationForm>

In accordance with Section 4104 of the Public Contract Code of the State of California, as amended, the following information is required for each subcontractor who will perform work amounting to more than one half of one percent (0.05%) of the Total Cost Base Bid. In addition, this form will be used to determine if the bidder is responsive to Section 2.08 of the General Provisions.

Name of Sub-Bidder	Street Address of Shop, Mill, or Office (Shall be completed within 2 working days of bid opening by apparent low bidder)	License Type and Number	Dept. of Ind. Relations Reg. No.	Portion of Work to be Done by Specification Section	Percentage of Total Work



SF-9

SUBMITTAL TRANSMITTAL

Date:

Project Name: _____

Attention: _____

The items listed below are subject to all the provisions of the plans, specifications, and addenda.

- Approved
- Approved as Noted
- Not Approved
- Resubmit
- Submit additional copies
-

No. of Copies	I.D. No.	Manufacturer of Supplier	Subject Title

- Enclosures:
- Contractor (3)
 - Project Engineer (1)
 - Construction Inspector (1)
 - Project File (1)



**PROPRIETARY INFORMATION AGREEMENT
BETWEEN
THE CITY OF FOLSOM
AND**

**(Contractor)
SF-10**

The City of Folsom (hereinafter referred to as City) wishes to receive from _____ (hereinafter referred to [Contractor] as Contractor) certain technical information claimed by the Contractor to be proprietary and hereinafter referred to as "Proprietary Data". Submittal of Proprietary Data by Contractor to City is required by the construction contract for testing, operating, and maintaining equipment, equipment assemblies and systems constructed under the contract. Contractor and City agree for a period of ____ years as follows:

1. The proprietary data is submitted to the City based on the understanding that the City would not disclose the same to others outside the City, nor reproduce the contents of said proprietary data or provide copies thereof to others outside the City without authorization from Contractor. Contractor claims proprietary rights in the contents of the proprietary data as a basis for preventing disclosure of the contents thereof to others. Contractor understands that the City has reservations as to the propriety of excluding the proprietary data from disclosure under the California Public Records Act (Government Code, Section 6250, et seq.).
2. The City may make such disclosure or reproduction of the proprietary data as is reasonably necessary or convenient to operate and maintain the subject equipment and to otherwise fully enjoy the use and benefit of the subject equipment.
3. Except as provided in paragraph 2, above, if any person makes a proper request to review or be provided with copies of the proprietary data or any part thereof, immediately upon notification thereof, Contractor agrees to defend the City and its officers, agents, and employees against any action resulting from denial of such request. If Contractor fails to promptly provide such defense, the City, its officers, agents, and employees shall be free to grant such requests.
4. Contractor shall indemnify and hold harmless the City, its officers, agents, and employees from any and all claims, costs, liabilities or damages, including attorney's fees and court costs resulting from the performance of this agreement.

EXECUTED on this ____ day of _____, 20__.

CITY OF FOLSOM _____ (Contractor) _____

By _____ By _____

Title _____ Title _____

GUARANTEE

SF-11

We hereby guarantee the

which we propose to install in the City of Folsom for (1) year in accordance with the guarantee required in the specifications. We agree to repair or replace any or all such work, together with all or any other work which may be displaced in so doing, that may be proven defective in workmanship or material within the period from the date of acceptance without expense whatsoever to the City, excluding ordinary wear and tear and unusual abuse or neglect excepted.

In the event of our failure to comply with a above mentioned conditions within five (5) days time after being notified in writing, we collectively or separately, do hereby authorized the City to proceed to have the defects repaired and made good at our expense and will pay the costs and damages incurred immediately upon demand.

Signed:

Dated:

NOTICE: SIGNATURE(S) ON BEHALF OF "SUBDIVIDER" MUST BE NOTARIZED

Certificate of Acknowledgement pursuant to Civil Code, Section 1189, must be attached.



**REQUEST FOR INFORMATION
SF 12**

City of Folsom
50 Natoma Street, Folsom. CA 95630

NAME & ADDRESS OF PROJECT:

DATE OF ISSUANCE:

RFI NUMBER

CONTRACT FOR:

File Reference
OWNER
ARCHITECT
CONTRACTOR
FIELD
OTHER

NAME & ADDRESS OF CONTRACTOR:

ARCHITECT:

DESCRIPTION OF PROBLEM / CLARIFICATION / INFORMATION REQUIRED:

Reference:

Subject:

Description:

PROPOSED SOLUTION:

Submitted by: _____
Name Company / Position

RESPONSE:

This document is to provide additional information or clarification only, and does not constitute authorization or direction to proceed with any changed or additional work. Changed or additional work must be separately authorized in writing by the City.

Response by: _____
Signature of A/E or other respondent Date

Reviewed by: _____
Signature of A/E or other respondent Date

Cc: Contractor
 IOR
 CM
 Other:
 Other:

STANDARD CONSTRUCTION SPECIFICATIONS

Section 1: GENERAL REQUIREMENTS

1.1 PRE-CONSTRUCTION PHOTOGRAPHS AND RECORD DRAWINGS

Pre-construction photographs or record drawings are not required unless specifically set forth in the Special Provisions for the project.

1. Measurement and Payment

The cost of the pre-construction photographs or record drawings shall be included in the price paid for other items of work in the Proposal, and no separate payment will be made therefore.

2. Pre-Construction Photographs Specification

When pre-construction photographs are specified in the Special Provisions, the Contractor shall provide pre-construction color prints of the work. The photographs shall be high resolution digital images. Each photograph shall be marked to indicate the date, name of work, and the location where the photograph was taken. Before construction may start, two 3-½"x5" color prints of each picture shall be delivered to the Engineer. Pre-construction photographs shall be taken at an approximate average interval of 100 feet as designated by the Engineer. Photographer shall be equipped at all times to take either interior or exterior exposures.

Prints shall be submitted in a three-ring photo album binder with clear plastic covered fillers, four photos each side, grouped according to street, lateral or line, and in sequence. Each group of prints shall be identified by a label, which projects beyond the edge of filler and is easily recognized. Digital images shall be included on CD/DVD and submitted with the photo album.

Approximately 25 photographs shall be submitted to the Engineer for the Engineer's approval. This approval shall be obtained before proceeding with the remaining photographs.

All photographs which do not conform to these specifications or which, in the Engineer's estimation, are unsatisfactory, shall be re-photographed.

3. Pre-Construction Video Specification

When pre-construction video is specified in the Special Provisions, the Contractor shall provide pre-construction video and audio in DVD format. Such coverage shall include, but not be limited to, all existing driveways, sidewalks, curbs, streets, signs, landscaping, trees, catch basins, fences, visible utilities and all buildings located within the zone of influence. Of particular concern are any existing faults, fractures, defects or other features. Audio description shall be made simultaneously with and support the video coverage.

Streets shall be recorded by audio-video tape for the full width of the right-of-way, except where specifically noted otherwise by the City Engineer.

Work Agreement Areas shall be recorded by audio-video DVD including all adjacent areas lying within the zone of influence of construction as directed by the City Engineer. The size and locations of all areas to be taped will be shown on the Plans or otherwise supplied by the City Engineer.

Front and/or Side Yard Areas of residential homes within the zone of influence of construction will be recorded.

All DVD's shall be properly identified by number, location and project name in a manner acceptable to the City of Folsom.

A record of the contents of each DVD shall be supplied on a run sheet identifying each segment in the tape by location, i.e., street viewing side, traveling direction, engineering stationing, and all referenced by tape counter numbers.

All video recordings shall begin with the date and time of recording, the project name, the sheet numbers of engineering stationing as shown on the plans, the name of the street, area or building being taped, the direction of travel and the viewing side. Houses and buildings shall be identified visually by house or building address, when possible, in such manner that the progress of the taping and the proposed system may be located by reference to the houses and buildings.

All taping shall be done during times of good visibility. No outside taping shall be done during periods of visible precipitation or when the ground is covered with leaves or debris, unless otherwise authorized by the City Engineer.

In order to produce the proper detail and perspective, adequate auxiliary lighting will be required to fill in shadow areas caused by trees, utility poles, road signs and other such objects, as well as other conditions requiring artificial illumination.

The average rate of speed in the general direction of travel for the conveyance used during taping shall not exceed 60 feet per minute. Panning and zoom-out rates shall be controlled sufficiently so that playback will produce adequate clarity of the object being viewed.

When conventional wheeled vehicles are used as conveyances for the taping, the distance from the camera lens to the ground shall be such as to ensure proper perspective. In instances where tape coverage will be required in areas not accessible to conventional wheeled vehicles, such coverage shall be obtained by walking or by special conveyance approved by the City Engineer but with the same requirements for tape quality and content as specified herein, except as may be specifically exempted by the City Engineer.

4. Record Drawings Specification

The final locations and layout of all mechanical, electrical, and instrumentation equipment; piping and conduit; structures; and other facilities. Drawings shall be kept current weekly, with all work instructions and change orders; mechanical, electrical, and instrumentation equipment accommodations; and construction adjustment. Drawings shall be subject to the inspection of the Project Manager at all times. Progress payments, or portions thereof, may be withheld if drawings are not accurate and current. Prior to acceptance of the work, the Contractor shall deliver to the Engineer three (3) bond copies, and an electronic copy of the plans, or as specified by the City, neatly marked accurately showing the information required above.

1.2 MOBILIZATION

A. Measurement and Payment

Mobilization shall consist of preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to the site; for the establishment of all offices, buildings, and other facilities necessary for work on the project; and for all other work and operations which must be performed, or costs incurred prior to beginning work, on the various items on the project site. Payment for mobilization shall be made as follows:

B. Mobilization Not a Pay Item

When the contract does not include a pay item for mobilization, full compensation for any necessary mobilization required shall be considered as included in the contract lump sum price or as included in the prices paid for the various items of work in a unit price contract, and no additional compensation will be allowed therefore.

C. Mobilization a Pay Item

When the contract includes a contract pay item for mobilization, the lump sum price item for mobilization shall include full compensation for the furnishing of all labor, materials, tools, equipment, administrative costs, and incidentals for mobilization.

1. The City shall pay no greater than 5% of the original contract amount as a separate pay item for mobilization.
2. During the course of construction mobilization payment shall be paid as follows:
 - a. When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 5% or more of the original contract amount, 50% of the contract item price for mobilization or 2.5% of the original contract amount, whichever is the lesser, will be included in said estimate for mobilization payment.

- b. When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 10% or more of the original contract amount, the total amount earned for mobilization shall be 70% of the contract item price for mobilization or 3.5% of the original contract amount, whichever is the lesser, and said amount will be included in said estimate for mobilization payment.
 - c. When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 20% or more of the original contract amount, the total amount earned for mobilization shall be 90% of the contract item price for mobilization or 4.5% of the original contract amount, whichever is the lesser, and said amount will be included in said estimate for mobilization payment.
 - d. When the monthly partial payment estimate of the amount earned, not including the amount earned for mobilization, is 50% or more of the original contract amount, the total amount earned for mobilization shall be 100% of the contract item price for mobilization or 5% of the original contract amount, whichever is the lesser, and said amount will be included in said estimate for mobilization payment.
3. The City shall not pay additional mobilization compensation for change order work. Payment for mobilization shall be subject to retention per Article 8 of the General Provisions.

Section 2: ROADWAYS, STREETS, AND SIGNS

2.1 EXCAVATION

1. Roadway Excavation

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per cubic yard for roadway excavation. The requirements of this specification shall be as set forth in Sections 15 and 19 of the State Specifications, except that the contract unit price paid per cubic yard for roadway excavation shall include full compensation for compacting natural and original ground, for subgrade preparation, for all haul and overhaul, for excavation, for placing earth embankment as shown on the plans and as directed by the Engineer, and for furnishing all water necessary for the compaction of the material and subgrade preparation. The bid price shall also include shaping and trimming slopes to solid material and to the lines and elevations shown on the plans.

B. Ditches, Channels, Side Slopes

Ditches and channels in the median area, between roadway and frontage roads and side ditches contiguous to the roadway and other locations as shown on the plans will be paid for as roadway excavation as specified herein, unless specifically indicated as ditch and channel excavation in the Special Provisions and the Proposal. It shall also be required to adjust excavation and embankment side slopes to clear existing improvements, utility poles, and vegetation, as directed by the Engineer.

C. Subgrade Preparation

The requirements for subgrade preparation shall be as set forth in Section 19-5 and Section 19-6 of the State Specifications and in accordance with the following provisions:

1. Relative compaction of not less than 95% shall be obtained for a minimum depth of 0.5 foot below the grading plane for the width between the outer edges of shoulders or 2.5 feet below the finished grade for the width of the traveled way plus 3 feet on each side, whether in excavation, embankment, or at original ground level. All other material shall be compacted to a relative compaction of 90%, including subgrade under meandering sidewalks not adjacent to curb and gutter, except for embankment under bridge and retaining wall footings which shall be as specified in Section 19-5.03 of the State Specifications.

2. When the next layer of material to be placed on the subgrade is an asphalt concrete pavement, asphalt concrete base, or asphalt concrete subbase, the subgrade grading plane at any point shall not vary more than 0.05 foot above or below the grade established by the Engineer.
3. In addition to the above requirements, it will also be necessary to assure that the subgrade or aggregate base is stable prior to paving. If there appears to be any question regarding stability, the contractor will be required to proof roll the area prior to placing asphaltic concrete. The equipment used for this proof rolling shall be subject to the approval of the inspector. Payment for proof rolling shall be included in the cost for roadway excavation.
4. Subgrade preparation requirements as set forth in this section will be waived where the width of the subgrade to be prepared is less than 4 feet if the undisturbed subgrade (grading plane) is firm and stable as determined by the Engineer. The Engineer may order mechanical tamping to obtain the desired firmness and stability. The Engineer may order removal of soft and unstable material below the grading plane and backfill with acceptable import materials if the subgrade (grading plane) is unsuitable to place the next layer of the structural section.

D. Relative Compaction

Whenever relative compaction specified in these specifications or the Special Provision, the relative compaction will be determined by Test Method No. California 231 or the latest State test method.

E. Unsuitable Roadway Excavation and Backfill

Any unsuitable material encountered within 2.5 feet below the subgrade or 2.5 feet below original ground, whichever is lower, shall be brought to the attention of and removed at the direction of the Engineer and the additional excavation greater than that required for preparation of original ground or subgrade shall be computed and paid for at the contract unit price bid per cubic yard of roadway excavations. Unsuitable material excavated more than 2 feet below subgrade shall be paid for as extra work if no item for "unsuitable material excavation" appears in the proposal.

The Contractor shall use extra care in excavating unsuitable material so as not to aggravate the condition. If, in the opinion of the Engineer, the Contractor methods for excavating are increasing the amount of unsuitable material required to be excavated, the Engineer will require the Contractor to take the necessary steps to correct the condition.

Backfill to replace the unsuitable material removed as roadway excavation shall be placed and compacted to subgrade as specified herein. Suitable backfill material shall be one of the following:

1. Pit run materials as specified in Section 2.2.1 of these Specifications.
2. Cobbles as specified in Section 2.2.2 of these Specifications.
3. Roadway excavation material approved by the Engineer.
4. Imported borrow as specified in Section 9.3 of these Specifications.
5. Any combination of "1", "2", "3", and "4".

The selection of the proper backfill shall be at the discretion of the Engineer. Backfill, when made with material excavated from the job site, will be paid for at the same contract unit price paid for roadway excavation. The pay quantity will be the same as that computed for unsuitable material excavated as roadway excavation as specified herein. Imported borrow, pit run material and cobbles, and the placing of such materials shall be paid for as specified in these Specifications for those items.

F. Unsuitable Material in Embankments

Unsuitable material excavated as roadway excavation, which, in the opinion of the Engineer, cannot be worked into the roadway embankment, shall be removed from the job site or wasted within the right-of-way as directed by the Engineer. No additional compensation will be allowed for removing unsuitable material from the job site. Unsuitable material excavated as roadway excavation, which in the opinion of the Engineer can be used for roadway embankment, shall be placed in embankment below a plane 30-inches below the finished grade and compacted to a minimum relative compaction of 90 %. No additional compensation will be allowed for placing unsuitable material in the roadway embankment.

G. Surplus Material Disposal

The contractor's attention is directed to Section 9.5 of these Specifications for disposal of excess excavation materials outside of easements or right-of-way.

2. Ditch and Channel Excavation

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a unit price per cubic yard for ditch and channel excavation when such ditch and channel excavation is specifically indicated on the plans and in the Proposal. Ditches and channels shall be excavated to line and grade and sections as shown on the plans. Material resulting from excavating ditches and channels shall be used in fill and embankment areas as shown on the plans; surplus excavated materials shall become the property of the Contractor, and shall be disposed of as specified in Section 9.5 of these Specifications, unless otherwise shown on the plans or in the Special Provisions. No additional compensation shall be made for disposal of surplus excavated materials. Trees and shrubbery shall be

protected as required in Article 12 of the General Provisions and Section 9.1.9 of these Specifications.

The unit price paid for channel excavation shall include full compensation for earth berms, overhaul, channel fills, sliver fills, access ramps, channel embankment, disposal of surplus channel excavation or unsuitable materials, dewatering, extending and shortening existing side drains and furnishing and applying water for compaction and dust control, and no separate payment will be made for any of these items.

Final Pay Quantities: When the estimated quantities for a specific portion of the work are designated on the plans 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 on the plans as final pay quantities, portions not so designated will be measured and paid for in accordance with the applicable provisions of these specifications and the Special Provisions.

In case of any discrepancy as to final pay quantities, the final pay quantities shown on the plans shall prevail.

B. Grade Control

For channels, which are to be lined, the Contractor shall place grade control points at 25-foot intervals along the invert of the shaped channel to control the grade and thickness of the concrete bottom. For channels 12 feet and over in width, which are to be lined, the Contractor shall place grade control points at 25-foot intervals along each edge of the bottom. Care shall be taken to prevent excavating below the channel grade line or beyond the slope lines. Areas excavated below grade or beyond the slope shall be filled with suitable materials and thoroughly compacted to 90% relative compaction by the Contractor at his own expense.

C. Channel Backfill

In those areas where the bottom of the existing channel is below the proposed grade or beyond the slope lines, the Contractor shall fill and thoroughly compact these areas to a minimum 90% relative compaction with suitable material. No additional payment

will be made for this work, as it shall be considered as included in the price bid for channel excavation.

D. Channel Embankments

Embankments shall be placed as shown on the plans. Embankment areas shall be filled with suitable material, as determined by the Engineer, resulting from channel excavation. The fill shall be placed in a neat and uniform manner, and shall be spread uniformly to the grades as shown on the plans. Where embankment is made on the existing channel or on other slopes, the existing slope shall be plowed or cut into as the embankment is constructed so as to tie the new embankment to the existing slope. All fill slopes shall be trimmed to give a neat and uniform appearance. Fill areas in unlined channels shall be compacted to a minimum relative compaction of 90% unless otherwise shown on the plans.

In lined channels, fill areas shall be compacted to a minimum relative compaction of 90% to an elevation 1 foot above the top of the channel lining, unless otherwise shown on the plans.

Localized erosion, sloughing or other slight irregularities in the existing channel which may occur between cross sections may not be shown on the plans or cross-sections. Where the localized erosion, sloughing or irregularities extend beyond the limits of the channel cross-section, these areas shall be filled and compacted to conform to the design channel cross-section. No additional payment will be made for these fills.

E. Water

The method and rate of applying water shall conform to Section 17 of the State Specifications. The Engineer shall determine the necessity for dust control, the areas in which the water is to be applied, and the quantity of water to be applied. Unless specifically set forth in the Special Provisions and in the Proposal, no additional payment will be made for water, and the cost involved for furnishing and applying water shall be included in the price bid for channel excavation.

F. Pipe Adjustments

Side drain pipes less than 18-inch diameter shall be extended or shortened as required to discharge into the new channel, so that the pipe outlet is flush with the channel slope in conformance with Standard Drawing SD-19. The pipe used for extending existing side drains shall be of the same diameter as the existing pipe, and shall conform to one of the options specified in these Standard Specifications.

Side drain pipes 18-inch diameter or greater shall be extended or shortened to conform with Standard Drawing SD-20. Access control racks shall conform to Standard Drawing SD-15.

Method of placing pipe extensions shall conform to these specifications and the Standard Drawings. Existing side drain pipes to be shortened shall be cut off parallel to the slope of the channel in a neat, workmanlike manner.

G. Unsuitable Ditch and Channel Excavation and Backfill

Any unsuitable material as determined by the Engineer, encountered within 2 feet below the subgrade of the channel shall be removed at the direction of the Engineer and the additional excavation greater than that required for channel subgrade shall be computed and paid for at the contract unit price bid per cubic yard of channel excavation. The Contractor shall use extra care in excavating unsuitable material so as not to aggravate the condition. If, in the opinion of the Engineer, the Contractor's methods for excavating are increasing the amount of unsuitable material required to be excavated, the Engineer will require the Contractor to take the necessary steps to correct the condition. Should the Contractor elect to place cobbles or other material in the channel bottom to provide a working surface, in lieu of dewatering the channel, the cost of furnishing and placing such material shall be at the Contractor's sole expense.

Backfill of areas where unsuitable material was removed as channel excavation shall be placed and compacted to subgrade as specified in Section 9.2.1.D of these Specifications. A minimum relative compaction of 90% is required. Suitable backfill material shall be one of the following:

1. Pit run materials as specified in Section 2.2.1 of these Specifications.
2. Cobbles as specified in Section 2.2.2 of these Specifications.
3. Channel excavation materials approved by the Engineer.
4. Imported borrow as specified in Section 9.3 of these Specifications.
5. Any combination of "1", "2", "3", and "4".

The selection of proper backfill shall be at the discretion of the Engineer. Backfill, when made with material excavated from the job site, will be paid for at the same contract unit price paid for channel excavation. The pay quantity will be the same as that computed for unsuitable material excavated as channel excavation as specified herein. Imported borrow, pit run material, and cobbles, and the placing of such materials, shall be paid for as specified in these Specifications.

H. Unsuitable Or Surplus Material Disposal

Unsuitable or surplus material excavated as channel excavation, which in the opinion of the Engineer, cannot be worked into the required embankments, shall become the property of the Contractor and shall be disposed of as specified in Section 9.5 of these Specifications, unless otherwise shown on the plans or in the Special Provisions. No

additional compensation shall be made for disposal of surplus material or of surplus unsuitable material.

2.2 GENERAL MATERIALS

1. Pit Run

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per ton for clean, granular pit run compacted in place. The quantity shown for this item shall be considered as approximate, and is indicated for bid comparison only, and no guarantee is made or implied that the quantities as shown will not be reduced or increased or deleted as may be required by the Engineer.

If no item for pit run appears in the Proposal and the Engineer deems it necessary to place pit run, the material shall be furnished and compacted as extra work in accordance with Article 4, Section 4.12 of the General Provisions.

B. Materials

The pit run material is to be used to replace unsuitable material encountered as specified elsewhere in these Specifications or as directed by the Engineer. The material shall have a minimum sand equivalent of 25. The pit run material shall be compacted to a minimum of 90%. No additional fill shall be placed over the pit run until the Engineer has inspected the pit run, in place, and given his approval for additional fill to be placed.

2. Cobbles

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per ton for clean cobbles in place. The quantity shown for this item shall be considered as approximate and is indicated for bid comparison only, and no guarantee is made or implied that the quantities as shown will not be reduced or increased or deleted as may be required by the Engineer.

If no item for cobbles appears in the Proposal and the Engineer deems it necessary to place cobbles, the material shall be furnished and placed as extra work in accordance with Section G8-03 of these Specifications.

B. Materials

The cobble material is to be used to replace unsuitable material encountered as specified elsewhere in these specifications or as directed by the Engineer. The material shall have a minimum of 4-inches in its least dimension and maximum of 12-inches in

its greatest dimension. Cobbles shall be inspected, placed, and compacted to the satisfaction of the Engineer.

3. Quarry Rock

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per ton for furnishing and placing quarry rock as shown on the plans and as directed by the Engineer.

B. Materials

Quarry rock shall consist of quarried stones and 65% of the stones by weight shall weigh between 800 pounds and 1,400 pounds. No individual stone shall weigh more than 2,500 pounds or less than 20 pounds, except that 18% of the stones by weight may pass the 3-inch screen. The stones shall be angular in shape so as to form a stable protection structure of the required section. Rounded boulders or cobbles shall not be used. Breadth or thickness of individual stones shall not be less than 1/3 the length.

4. Class "C" Subgrade

A. Measurement and Payment

The excavation and disposal of existing pavement other than that shown on the plans to be excavated as a part of, or adjacent to, an area to be excavated to provide a new structural section, shall be paid for as extra work, unless set forth in the Special Provisions and on the Proposal as a separate pay item.

Excavation of pavement and materials shown on the plans necessary for preparation of Class "C" subgrade shall be paid for as roadway excavation as set forth in Section 2.1.1 of these Specifications.

Full compensation for furnishing all labor, material, tools, equipment, and incidentals and for doing all work involved in preparing Class "C" subgrade, except excavation, as shown on the plans, specified in these specification or as directed by the Engineer, shall be included in the contract unit prices paid for the materials, in place, on the subgrade as specified on the plans, or directed by the Engineer.

B. Location

Those areas of existing pavement as indicated on the plan or as directed by the Engineer to receive an overlay of asphalt concrete shall be prepared as Class "C" subgrade. Class "C" subgrade shall apply to subgrade prepared on an existing roadbed, subbase, base, surfacing or pavement which was not constructed by the Contractor, and on which a layer of subbase, base, surfacing, pavement, or other specified material is to be placed.

C. Preparation

In advance of spreading the new subbase, base, surfacing or pavement material, the existing roadbed, subbase, base, surfacing or pavement shall be cleaned of all dirt and loose material and full compensation for such work shall be considered as included in the contract price or prices paid for the subbase, base, surfacing or pavement material being placed.

If ordered by the Engineer, a leveling course of the material to be placed shall be spread upon the existing roadbed, subbase, base, surfacing, or pavement, in accordance with the specifications for the type of material being placed, and no compensation other than the contract price or prices being paid for the material will be made for such work.

Where shown on the plans or specified or directed by the Engineer, the existing roadbed, subbase, base, surfacing or pavement shall be scarified, watered, and rolled in advance of placing new material thereon.

Broken, failed or other unsatisfactory portions of the existing roadbed, subbase, base, surfacing or pavement, and sections interfering with new construction shall be removed and disposed of. The areas and depths to be removed shall be as ordered by the Engineer. The area in the exposed spaces shall be watered and compacted, after which the space shall be filled with subbase, base, surfacing or pavement material as directed by the Engineer.

5. Aggregate Subbase

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per ton for furnishing Class 1 aggregate subbase material in place as shown on the plans and specified herein.

B. Material and Placement

Aggregate subbase material and method of placing shall conform to Section 25 of the State Specifications excepting modification as herein specified. The aggregate subbase shall conform to the grading provided for 2½-inch or 3-inch maximum grading at the Contractor's option, as shown herein.

Sieve Size	Percentage Passing Sieve By Weight	
	2½" Maximum	3" Maximum
4"	100	100
3"	100	90-100
2½"	90-100	80-100
No. 4	35-70	25-50
No. 200	0-10	0-10

The weight of material to be paid for 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 one percentage point more than the optimum moisture content as determined by Test Method No. Calif. 216 Dry Density Basis. The weight of water deducted as provided herein will not be paid for.

The aggregate subbase shall have sufficient moisture, in the opinion of the Engineer, to prevent undue segregation during the spreading operation and shall be compacted immediately after delivery and the Contractor shall be responsible for maintaining the required moisture content until the next successive layer of materials is placed. No additional compensation will be allowed for water applied to the aggregate subbase after the material has been weighed.

6. Aggregate Base

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per ton for furnishing Class 2 aggregate base material in place as shown on the plans and as specified herein.

B. Material and Placement

Aggregate base material and method of placing shall conform to Section 26 of the State Specifications excepting modification as herein specified. The aggregate base shall conform to the grading provided for 1½-inch or ¾-inch maximum grading at the Contractor's option, as shown herein.

Sieve Size	Percentage Passing Sieve By Weight (Operating Range)	
	1-½" Maximum	¾" Maximum
2"	100	100
1½"	90-100	100

¾"	50-85	90-100
No. 4	25-45	35-60
No. 30	10-25	10-30
No. 200	2-9	2-9

The weight of material to be paid for 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 one percentage point more than the optimum moisture content as determined by Test Method No. Calif. 216. The weight of water deducted as provided herein will not be paid for.

The material shall be deposited on the roadbed in such a manner as to provide a uniform section of material within 5% tolerance of the predetermined required volume. Deposition shall be by spreader box or bottom dump truck to prevent segregation of the material. The material so deposited on the roadbed shall have sufficient moisture which, in the opinion of the Engineer, is adequate to prevent excessive segregation. It shall then be immediately spread to its planned grade and cross section. Undue segregation of material, excessive drifting or spotting of material will not be permitted and any material in the opinion of the Engineer to be unsuitable segregated, shall be removed from the roadbed or completely reworked to provide the desired uniformity of the material. When the required thickness is more than 6-inches, the base material shall be spread and compacted in two or more layers of approximately equal thickness, the maximum compacted thickness of any one layer is not to exceed 6-inches. Each layer shall be spread and compacted in the above manner.

The Contractor shall be responsible for maintaining the required moisture content until the next successive layer of materials is placed. No additional compensation will be allowed for water applied to the aggregate base after the material has been weighed.

7. Water

A. Water Use Permit

All contractors are required to obtain a Water Use Permit in order to take water for construction purposes from the Department of Utilities or supplying agency.

For City Capital Improvement Projects (publicly financed) within the City's water service area, this permit will be a no charge permit. If water is to be taken outside the City's water service area, the contractor shall obtain and pay for a water use permit from the water purveyor for that water service area. The payment for the cost for any permit and water usage shall be included with the various items of the proposal and no separate payment will be made.

For privately funded projects, the contractor will be required to obtain a fire hydrant water meter in addition to the water use permit, and such water shall be paid for at the current rate established by the Utilities Department.

Violations of this provision may result in prosecution in accordance with Section 1.12 of the Folsom Municipal Code.

B. Water Source

In accordance with Article 17.03 of the General Provisions, arrangements for water needed for construction purposes must be made with the supplying agency. Proof of such arrangement, including method of reimbursement, shall be subject to inspection and approval by the Engineer. Before drawing any water from a City owned or operated water system, the Contractor shall obtain a permit from the Department of Public Works.

8. Sand Cover

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per ton for furnishing and applying sand cover for prime coat. The sand, method, and rate of spreading and payment shall conform to Sections 36 and 39 of the State Specifications.

9. Sand Slurry

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per ton for furnishing and applying sand cover for prime coat. The sand, method, and rate of spreading and payment shall conform to Sections 36 and 39 of the State Specifications.

10. Screenings

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per ton for furnishing and placing screenings of the size shown in the Proposal.

B. Grade and Rate

The screenings will be used in a double seal coat for the shoulders of the road and for other seal coats as indicated in the plans. The screenings, method and rate of spreading, and the payment shall conform to Section 37 of the State Specifications.

11. Control Low-Strength Material (CLSM)

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per cubic yard for furnishing and placing Control Low Strength Material (CLSM) as shown on the Proposal or as ordered by the Engineer. If no item is included in the Proposal, the CLSM shall be paid for as a force account as stated in Article 9.04 of the General Provisions.

12. Dust Palliative

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per cubic yard for dust palliative, when ordered by the Engineer. If no item is included in the Proposal, the dust palliative shall be paid for as a force account as stated in Article 9.04 of the General Provisions.

B. Application

Dust palliative shall be applied to detours, temporary surfacing, and construction sites when, in the opinion of the Engineer, this type of dust control is required. Dust palliative shall be asphaltic emulsion as specified elsewhere in these specifications, or of the type directed by the Engineer.

13. Bar Reinforcing Steel

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per pound for furnishing and placing the type and grades of bar reinforcing steel as indicated in the plans and specifications and as directed by the Engineer.

If there is no item in the Proposal for bar reinforcing steel, it shall be understood that the steel shall be furnished and placed as specified on the plans and in the specifications and that the cost for such work shall be included in the prices bid for other items of work and that no additional compensation will be allowed therefore.

B. Material and Placement

Bar reinforcing steel and method of placing shall conform to Section 52 of the State Specifications.

C. Final Quantities

The quantity of bar reinforcing steel shown on the plans and Proposal shall be the final quantity for which payment will be made, as provided in Section 9 of the State Specifications.

2.3 ASPHALT MATERIALS

1. Asphalt Concrete - Type "B"

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per ton for furnishing and placing asphalt concrete, Type "B". The grade of the liquid asphalt to be used shall be determined by the Engineer. Asphalt concrete will be paid for at the contract unit price per ton in place, and not separately as mineral aggregate and paving asphalt.

B. Material and Placement

The asphalt concrete and the method of placing shall conform to Sections 39 and 92 of the State Specifications, except as herein modified. Asphalt concrete shall be placed when the atmospheric temperature is 50 degrees F or above. When asphalt concrete is placed as a base course, the asphalt concrete may be placed when the ambient temperature is 40 degrees F and rising, if the material is deposited directly into the paver hopper. The Contractor shall provide a 12-foot straight edge for checking surface smoothness. The Contractor's attention is specifically directed to finished surface requirements under Section 39-6.03 of the State Specifications. The maximum thickness of the base course shall be 3-inches (.25 foot) and the minimum surface course shall be 1½-inches (.125 foot).

C. Miscellaneous Areas

The contract unit price shall include full compensation for placing overlay areas, driveways, asphalt gutters, spillways, and other incidental areas as indicated in the plans and specifications and as directed by the Engineer.

D. Paving and Rolling

Prior written approval of the Engineer is required before the Contractor may place asphalt concrete without the use of a paving machine. On subdivisions, when the hourly production rate is less than 125 tons per hour, one tandem roller will be required as set forth in Section 39-5.02 of the State Specifications. On subdivisions, when the hourly production rate is greater than 125 tons per hour, 2 rollers will be required. When pickup machine or front end loader is used on the paving machine, the Engineer may require the use of an additional 12 ton steel tired roller at the paving site. In lieu of the additional roller, the Contractor may furnish a water truck on stand-by for filling the rollers. After compaction, the asphalt concrete shall have a density of not less than 95% of the maximum theoretical unit weight, as determined in the laboratory by Test Methods No. Calif. 304 and No. Calif. 375.

E. Leveling Course

In advance of spreading asphalt concrete over existing pavement, the Engineer may order, in writing, a surface course mixture spread to level irregularities, dips, depressions, sags, and excessive crown and to provide a smooth base of uniform grade and cross section in order that the surface course and/or subsequent layers of

surfacing will be of uniform thickness and true to grade and cross section. The spreading shall be done with blading equipment acceptable to the Engineer and such manner as directed by the Engineer. Asphalt concrete so spread by blade method shall be compacted as provided herein. No additional compensation will be allowed for spreading asphalt concrete as herein specified, and full compensation for all work incidental to such operations will be considered as included in the contract price paid for asphalt concrete.

F. Paving Aggregate

Aggregate for base course of asphaltic concrete structural sections shall be $\frac{3}{4}$ -inch or $\frac{1}{2}$ -inch maximum. For all other asphaltic concrete structural sections, $\frac{1}{2}$ -inch maximum aggregate shall be used, unless otherwise specified on the plans and/or in the Special Provisions. The Engineer may require a lesser-sized aggregate where special conditions exist.

G. Existing Pavement

Cut lines made on the existing pavement, both longitudinally and transversely, for the placing of new structural section, shall be sawcut straight and smooth. Edges shall be clean and free of dirt and dust prior to placing tack coat. Asphaltic emulsion shall be used as a tack coat or paint binder on existing pavement that is to receive an asphalt concrete overlay and also along the exposed edges of abutting pavement and concrete curbs and gutters. Its use may also be required between subsequent layers of asphalt concrete placed by the Contractor when ordered by the Engineer. Asphalt emulsion shall conform to Section 2.3.3 of these Specifications. If no item is included in the Proposal for asphaltic emulsion, payment shall be included in the price bid for asphalt concrete.

The asphalt concrete structural section shall be brought to the elevation of the existing pavement before the overlay is placed. The overlay joints on the top lift shall overlap the joint between the new and the existing pavement.

H. Thickness

The minimum compacted thickness of asphaltic concrete shall be the thickness shown on the plans. The tolerance for minimum thickness for all operations shall be 0.01 foot. The tolerance for maximum thickness for asphalt concrete less than 0.35 foot shall be 0.02 foot and for thickness more than 0.35 foot shall be 0.03 foot.

I. Joints

Longitudinal pavement joints shall be on or as close as possible to the lane lines. The Engineer shall determine the locations of the longitudinal joints. At the end of each

working day, the distance between ends of the adjacent improved lanes shall be between five and 10 feet.

J. Equipment

On streets with more than two lanes and major streets, as defined in Section 11 of the City's Design Standards, when placing the finish lift of asphaltic concrete on existing pavement, the end of the screed nearest the centerline shall be controlled by a sensor activated by a ski device not less than 30 feet long.

2. Liquid Asphalt

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per ton for furnishing and applying the liquid asphalt.

B. Grades

Liquid asphalt grade shall be determined by the Engineer. The liquid asphalt and the method of application shall conform to Sections 39, and 93 of the State Specifications.

C. Rates

The liquid asphalt shall be used as prime coat for the aggregate base, and as a penetration treatment for the shoulders of the road and driveways. Prime coat shall be spread at the approximate total rate of 0.25 gallon per square yard of surface covered and penetration treatment shall be spread at a uniform rate not to exceed 0.50 gallon per square yard. The Engineer will determine the exact rate and number of applications.

3. Asphaltic Emulsion

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per ton for furnishing and applying asphaltic emulsion. The asphaltic emulsion shall be used in a double seal coat for the shoulders of the road, as indicated on the plans, as a paint binder on existing asphalt concrete pavement that will be given an asphalt concrete overlay, and when ordered by the Engineer to be used on subsequent layers of asphalt concrete placed by the Contractor.

B. Grade and Rate

The asphaltic emulsion shall be of the high viscosity type to be determined by the Engineer, and the method and rate of spreading shall conform to Sections 37, 39, and 94 of the State Specifications.

4. Asphalt Concrete Dike

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a unit price per lineal foot for placing asphalt concrete dike. Quantities of dike constructed of asphalt concrete will be paid for at the contract price per ton for asphalt concrete, and also at the contract price per lineal foot for placing asphalt concrete dikes. Full compensation for any necessary excavation and backfill involved in undercutting cut slopes for constructing dikes, will be considered as included in the contract price paid per lineal foot for placing asphalt concrete dikes, and no additional compensation will be allowed therefore.

B. Placement

Dikes shall be shaped and compacted with an extrusion machine only, and the machine shall be capable of shaping and compacting the material to the required cross section. Any machine, which, in the opinion of the engineer, is not doing a satisfactory job, shall be removed from the project. Asphalt concrete shall be as specified in Section 2.3.1 of these Specifications.

2.4 PORTLAND CEMENT CONCRETE

1. General

A. Specification

Portland cement concrete shall conform to Section 90 of the State Specifications except as herein modified.

B. Class "A"

Concrete shall conform to either the 1-inch or 1½-inch gradation, at the option of the Contractor, unless otherwise specified in these Specifications or in the Special Provisions.

C. Class "B"

Concrete shall conform to either the 1-inch or 1½-inch gradation at the option of the Contractor, unless otherwise specified in these Specifications or in the Special Provisions.

D. Class "C"

Concrete shall conform to either the 1-inch or 1½-inch gradation at the option of the Contractor, unless otherwise specified in these specifications or in the Special Provisions.

E. Admixtures

Admixtures shall be used only when specified in the Special Provisions or when permitted in writing by the Engineer. When specified or permitted by the Engineer, admixtures shall be governed as set forth in Section 90-1.01C (4) of the State Specifications.

F. Cement

Portland cement shall be Type II and all cement used on a project shall be the same brand.

G. Cement Mortar or Grout

Mortar shall consist of one part of Type II cement and two parts of sand by volume. Grout shall be composed of one part of Type II cement and 1½ parts of sand by volume. Admixtures of hydrated lime, fire clay, diatomaceous earth, or other approved inert material may be used to facilitate workability. Embecco pre-mixed grout or additive, when specified or permitted, shall be prepared and used in strict accord with the manufacturer's directions.

Mortar and grout shall be mixed in a revolving drum or revolving blade type mortar mixer or hand-mixed in a suitable watertight mixing box. When hand-mixed, the material shall be thoroughly mixed dry and then sufficient water added to bring the mixture to a workable consistency. All mortar and grout must be used before it has taken an initial set, and no re-tempering with additional water will be permitted.

2. Class "A" Structures

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per cubic yard for furnishing and placing Class "A" portland cement concrete for structures as shown on the plans and as directed by the Engineer. The contract unit price bid per cubic yard shall include full compensation for furnishing all labor, materials, tools, equipment, and doing all work necessary to form and place concrete as indicated in the plans and specifications and as directed by the Engineer.

The quantity of Class "A" portland cement concrete (structures) shown on the plans and in the Proposal shall be the final quantity for which payment will be made, as provided in Section 9-1.015 of the State Specifications.

If no item is shown in the Proposal for Class "A" portland cement concrete (structures) and concrete structures are shown on the plans and in the Proposal on a unit price or lump sum price basis, the requirements for Class "A" portland cement concrete (structures) as set forth in this section shall apply except as to payment and full compensation for adherence to this section shall be included in the lump sum price or unit price bid for the structures.

B. Material and Method

Class "A" concrete and method of placing and finishing shall conform to Sections 51 and 90 of the State Specifications. Grading limits of combined aggregates shall conform to Section 90-3.04 of the State Specifications.

C. Slump

The slump cone method, ASTM Designation: C 143 may be substituted for Test Method No. Calif. 533 as specified in Section 90-6.06 of the State Specifications. When the slump cone method is used, the nominal and maximum slump shall be twice the nominal and maximum penetration given in the State Specifications.

D. Tolerance

All concrete structures, which have a roadway deck, shall have a smooth riding surface. The finished surface shall be tested by means of a straight edge 12 feet long. The surface shall not vary more than 0.01 foot from the lower edge of the straight edge. All high areas in the hardened surface in excess of 0.01 foot as indicated by the test shall be removed by abrasive means. All low areas in excess of 0.01 foot as indicated by the test shall be cut out to a depth of 1-inch below the straight edge and patched with epoxy concrete.

E. Patching

Epoxy concrete for patching bridge deck shall consist of a mixture of epoxy binder and aggregate. The epoxy binder and adhesive shall be a two component mixture conforming to Section 95-2.01 of the State Specifications. Aggregate shall conform to the aggregate for portland cement concrete in Section 90 of the State Specifications. The Contractor, subject to the approval of the Engineer, shall determine the aggregate size and proportions. Aggregate shall be thoroughly dry when mixed with binder.

When fine aggregate is used, the grout shall consist of one part of binder to approximately five parts fine aggregate, by volume. When both coarse and fine aggregate are used, the concrete shall consist of one part of binder to approximately six parts combined aggregate, by volume.

The aggregate shall be stored and proportioned so as to give a uniform combined material. The aggregate and the epoxy binder shall be mixed in equipment and by methods that result in a homogeneous mixture.

Prior to placing epoxy concrete, the entire area to be patched shall be cleaned free of all loose and deleterious materials by abrasive blasting or machine scarifying and clean aggregate exposed.

The areas shall be surface dry and the surface temperature shall be 50 degrees F, or above, when the epoxy concrete is applied.

The areas to be covered shall be coated with epoxy adhesive applied at the rate of one gallon for each 25 square feet of area.

Immediately after placing, the epoxy concrete shall be thoroughly tamped or rolled into place, to minimize air voids, and struck off to the required grade. The final finish shall conform to Section 51-1.17 of the State Specifications.

3. Curb And Gutter

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per lineal foot for Type 1, Type 1A, and Type 2 portland cement concrete curb and gutter. The materials and methods of placing shall conform to Section 73 of the State Specifications.

B. Material

Portland cement concrete curbs and gutters may be constructed of Class "A" or Class "B" concrete at the Contractor's option.

C. Types

Curb types shall conform to the Standard Drawing RD-01.

D. Aggregate Base Material

The 6-inch thickness of aggregate base material required as base for curb and gutter shall be paid for under the unit price bid for aggregate base. The aggregate base shall be compacted to a relative compaction of not less than 95%.

E. Reinforcing Steel

Where required for curb and gutter construction, reinforcing steel shall be included in the unit price bid for curb and gutter, and no additional compensation shall be allowed therefore.

F. Curing

Curb and gutter shall be sprayed uniformly with a white pigmented or clear curing compound. The material, method, and rate of application shall conform to Section 90-7.01B of the State Specifications.

G. Testing and Tolerance

Curb and gutter shall be water tested in the presence of and prior to acceptance by the Engineer. No standing water will be allowed. The surface shall not vary more than 0.02

foot from a straight edge, not less than 10 feet in length, except at grade changes, and the finished surface shall be free from humps, sags or other irregularities. Curb and gutter constructed on vertical curves shall be staked at 25 feet maximum spacing with intermediate points added to maintain accurate grade and a smooth alignment.

H. Use of Extrusion Machine

Should the Contractor place the concrete by the extrusion method, Section 73-1.05B of the State Specifications shall apply with the following exceptions:

1. In lieu of sawing, the Contractor shall place 1½-inch deep score on 12 foot intervals with ½-inch scores on 4 foot intervals.

4. Curb

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per lineal foot for Type 3, 4, and 5 portland cement concrete curb. The materials and method of placing shall conform to Section 73 of the State Specifications. Curb types shall conform to Standard Drawing RD-01.

B. Anchoring

Type 4 curb shall be anchored to the pavement by means of ½-inch bar reinforcing steel dowels 18-inches in length driven firmly into the pavement at 8 feet spacing and a longitudinal ½-inch bar wired to the dowels. In lieu of placing dowels and ½-inch longitudinal bars, curb may be anchored by means of adhesive as specified in Section 73-1.05B of the State Specifications. If dowel placement shall be such that not more than 100 feet of dowels are left exposed at the end of the day's work. Exposed dowels shall be fully barricaded at the end of the day's work.

C. Curing

Curb shall be sprayed uniformly with a white pigmented or clear curing compound as ordered by the Engineer. The material, method, and rate of application shall conform to Section 90-7.01B of the State Specifications.

D. Medians And Islands

Traffic and median islands constructed with Type 4 or 5 curb shall be paved with 4-inches of Portland cement concrete or as shown on the plans in accordance with special provisions. Portland cement concrete and the method of placing shall be as specified in Section 2.4.6 of these Specifications and the price shall be the unit price bid per square foot for Portland cement. Soil sterilization of all paved island areas shall be included in the price bid per lineal foot of curb. The soil sterilant shall be monobor chlorate or equal, and shall be applied at the rate of 6 pounds per 100 square feet of

area to be treated, or as directed by the Engineer. Openings for drainage through medians and islands shall be provided when indicated on plans or directed by the Engineer. The Engineer shall approve the method of blocking out.

E. Weep Holes

Weep holes shall be constructed in traffic islands over existing pavement. Weep holes shall be constructed by placing 1"x2" lumber on the pavement before the curbing is poured. The 1"x2" lumber is to be removed after the curb is completed and before backfill is placed. Weep holes are to be placed at the low points and at the lowest end of island, or as directed by the Engineer. One cubic foot of pervious material in a burlap bag shall be placed back of each weep hole. Backfill material shall be compacted to a minimum compaction of 90%. The unit price bid per lineal foot shall include full compensation for weep holes, pervious material and backfill.

F. Use of Extrusion Machine

Should the Contractor place the concrete by the extrusion method, Section 73-1.05.B of the State Specifications shall apply with the following exceptions:

2. In lieu of sawing, the Contractor shall place 1½-inch deep score on 12 foot intervals with ½-inch scores on 4 foot intervals.

5. Special Curb

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per lineal foot for special portland cement concrete curb. The materials and method of placing shall conform to Section 73 of the State Specifications.

B. Material

Class "A" or Class "B" concrete may be used at the Contractor's option and the curb shall conform to dimensions and requirements as indicated in the construction plans and/or Special Provisions.

C. Curing

Curb shall be sprayed uniformly with a white pigmented or clear curing compound as ordered by the Engineer. The material, method, and rate of application shall conform to Section 90-7.01B of the State Specifications.

D. Use of Extrusion Machine

Should the Contractor place the concrete by the extrusion method, Section 73-1.05.B of the State Specifications shall apply with the following exceptions:

1. In lieu of sawing, the Contractor shall place 1½-inch deep score on 12-foot intervals with ½-inch scores on 4-foot intervals.

6. Sidewalk

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a unit price per square foot for constructing the respective thickness of concrete sidewalk or driveway shown on the plans and in the Proposal.

B. Method and Materials

The method of placing sidewalk or driveway shall conform to Section 73 of the State Specifications. Class "A" or Class "B" concrete may be used at the Contractor's option.

C. Aggregate Base Material

The 6-inch thickness of aggregate base Class II material required as subgrade for sidewalk shall be paid under the unit price bid for aggregate base. The aggregate base shall be compacted to a relative compaction of not less than 90%.

D. Curing

The sidewalk shall be sprayed uniformly with a white pigmented or clear curing compound. The material, method, and rate of application shall conform to Section 90-7.01B of the State Specifications.

E. Use of Extrusion Machine

Should the Contractor place the concrete by the extrusion method, Section 73-1.05.B of the State Specifications shall apply with the following exceptions:

1. In lieu of sawing, the Contractor shall place 1½-inch deep score on 12-foot intervals with ½-inch scores on 4-foot intervals.

7. Sidewalk Ramps

A. Measurement and Payment

Under this item of the proposal, the Contractor shall bid a price per each for constructing sidewalk ramps in existing curb, gutter, and sidewalk as indicated in the plans and specifications and as directed by the Engineer. When sidewalk ramps are placed with adjacent new sidewalk construction, they shall be paid for as sidewalks, not as ramps.

This work shall consist of sawcutting and removal of portions of existing curb, gutter, and sidewalk, and constructing sloped ramps of portland cement concrete.

B. Material and Placement

The materials and methods of placing shall conform to Section 73 of the State Standard Specifications. Portland cement concrete sidewalk ramps may be constructed of Class "A" or Class "B" concrete at the Contractor's option.

C. Details

Sidewalk Ramp details shall conform to Standard Drawings RD-04, RD-05 and RD-06 of these Specifications.

D. Aggregate Base Material

The 6-inch thickness of aggregate base material required as subgrade for sidewalk ramps shall be paid under the unit price bid for aggregate base. The aggregate base shall be compacted to a relative compaction of not less than 90%.

E. Curing

The new concrete shall be sprayed uniformly with a white pigmented or clear curing compound. The material, method, and rate of application shall conform to Section 90-7.01B of the State Specifications.

F. Testing

The gutter shall be water tested in the presence of and prior to acceptance by the Engineer.

G. Removal

Removal of existing curb, gutter, and sidewalk shall conform to Section 9.1.11 of these Specifications. For Type 1, Type 1A, and Type 2 curbs, the entire gutter pan at the ramp shall be removed.

8. Air Blown Mortar

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a unit price per square foot for air blown mortar of the various thicknesses shown on the plans and in the Proposal.

B. Uses

Air blown mortar may be used for channel side slopes as bid under the items for channel lining. See Section 7.6.11 of these Specifications.

C. Material and Placement

Air blown mortar shall conform to Section 53 of the State Specifications, except that payment shall be made on the basis of unit price per square foot in place, in lieu of the price per cubic yard set forth in the State Specifications.

2.5 RESTORATION OF SURFACES

1. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a lump sum price for restoration of surfaces removed, damaged, or displaced by the construction of the underground facilities set forth in the contract. If there is no item for restoration of surfaces in the Proposal, it shall be understood that such work will be done as herein specified, and that the cost for such work will be included in the prices bid for other items of work, and that no additional compensation for restoration of surfaces will be made.

2. General

All curbs, gutters, the Contractor shall reconstruct sidewalks, driveways, road shoulders, pavement, and similar items removed, damaged or displaced. Reconstruction shall be of the same kind of material and to not less than the original dimensions, subject to minimum requirements specified herein, on the plans, or in the Special Provisions. All work shall match the appearance of the existing improvements as closely as practicable.

3. Private Roads

On private roads, the trench compaction shall meet the same requirements as that for public roads and streets. Where asphalt surfacing exists, the surface restoration shall be a minimum of 4-inches aggregate base and 2-inches asphalt concrete. Where gravel, stone, or crushed rock surfacing exists, surface restoration shall consist of a minimum of 4-inches aggregate base. The remaining gravel or stone roadway shall be reshaped to pre-construction cross section and given an application of a minimum of 2-inches of ¾-inch maximum size gravel or crushed rock compacted into place. The surface restoration of private roadways under any circumstances shall be no less than existed in the pre-construction condition.

4. Resurfacing Streets

Final asphalt concrete surfacing of roadways and parking lots shall not proceed until 10 days after completion of the backfill and placement of first lift surfacing, unless otherwise approved by the Engineer. The trench area shall be kept level with the adjacent street or shoulder, and continuously maintained to prevent a traffic hazard, until the permanent pavement is placed.

Repaving of trench areas in bituminous pavement shall be in accordance with Standard Drawing RD-21. The asphalt concrete shall be placed in two lifts if final thickness is greater than 2.5". A single seal coat shall be supplied after placement of the final lift of asphalt

concrete. After placement of the seal coat, a "shiner" shall be placed in the undisturbed portion of the roadway 2 feet beyond the edge of the pavement. In areas where the cut extends the full width of the street, the "shiner" shall be placed on the centerline of the street 2 feet beyond the edge of the cut pavement. The month and year of installation and the contractor's firm name shall be the information stated on the "shiner."

A. Aggregate Base

The aggregate base materials and placement shall meet the requirements of Section 2.2.6 of these specifications (except provisions for payment), $\frac{3}{4}$ maximum grading. The relative compaction of the base material shall be not less than 95%.

B. Asphalt Concrete

Immediately prior to placing the pavement, the top 4-inches of base material, or more where greater depth of paving is indicated, shall be removed, and the surface re-compacted to a minimum relative compaction of 95%. Additional base or underlying material that is soft or spongy shall be removed and replaced with aggregate base material and compacted in layers not exceeding 6-inches in depth to a minimum relative compaction of 95%. Edges of trenches, which are broken or damaged, shall be removed and neatly trimmed back to stable and undisturbed base and surface materials.

The edges of the existing pavement shall be given a tack coat of asphaltic emulsion as directed by the Engineer. The trench shall then be filled and compacted, in layers not to exceed 2-inches, with asphalt concrete, Type "B", conforming to Section 2.3.1 of these specifications (except provisions for payment), until the trench has been brought to approximately $\frac{3}{4}$ -inch below the finish grade and cross section of the street. The Contractor shall immediately repair any settlement more than 1-inch below finish grade.

Prior to placement of the second lift, the surface of the first lift of pavement and the edges of the existing pavement shall be given a tack coat of asphaltic emulsion as directed by the Engineer. The trench shall then be filled and compacted with asphalt concrete Type "B", $\frac{1}{2}$ -inch maximum gradation, as specified above, until the pavement has been brought to the final grade and cross section of the street.

C. Seal Coats

Seal coat treatment shall be applied at locations herein specified, or as indicated on the plans or as directed by the Engineer. Seal coat shall not be placed until at least 72 hours after placement of final paving lift.

1. Single Seal

Alternate #1 - The placement of slurry seal as set forth in Section 37-2 of the State Specifications, with the exception that the fifth paragraph of Section 37-2.06, "Placing", shall be modified to provide that the thickness of application of slurry seal shall be adjusted to provide one layer not less than 1/8-inch thick, nor greater than 1/4-inch thick. The requirement for wetting surface prior to placement of slurry seal is waived.

Alternate #2--Sand seal shall be provided and placed in accordance with the general provisions of Section 37-1, "Seal Coats, of the State Specifications; however, the asphaltic binder and aggregate shall be as follows:

The asphaltic materials for the construction of sand seal shall be CRS 1 conforming to the requirements set forth in Section 94, "Asphaltic Emulsions," of the State Specifications.

The rate of application of CRS 1 shall vary between 0.08 and 0.15 gallons per square yard as directed by the Engineer, depending upon the surface condition and weather.

Aggregate for sand seal shall conform to the provisions of Section 37-2.02C of the State Specifications and shall be spread at the rate of 6 to 10 pounds per square yard, as directed by the Engineer.

Preparation of seal coat, applying bituminous binder, spreading, and finishing shall be in accordance with Section 37 of the State Specifications, with the exception that steel wheeled rollers for sand seal may be eliminated and the pneumatic roller used for all seal operations.

All bituminous pavement replacements and seal shoulders sealed under one of the above alternates shall receive the seal coat for the full width of the trench or pavement replacement, plus a minimum of 24-inches on each side of the trench, except that seals shall not overlap concrete curb and gutter.

2. Double Seal

Those areas indicated on the plans or directed by the Engineer shall receive a double seal coat treatment. The first seal coat of the double seal shall be the course seal coat specified in Section 37 of the State Specifications. The final seal shall be as outlined herein for single seal.

D. Shoulders

Surface restoration of trenches located in a shoulder within 6 feet of the traveled way, shall consist of a structural section equal to the original, or as set forth on the plans, but with a minimum of 5-inches of aggregate base compacted to a relative compaction of 95%. This aggregate base shall then receive a double seal coat treatment as outlined herein, unless otherwise specified or directed by the Engineer.

E. Cuts in Pavement

Cuts in pavement shall be treated as follows:

The existing pavement around the cut shall be planed to a depth of 1½-inches by a method approved by the Engineer. The planed area shall extend on each side of the cut as shown in Standard Drawing RD-21. The planed area shall be given a tack coat of asphaltic emulsion and paved with 1½-inches of asphalt concrete, Type B, and compacted. The final grade of the paving shall make a neat, smooth match to the existing pavement and a shiner shall be placed as described elsewhere in this section. No seal coat shall be placed on the final paving.

5. Concrete

Repairs to concrete curbs, gutters, sidewalks, driveways, and other concrete surfaces shall be made by removing and replacing the entire portions between joints or scores, and not merely by refinishing the damaged part, except as follows: (1) curb and gutter shall be replaced between saw cuts so that the remaining or new curb and gutter will not be less than 4 feet in length; (2) the entire width of sidewalk shall be replaced between saw cuts for a length of not less than 4 feet providing the remaining sidewalk shall not be less than 4 feet in length; and (3) driveways shall be replaced as directed by the Engineer, either completely or partially by saw cutting in the middle of the driveway. Replacement shall be in accordance with the applicable requirements, except provisions for payment, for the type and classification of work set forth in other sections of these specifications. If an alternate pedestrian route is not provided in accordance with Article 10 of the General Provisions, compacted asphalt plant mix cutback shall be used to provide a temporary sidewalk until replacement is completed.

6. Pavement Markings

The Contractor shall be responsible for replacement of crosswalks and other permanent pavement markings and raised markers when disturbed, destroyed, or covered by the work. Payment shall be lump sum and include all labor, materials, tools, and equipment necessary to complete this item.

7. Temporary Paving

Temporary paving shall be placed at locations indicated on the plans or directed by the Engineer. Asphalt concrete Type "B", conforming to Section 2.3.1, Asphalt Concrete Type "B", of these Specifications, shall be used as temporary paving on all major streets and two-lane roadways described in Article 10 of the General Provisions. Temporary paving in all other paved areas may be asphalt plant-mix cutback unless otherwise directed by the Engineer. Thickness of temporary paving shall be 1½-inches unless otherwise specified on the plans. Temporary paving shall be maintained at the same level as the existing pavement until the permanent surfacing is placed.

Temporary paving shall be paid for as specified in Section 2.7 of these Specifications.

2.6 TEMPORARY PAVING

1. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a unit price per ton for temporary paving which shall include furnishing, placing, and removing temporary paving as set forth in Section 2.6 of these Specifications. If no unit price is shown in the Proposal for temporary paving, all costs therefore shall be considered as included in the lump sum price bid for restoration of surfaces or other items of work

The quantity shown for this item is approximate and is indicated for bid comparison only and no guarantee is made or implied that the quantities shown will not be reduced or increased or deleted as may be required by the Engineer.

2.7 PILING

1. General

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing the respective types of piling, other than cast-in-place concrete piling, as detailed on the plans and indicated on the Proposal. The requirements of the respective types shall conform to Section 49 of the State Specifications. No test piles will be required unless specifically called for in the Special Provisions.

2. Driving Piles

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per each for driving piles of the respective types detailed on the plans and shown on the Proposal. The requirements for driving the respective types of piles shall conform to Section 49 of

the State Specifications. No test piles will be required unless specifically called for in the Special Provisions.

3. Piles - Cast-In-Place Concrete

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective types of cast-in-place concrete piles. The requirements for the respective types of cast-in-place concrete piling shall conform to Section 49 of the State Specifications. No test piles will be required unless specifically called for in the Special Provisions.

2.8 RAILING AND FENCES

1. Metal Beam Guard

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a unit price per lineal foot for metal beam guard railing in place. Metal beam guard railing, method of installation, measurement and payment shall conform to special details of the plans and to Section 83-1 of the State Specifications and to the Standard Plans of the State of California, Department of Transportation or to the latest revisions or editions thereof.

2. Metal Railing (Pipe and/or Tubular)

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a unit price per lineal foot for metal railing (pipe) and/or metal railing (tubular) in place. Metal railing (pipe and/or tubular) method of installation, measurement, and payment shall conform to the special details shown on the plans, to the provisions in Section 83-1 of the State Specifications, to the latest edition of the Standard Plans of the California Department of Transportation, and to the Special Provisions.

3. Property Fence And Gates

A. Measurement And Payment

Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective types of property fence and a price per each for gates of the type and widths as indicated on the plans and in the Proposal.

Quantities of property fence to be paid for shall be determined by the linear foot from actual measurements of the completed fence, such measurements to be made parallel to the ground slope along the line of the complete fence, deducting the width of openings.

Quantities of gates shall be determined by actual count. When more than one gate is placed in an opening, each single unit placed will be counted as a gate. A gate unit complete in place shall include one gate with all necessary fittings, hardware, and gate posts with braces.

Items of work, measured as specified shall be paid for at the contract price per linear foot, for property fence (Type BW or WM) and the contract unit price per property fence gate, if gates are required.

Full compensation for clearing the line of the fence and disposing of the resulting material, excavating high points in the existing ground between posts when wire mesh fence is being constructed, excavating and backfilling holes, disposing of surplus excavated material, and furnishing and placing concrete footings and deadmen, and connecting new fences to structures and existing cross fences, and constructing temporary fences for the protection of stock, shall be considered as included in the contract prices paid for the fence and no additional compensation will be allowed therefore.

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

B. Type BW Property Fence

Type BW property fence shall consist of 5 lines of barbed wire on metal posts placed at 12-foot intervals unless wood posts are required on the plans or in the Special Provisions.

C. Type WM Property Fence

Type WM property fence shall consist of 32-inch wire mesh and 3 lines of barbed wire on metal posts placed at 12-foot intervals unless wood posts are required on the plans or in the Special Provisions.

D. Specification

All property fence materials and construction methods shall conform to Section 80 of the State Specifications.

4. Chain Link Fence

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing chain link fence and a price per each for gates, of the height and widths indicated on the plans and in the Proposal.

Quantities of chain link fence to be paid for shall be determined by the lineal foot from actual measurements of the completed fence, such measurements to be made parallel to the ground slope along the line of the complete fence, deducting the width of openings.

Quantities of gates shall be determined by actual count. When more than one gate is placed in an opening, each single unit placed will be counted as a gate. A gate unit complete in place shall include one gate with all necessary fittings, hardware, and gate posts with braces.

Full compensation for clearing the line of the fence and disposing of the resulting material, excavating high points in the existing ground between posts when chain link fence is being constructed, excavating and backfilling holes, disposing of surplus excavated material, and furnishing and placing concrete footings and deadmen, and connecting new fences to structures and existing cross fences, and constructing temporary fences for the protection of stock, shall be considered as included in the contract prices paid for the fence, and no additional compensation will be allowed therefore.

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

B. Materials and Methods

All chain link fence, fabric, gates, and posts shall conform to the materials and construction methods as set forth in Section 80 of the State Specifications and Standard Drawing A 85, except as specified herein.

C. Posts

Gate posts for gate widths less than or equal to 6 feet shall be a minimum of 2½-inch outside diameter steel pipe weighing not less than 4.95 pounds per lineal foot. Posts for gate widths greater than 6 feet and less than or equal to 12 feet shall be a minimum of 4-inch outside diameter steel pipe weighing not less than 10.79 pounds per lineal foot.

D. Extension Arms

When specified on the plans and in the Proposal, extension arms with 3 lines of barbed wire shall be furnished and rigidly fastened to the posts. The extension arms shall be at an angle of approximately 45 degrees. The barbed wire shall conform to Section 80 of the State Specifications, and shall be securely fastened to the extension arms. The extension arms shall be of a good quality steel and shall be galvanized in conformance with ASTM Designation: A 123. Where extension arms with barbed wire are specified, the cost shall be included in the price bid for chain link fence.

5. Chain Link Fence with Redwood Pickets And Gates

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing chain link fence with redwood pickets and a price per each for gates with redwood pickets of the height and widths indicated on the plans and in the Proposal.

Quantities of chain link with redwood pickets to be paid for will be determined by the lineal foot from actual measurements of the completed fence, such measurements to be made parallel to the ground slope along the line of the complete fence, deducting the width of openings.

Quantities of gates with redwood pickets will be determined from actual count. When more than one gate is placed in an opening, each single unit placed will be counted as a gate. A gate unit complete in place shall include one gate with all necessary fittings, hardware, and gate posts with braces.

Full compensation for clearing the line of the fence and disposing of the resulting material, excavating high points in the existing ground between posts when the fence is being constructed, excavating and backfilling holes, disposing of surplus excavation material, and furnishing and placing concrete footings and deadmen, and connecting new fences to structures and existing cross fences for the protection of stock, shall be considered as included in the contract prices paid for the fence and no additional compensation will be allowed therefore.

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

B. Materials

The fencing fabric shall be woven from No. 9 gauge wire conforming to Sections 3, 4, 7, and 8 of ASTM Designation: A 116, with Class III zinc coating. The fencing fabric shall be a chain link type fabric as defined in Section 3 of ASTM Designation: A 392, and shall be woven into a 3½"x5½" wire mesh.

Pickets shall be ¾"x2½" standard Grade A stained redwood, and shall be inserted vertically in each mesh of the chain link fabric. Each picket shall extend the full height of the chain link fabric and be attached in a minimum of two locations to the fabric with staples which go through the picket and are cleated on the opposite side. Any pickets with cracks, splits or other blemishes shall be removed and replaced.

C. Posts, Rails, and Braces

Line posts shall be 2½-inch outside diameter steel pipe weighing not less than 3.65 pounds per lineal foot. End, gate, pull, and corner posts shall be 3-inch O.D. pipe weighing not less than 5.79 pounds per lineal foot. Top rails and braces shall be 1½-inch O.D. steel pipe weighing not less than 2.27 pounds per lineal foot. The posts, rails, and braces shall be galvanized and of a good quality weldable steel, with a minimum copper content of 0.20%. Galvanizing shall conform to ASTM Designation: A 123.

D. Fittings

The bottom tension wire shall be No. 7 gauge coil spring tension wire. Fittings including top and bottom couplings, finials, gate hinges, holders, locking devices, etc., shall be heavy malleable iron or pressed steel, hot dipped galvanized, and designed to fit the members to which they are attached. Galvanizing shall conform to ASTM Designation: A 123.

E. Gates

Gates for chain link fence with redwood pickets shall conform to the following special requirements:

Chain link gates with redwood pickets shall be constructed of 2-inch O.D. pipe, weighing not less than 2.72 pounds per lineal foot. Pipe shall be constructed of pipe materials as specified in 2.9.4.C of these Specifications. The height of the gate shall be the same as the connecting fence unless otherwise specified.

Galvanized gate holders of heavy cast construction shall be provided for each gate section. They shall be of the counter-balanced type adjusted so they will automatically catch and hold the gate by simply pushing the gate open, and will release it by depressing the holder with the foot. A concrete post shall anchor the gate holder or a steel support set in concrete.

Gates shall be fitted with heavy hinges and lift bar locking devices arranged for two padlocks. Gates shall be furnished complete with one master keyed padlock as specified by the Engineer.

F. Extension Arms

When specified on the plans and in the Proposal, extension arms with 3 lines of barbed wire shall be furnished and rigidly fastened to the posts and gate frames. The extension arms shall be at an angle of approximately 45 degrees from horizontal. The barbed wire shall conform to Section 80 of the State Specifications, and shall be securely fastened to the extension arms. The extension arms shall be of a good quality steel and shall be galvanized in conformance with ASTM Designation: A 123. Where extension arms with barbed wire are specified, the cost shall be included in the price bid for chain link fence with redwood pickets.

G. Installation

Construction methods shall conform to the applicable portions of Section 80-4 of the State Specifications and as modified herein.

Fence posts shall be set plumb and in true alignment, and be embedded 3 feet in a concrete base. The base shall have a diameter at least 3 times that of the post, with an 8-inch minimum, and a depth of at least 39-inches.

Concrete shall be Class "B" and allowed to cure not less than 5 days before the wire fabric is placed. Gate, end and corner posts shall be located where indicated, and the line posts adjusted for spacing accordingly, except that they shall be spaced not more than 10 feet apart.

Braces shall be installed in panels adjacent to gate openings, and at corners or at alignment changes of more than 30 degrees. They shall be located midway between top rail and ground and extend from the end, corner, or gate post to the first adjacent line post. Compression bars and $\frac{3}{8}$ -inch tension brace to rods with heavy turnbuckles shall be installed at each brace panel.

The fence shall be constructed with a continuous top rail and a bottom tension wire. Top rails shall pass through line post tops to form a continuous brace from end to end of each stretch of fence. Rail shall be provided with expansion couplings approximately every 20 feet and be securely fastened to end, corner, or gate posts by means of suitably pressed steel connections. The bottom tension wire shall be stretched and secured to the posts 6-inches from the bottom edge of the fabric. The fabric shall be secured to the top rail and bottom tension wire every 2 feet with No. 9 gauge tie wire.

The wire fabric shall be stretched taut and secured to the posts by means of aluminum bands spaced 14-inches on center. At terminal posts, a tension bar and adjustable clamps shall secure the fabric.

6. Reset Existing Fences

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a unit price for removal and resetting existing fences and erecting of temporary fencing where the existing fencing is for security of property or containment as indicated in the plans and as directed by the Engineer. If there is no payment item in the Proposal for resetting fences the cost for removal and resetting existing fences shall be included in other items of work.

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

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 the removal and resetting of the existing fence, complete in place, as shown on the plans, as specified in the specifications and as directed by the Engineer.

B. Materials

Materials removed from the existing fence which, in the opinion of the Engineer, are unsuitable for use in the reconstructed fence, shall be replaced with material of a kind and quality equal to the best of the salvaged material to the extent that when the fence is reconstructed in its new location, it will be equal in all respects to the best portions of the existing fence, using as much material from the salvaged fence as possible. Existing fences to be removed and not reset shall be included in the item for clearing and grubbing.

2.9 STREET CLOSURES

1. Measurement and Payment

Payment for street closures shall be included in the various items of the proposal and no separate payment shall be made.

2. Requirements

When street closure is required or permitted for the construction of facilities on or under the street, the Contractor shall notify in writing, the occupants of all homes and businesses with access to that street of the proposed closure two calendar days in advance of the closure. The Contractor shall be prepared to make access available at any time during the day to emergency type vehicles (fire trucks, ambulances, etc.). These requirements are in addition to those of Article 10 of the General Provisions.

Following is the minimum delineation, which is required at locations where permission has been granted to temporarily close a public street.

Type of Street	Road Closed - (C2) Signs				Red Type N Reflective Market Signs			
	No.	Size	Location	No.	Size	Location		
40'	1	36"x24"	Center of traveled way	2	24"	Evenly spaced between C-2 signs and ends of fence barricades		
50' 56' 60'	1	48"x30"	Center of traveled way	2	30"			
84' 110'	2	48"x30"	Center of each half of traveled way	40	30"			

Additional delineation may be required by the Engineer where roadway alignment and/or approach speed potential increase the need for notice to the driver. The City will furnish the signs required for street closure as provided for in Article 10 of the General Provisions.

2.10 TRAFFIC STRIPING

1. Measurement and Payment

The various colors, types and widths of traffic lane lines, markers, and pavement markings shall conform to Sections 84 and 85 of the State Standard Specifications and Drawings, except as herein modified. Measurement and payment shall be according to Sections 84 and 85 of the State Standard Specifications.

2. Placement Schedule

Where existing lane striping is being covered by asphalt concrete overlay or seal coat, new striping as shown on the striping plans shall be placed according to the following schedule:

- a. Yellow Lane Striping: Same day as overlay.

- b. "Cat Tracking" for Remaining Striping: Day following overlay.
- c. Remaining Striping and Markings: Not more than one day following review and approval of "Cat Tracking" by the Engineer.
- d. Markers: Not more than two weeks following overlay.

3. Angle Points

Points designated on the plans as angle points shall be "rounded off" approximately 30 feet to each side of the point.

4. Material

All striping and pavement marking shall be thermoplastic, unless otherwise noted on the plans, special provisions, or proposal.

5. Thermoplastic

Thermoplastic shall be Alkyd type for extrusion application, and shall produce an adherent reflectorized stripe capable of resisting deformation by traffic.

The thermoplastic material shall be 100% solid. The binder shall consist of synthetic alkyd resins, and shall be homogeneously incorporated with all the necessary prime pigments, fillers and glass beads to produce a traffic coating to meet the requirements as specified herein.

6. Permanent Striping and Pavement Marking Material

The following are allowed permanent traffic striping for pavement marking tape.

- a. Brite-Line Series 1000
- b. Swarco Industries "Director"
- c. 3M Stamark Brand Pliant Polymer Grade Series 350, 380, A420, A440 and 5730
- d. 3M Stamark Brand Bisymmetric 1.75 Grade Series 5750 (for use on low volume roadways only)

CHARACTERISTICS OF THE FINISHED THERMOPLASTIC

	White	Yellow
Glass Beads, AASHTO M-247, Type I, percent by weight, min. (Cal. Test Method 423)	30	30
Titanium Dioxide (TiO ₂), percent by weight, min. (AASHTO T250-77)	10	--
Lead Chromate, Medium Heat Stability, percent by weight, min.		2.5
Specific Gravity, max. (Cal. Test Method 423)	2.15	2.15
Binder, percent by weight, min. (Cal. Test Method)	18	18
Ring & Ball Softening Point, °F (ASTM E28)	200-240	200-240
Tests on Material after 4 hours heat with stirring at 425°F± 2°F., which includes 1 hour for meltdown and temperature stabilization:		
Bond Strength to Concrete, 0.125-inch thick film drawdown at 425°F test at 75°± 2°F., psi, min. (Cal. Test Method 423)	180	180
Brookfield Thermosel Viscosity, Spindle SC4-27, 20 RPM at 425°F., Poise, (Cal. Test Method 423)	30-45	30-45
Impact Resistance, Falling Ball Method, 0.125-inch thick film drawdown at 425°F. on concrete. Test at 75± 2°F. inch-pounds, with no cracks or bond loss, min. (ASTM D2794)	10	10
Daylight Luminous Reflectance, min. (ASTM E97)	75	40
Yellowness Index, max., (ASTM E313)	0.15	--
Hardness, Shore A-2 Durometer with 2 kilogram weight at 115°F., (Cal. Test Method 423)	60-80	60-80
Low Temperature Stress Cracking, Resistance at 25°F. (AASHTO T250-77)	No Crack	No Crack
Color Match, Federal Std. No. 595a, Color No. 33538	--	Passes

The thermoplastic material shall be applied by extrusion methods in a single uniform layer.

Stencils shall be used when applying thermoplastic material for pavement markings. Stencils shall be new or if bent or damaged shall be replaced at the request of the Engineer.

The pavement surface to which thermoplastic material is applied shall be completely coated by the material and the voids of the pavement surface shall be filled.

Unless otherwise specified in the special provisions, the thermoplastic material for traffic stripes shall be applied at a minimum thickness of .075± .005-inch. Thermoplastic material for pavement markings shall be applied at a thickness of 0.125± .005-inch. Glass beads shall be applied immediately to the surface of the molten thermoplastic material at a rate of not less than 8 pounds per 100 square feet. The amount of glass beads applied shall be measured by stabbing the glass beads tank with a calibrated rod.

7. Pavement Markers

Pavement markers shall conform to Section 85 of the State Standard Specifications except as herein modified.

a. Placement:

Hot melt bitumen adhesive shall be used to cement pavement markers to the pavement. The bitumen adhesive material shall conform to the following:

Specification	ASTM Test Method	Requirement
Flash Point, COC, °F.	D92	550 Min.
Softening Point, °F.	D36	200 Min.
Brookfield Viscosity, 400 °F.	D2196	7,500 cP, Max.
Penetration, 100g., 5 Sec., 77°F.	D5	10 - 20 dmm
Filler Content, percent by weight (insoluble in 1,1,1 Trichloroethane)	D2371	50 - 75

Filler material shall be calcium carbonate and shall conform to the following fineness:

Sieve Size	Percent Passing
No. 100	100
No. 200	95
No. 325	75

Bitumen adhesive shall be directly heated in an applicator with continuous agitation. The adhesive shall be applied at a temperature between 400 degrees F and 425 degrees F. Markers shall be placed immediately after application of the adhesive.

Markers shall be cemented to the pavement with a hot melt Bitumen adhesive. Markers shall not be placed under the following conditions:

1. When either the pavement or the air temperature is 53 degrees F or less.
2. If the relative humidity of the air is greater than 70%.
3. If the pavement is not surface dry.

The portion of the highway surface to which the marker is to be bonded by the adhesive shall be free of dirt, curing compound, grease, oil, moisture, loose or unsound layers, paint and any other material which would adversely affect the bond of the adhesive. Cleaning shall be done by blast cleaning on all surfaces regardless of age or type. The adhesive shall be placed uniformly on the cleaned pavement surface or on the bottom of the marker in a quantity sufficient to result in complete coverage of the area of contact of the marker with no voids present and with a slight excess after the marker has been pressed in place. The marker shall be placed in position and pressure applied until firm contact is made with the pavement. Excess adhesive around the edge of the marker, excess adhesive on the pavement, and adhesive on the exposed surfaces of the markers shall be immediately removed. The marker shall be protected against impact until the adhesive has hardened to the degree designated by the Engineer.

2.11 TRAFFIC STRIPE REMOVAL

1. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a unit price per lineal foot for removal of 4-inch traffic stripe. Stripes of widths other than 4-inches shall be converted to an equivalent length of 4-inch stripe for determination of quantities. Traffic stripe shall be defined as paint, thermo plastic, or any other stripe material. The unit price bid for stripe removal shall include full compensation for all material, tools, labor, and equipment to remove the stripe as specified herein.

2. Specifications

Traffic stripe removal shall conform to Section 15-2.02 of the State Specifications and the following requirements.

Traffic stripe shall be removed by sandblasting or approved grinding method. When such sandblasting is being performed within 10 feet of a lane occupied by vehicular traffic, the sandblast equipment shall be equipped with a vacuum attachment operating concurrently with the pressure equipment to immediately remove the sand from the surface after contact with the pavement. Shields shall also be used to protect the public, and the Contractor's attention is directed to Article 10 of the General Provisions. The Contractor shall remove all sand from the highway immediately.

2.12 STREET NAME SIGNS, HIGHWAY SIGNS, AND GUIDE MARKERS

These specifications define the minimum requirements and performance of single sheet aluminum highway signs, which have been high intensity, reflectorized with high quality reflective sheeting or painted with baked enamel paint.

These specifications further cover un-faced aluminum blanks, metal drive posts, guide marker components, flexible delineator posts, and miscellaneous hardware.

1. **General**

A. **Workmanship**

All items shall be new and the material and workmanship shall be of the best quality for the purpose.

B. **Guarantee**

Each sign or sign face shall be high intensity (Type III) and shall be guaranteed by the supplier for a total of 10 years. The guarantee shall commence from the date of original manufacture. The month and year will be the basis for the sign warranty. Any sign showing evidence of failure during the warranty period shall be replaced or renovated at no cost to the City. Evidence of failure shall be the occurrence of either of the following:

1. Any visible defect of the sign when viewed under daylight conditions from a distance of 30 feet, including loss of color, flaking, powdering, peeling, cracking, crazing or other defect.
2. A loss in reflective brightness of the reflective surface and letters or numerals on a cleaned sign to less than one-half of the value required of a new sign.

A sign showing evidence of failure during the warranty period will be removed from its location by the City and made available to the supplier at the City Maintenance Yard. The supplier shall, within 28 days after the date of notification, deliver a replacement sign to the Department of Public Works. All shipping charges for both failed signs and replacement signs are to be borne by the supplier.

C. **Sign Identification**

The initials of the sign fabricator, the month and year of fabrication, and the reflective sheeting manufacturer's identification and the lot number shall be either die stamped with $\frac{3}{8}$ -inch letters and numerals or legibly stamped with permanent ink with $\frac{1}{2}$ -inch letters and numerals on the back of all signs. Such sign identification shall be located on the lower right side of the sign when viewed from the back so as not to fall behind any post of frame member. Die stamping shall be performed in a manner that will not damage the finished sign.

D. Drawings

Standard signs shall be made in accordance with the reduced detail drawings of the California Department of Transportation. Such drawings shall be considered to be part of these specifications. All other signs shall be made in accordance with drawings furnished by the City or as mutually designed and agreed to by the Contractor and the City. All sign layouts shall be the Contractor's responsibility and shall be subject to the approval of the Engineer.

2. Minimum Requirements For Reflective Sheeting

Reflective sheeting selected by the sign fabricator shall comply with the following requirements:

A. Description

The reflective sheeting shall consist of spherical lens elements adhered to a synthetic resin and encapsulated by a flexible, transparent, weatherproof plastic having a smooth outer surface. The backing medium shall be synthetic sheet resin or other suitable non-cellulosic material.

The reflective sheeting shall be of the type that can be applied to the face of the sign (in accordance with the recommendations of the reflective sheeting manufacturer) using either (a) an approved vacuum applicator using a combination of vacuum and heat, or (b) a squeeze roller applicator.

The encapsulated lens type of reflective sheeting shall be backed with a pressure sensitive adhesive only. The pre-coated adhesive shall be protected by an easily removed liner, shall have no straining effect in the reflective sheeting, and shall be mildew resistant.

The reflective sheeting shall have sufficient strength so that it can be handled, processed, and applied (according to the recommendations of the sheeting manufacturer) without appreciable stretching, tearing or other damage.

B. General Characteristics

The sheeting shall permit cutting and color processing with compatible transparent and opaque process inks at temperatures of 60 degrees to 100 degrees F and relative humidities of 20% to 80%. Encapsulated lens sheeting shall be heat resistant and permit force curing at temperatures as recommended by the sheeting manufacturer.

The reflective sheeting as supplied, stored under normal conditions, shall be suitable for use for at least one year after purchase.

C. Reflective Intensity (After Sign Fabrication)

TYPE III
MINIMUM REFLECTIVE INTENSITY VALUES
(ENCAPSULATED LENS)

Observation Angle (degrees)	Entrance Angle (degrees)	White	Yellow	Red	Orange	Green	Blue
0.2	-4	250	170	45	100	45	20
0.2	+30	150	100	25	60	25	11
0.5	-4	95	62	15	30	15	7.5
0.5	+30	65	42	10	25	10	5.0

NOTE 1: The reflective intensity is expressed in units of candelas per foot candle per square foot and is measured as described in California Test Method No. 642.

NOTE 2: The minimum brightness values of the applied sheeting specimens with water falling on the surface shall not be less than 90% of the dry measured reflective values of the same specimens. Measurements shall be conducted in accordance with the rainfall test method specified in the Federal Highway Administration Specification FP-79, Section 718.01 (6)(1).

NOTE 3: The above values of reflective intensity apply to manufactured colors. For the reflective intensity of the screened sign face surface, see Section 4 of these Specifications.

D. Color (After Sign Fabrication)

The colors of the highway signs as specified shall conform either to the chromaticity coordinates specified in Table I, Section 633.06 of the Federal Standard Specification FP-79 or the PR color number specified by the Federal Highway Administration's color tolerance chart.

The instrumental method of determining color shall conform to the requirements specified in Federal Specification FP-79. In the event of any dispute concerning the results of instrumental testing, the visual test shall prevail.

A significant difference between day and nighttime reflective color shall be grounds for rejecting the signs.

E. Specular Glass (After Sign Fabrication)

The reflective sheeting shall have an 85 degree specular gloss of not less than 40 when treated in accordance with ASTM D-523.

F. Shrinkage

The reflective sheeting shall not shrink more than $\frac{1}{32}$ -inch in 10 minutes, and not more than $\frac{1}{8}$ -inch in 24 hours in any dimension when tested as specified below.

A 9"x9" reflective sheeting specimen with liner attached shall be conditioned a minimum of 1 hour at 73.4 ± 3.6 degrees F and $50 \pm 5\%$ relative humidity. The specimen shall be placed on a flat table with the adhesive side up. The liner shall then be removed. Ten minutes after liner removal and again after 24 hours, the specimen shall be measured to determine the amount of dimensional change.

G. Encapsulated Lens Reflective Sheeting

With the sheeting liner removed, conditioned for 24 hours at 73.4 ± 3.6 degrees F and $50 \pm 5\%$ relative humidity, the encapsulated lens reflective sheeting shall be sufficiently flexible to show no cracking when bent around a $\frac{1}{8}$ -inch mandrel with adhesive side contacting the mandrel. For ease of testing, spread talcum powder on adhesive to prevent sticking to mandrel.

H. Adherence

Two 2"x6" pieces of reflective sheeting shall be subjected to a temperature of 160 degrees F and a pressure of 2.5 pounds per square inch for 4 hours. Bring the materials to equilibrium at 73.4 ± 3.6 degrees F and $50 \pm 5\%$ relative humidity. Cut one 1"x6" specimen from each piece and remove the liner by hand without the use of water or other solvents. The liner, during removal, shall not break, tear, or remove any adhesive from the backing. Apply 4-inches of one end of each specimen to a test panel and condition for 48 hours at 73.4 ± 3.6 degrees F and $50 \pm 5\%$ relative humidity. Suspend the panels in a horizontal position with the specimen facing downward. Attach a 1- $\frac{3}{4}$ pound weight to the free end of each specimen and allow it to hang free at an angle of 90 degrees to the panel surface for five minutes. At the end of the five minute period, the separation or peeling distance shall not exceed 2-inches.

I. Solvent Resistance (After Sign Fabrication)

The sheeting surface shall be solvent resistant so that it can be cleaned with a soft, clean cloth dampened with VM&P naphtha or mineral spirits.

J. Durability and Qualification

1. Reflective sheeting must be processed and applied in accordance with the manufacturer's recommended procedures. The encapsulated lens reflective material shall be weather resistant and, following cleaning, shall show no appreciable color shift, discoloration, cracking, crazing, blistering, or dimensional change and no less than 70% of the specified minimum brightness values when subjected to accelerated weathering for 3,000 hours

in accordance with ASTM G26, Type B or BH xenon arc weather-ometer or 2,200 hours in accordance with ASTM G23, Type E or EH Carbon arc weather-ometer.

2. Proof shall be provided that the type of reflective sheeting intended for use in the manufacture of signs has been field-tested in the climatic conditions that exist in the State of California for a period of two years. The condition of the sheeting after two years exposure shall be such as to furnish assurance that the material will provide a satisfactory sign in the various weathering conditions for an expected service life of five to seven years.
3. The high quality reflective sheeting presently being manufactured or marketed by the following firms have been evaluated and found to comply with the foregoing specifications:
 - a. 3M
 - b. Seibulite
 - c. American Decal
 - d. Avery Fasign 1500/1600

During the term of the contract the supplier shall inform the City 30 days in advance of changing sheeting manufacturers.

K. Performance Requirements and Obligations

1. Certification - The manufacturer of the reflective sheeting shall provide a Certificate of Compliance for each lot of reflective sheeting. Such certificate shall be submitted to the Public Works Department. The certificate shall be signed by the appointed representative of the manufacturer and shall state that the reflective sheeting complies in all respects with the requirements of the specifications.

The lot of sheeting so certified shall be clearly identified in the certificate. The certificate shall include the test data generated for the lot to indicate compliance to all the requirements stated within these specifications for the reflective sheeting.

2. Identification - A coding system shall be developed which will clearly identify each lot of sheeting and the manufacturer of the sheeting. The system employed for use on the sheeting shall also be used for identification on the back of the signs as required in Section 2.13.1.C of these Specifications.
3. Field Performance Requirements - Encapsulated lens sheeting, except in the color orange, processed and applied to sign blank materials in accordance with sheeting manufacturer's recommendations, shall perform effectively for

the number of years stated in Table I below. The sheeting will be considered unsatisfactory if it has deteriorated due to natural causes to the extent that: (1) the sign is ineffective for its intended purpose when viewed from a moving vehicle under normal day and night driving conditions; or (2) the coefficient of retroreflection is less than the minimum specified for that sheeting during that period listed in Table I below.

TABLE I
Minimum Reflective Intensity Values Candelas
Per Foot Candle Per Square Foot

(0.2 Degrees Obs. and -4 Degree Entrance*)

Sheeting Color	Type III (High Intensity Minimum Coefficient of Retro. (Ten Years)
White	200
Yellow	136
Green	36
Red	36
Blue	16

* All measurements shall be made after sign cleaning according to the sheeting manufacturer's recommendations.

For screen printed transparent colored areas on white sheeting, the coefficients of retroreflection shall not be less than 50% of the values for the corresponding color in the above table.

4. Sheeting Manufacturer's Replacement Obligation - Where it can be shown that retroreflective traffic signs with sheeting supplied and used according to the sheeting manufacturer's recommendations have not met the performance requirements of Section 2.13.2.M, the sheeting manufacturer shall cover restoration costs as follows for sheetings shown to be unsatisfactory during:
 - a. The entire 10 years: the sheeting manufacturer will replace the sheeting required to restore the sign surface to its original effectiveness.
 - b. In addition, during the first seven years: the sheeting manufacturer will cover the cost of restoring the sign surface to its original effectiveness at no cost to the using agency for materials or labor.

3. Base Metal

A. Description

The base metal shall be new sheet aluminum of alloys 6061-T6 or 5052-H38 conforming to the requirements of ASTM Designation: B 209.

The thickness of the aluminum sheet shall be 0.080 gage unless otherwise specified. The material shall be subject to inspection prior to degreasing operations. Alloy and temper designations shall be verified by mill certification.

B. Fabrication

The fabrication of all metal parts shall be accomplished in a uniform and workmanlike manner. The sign panels are to be cut as shown on the sign specification sheets. The dimensional tolerance of the panels shall be plus or minus 1/16-inch. Metal panels shall be cut to size and shape and shall be free of buckles, warp, dents, cockles, burrs, and any other defects resulting from fabrication. Base plates for Standard Size Route Shield signs shall be die cut. All possible fabrication, including shearing, cutting and punching of holes shall be completed prior to the base metal pretreatment.

C. Pretreatment

The front and back surfaces of the aluminum base metal shall be cleaned, deoxidized, and coated with a light, tightly adherent chromated conversion coating free of any powder residue. The base metal pretreatment process shall be in conformance with Section 5, "Recommended Processing Methods" of ASTM Designation: B 449. The coating weight shall be Class 2 (10-34mg/sq. ft.), with a median of 25 mg/sq. ft. as the optimum coating weight.

All treatment tanks or spray applied pretreatment systems shall be charged with fresh chemicals at least once a year. If pretreatment is performed by immersion methods, the tanks shall be of sufficient size to accommodate the complete panel. Titration equipment shall be available for the inspectors use to check the solution strengths. The cleaned and coated base metal shall be handled only by a mechanical device or by operators wearing clean cotton or rubber gloves. After cleaning and coating operations, the panels shall be protected at all times from contact or exposure to grease, oils, dust or other contaminants.

Other pretreatment methods similar to those specified above may be used providing prior approval is obtained from the City Transportation Division Operations and Maintenance Office.

4. Screening Inks and Process Pastes

A. Restrictions

Unless otherwise prohibited, screening inks or process pastes can be used in lieu of manufactured colors, at the option of the sign manufacturer, to produce both the legend and background. Only the screened colors, of green, blue, red, brown and black may be used.

Only those screening inks or process pastes manufactured by the reflective sheeting manufacturer shall be used.

B. Outdoor Weatherability

The outdoor weatherability of the applied inks or paste shall be comparable to the outdoor durability of the reflective sheeting as stated in Section 2.13.2.L of these Specifications.

C. Adherence

No process inks shall be removed when tested by applying cellophane tape over a properly cured, color processed area and removing the tape with one quick motion. The tape shall be 3M Company Scotch Brand Cellophane Tape No. 600, 3/4-inch wide.

D. Solvent Resistance

After proper curing, screened sign faces shall be solvent resistant to cleaning solvents recommended by the manufacturer of the reflective sheeting and the screening inks and process pastes.

E. Color

The color of the screened sign face surface as specified shall conform to the color specification limits and reference standards for either Type I, Type II, or Type III reflective sheeting as specified in Table I and Table II of Federal Specification FP-79, Section 633.06 or to PR Color Number specified in the Federal Highway Administration's Visual Color Tolerance Charts, except that the maximum reflectance limit of the colors blue and green shall be 5.0 and 10.0, respectively.

The instrumental method of determining color shall conform to the requirements specified in Federal Specification FP-79, Section 633.06(b)(2).

A significant difference between day and nighttime reflective color shall be grounds for rejecting the signs.

F. Reflective Intensity (Transparent Colors)

Transparent, colored inks shall be processed and applied in accordance with the recommendations of the sheeting manufacturer using PE157 or 12xx screens. When tested using the method specified in Section 2.12.2.C of these Specifications, the minimum brightness value of the transparent color area processed on white sheeting shall be not less than those specified below for each color at 0.2 degrees observation and -4 degrees entrance angles, expressed in candelas per foot candle per square foot of processed area.

MINIMUM BRIGHTNESS

Process Color on Enclosed Lens Sheeting (White reflective sheeting with reflective intensity value as specified in Section 2.12.2.C of these Specifications).

<u>Stop Sign Red</u>	<u>Blue</u>	<u>Green</u>
22.5	10	22.5

G. Surface and Gloss

The screened sign face surface shall be smooth and flat to facilitate cleaning and maintain the wet performance and shall exhibit an 85 degree gloss rating of not less than 40 (ASTM D 523).

5. Sign Panel Fabrication

A. Legend and Border

The message shall be direct screened or reverse screened. The finished screened sign shall comply with all requirements of these specifications, including color and reflectivity.

B. Splices - Reflective Sheeting

No finished sign panel shall have more than one splice and no splice shall fall within 2-inches of the sign edge. When splices do occur, the adjoining reflective sheeting shall be color matched under both incident and reflected light. For squeeze roller application, no splice other than that occurring in the manufactured roll of reflective sheeting will be allowed. For vacuum application, there shall be no splices in the reflective sheeting other than those occurring in the manufactured roll of reflective sheeting, on panels with a minor dimension of 48-inches or less. On all rectangular signs with a minor dimension of more than 48-inches, the splice shall be horizontal.

C. Splices

METAL SIGN PANELS--In the horizontal direction, unless otherwise specified, the sign panel must be a continuous sheet (no vertical splices permitted). For signs greater than 48-inches in height, a horizontal splice is permitted.

D. Finish

The finished framed signs shall be flat within a ratio of 0.04-inch per linear foot when measured across the plane of each panel from opposite corners or at any location on the panel.

All surface exposed to weathering shall be free of any defects in the coating that may impair the serviceability or detract from the general appearance or color matching of the sign. The finished sign shall be clean and free from all router chatter marks, burrs, sharp edges, loose rivets, delaminated reflective sheeting, and aluminum marks. Signs with any defects or damage that would affect their appearance or serviceability will not be acceptable.

No air pockets or bubbles shall exist between the sheeting and the base material. No repairs shall be made to the face sheet without the approval of the Engineer.

6. Frames

A. Details

All rectangular signs over 60-inches measured along the horizontal axis and all diamond-shaped signs 60-inches and larger shall be framed unless otherwise specified. The frame shall be constructed of aluminum channel or rectangular tubing. Channel members and tubing members shall not be intermixed on one sign frame. The channel or tubing size shall be a minimum of 2-inches.

B. Rivets

The frame shall be affixed to the sign with $\frac{3}{16}$ -inch diameter rivets aluminum alloy 5052, of a type approved by the City. The exposed face of the rivets shall be of a similar shade and compatible with the face color of the finished sign. Aluminum alloys having properties similar to those specified may be used provided prior approval is obtained. The rivets shall be placed through the face of the sign with the web of the channel placed against the back of the sign. The maximum rivet spacing shall be 8-inches on centers. No rivets shall be placed closer than $\frac{1}{2}$ -inch from the edge of the aluminum face sheet. All rivets shall fall within the web of the channel frame.

C. Joints

All joints of the aluminum channel frame shall be welded with an inert gas shielded-arc welding process using 4043 electrode filler wire in accordance with good shop practice.

The width of the filler shall be equal to the wall thickness of the smallest channel being welded.

7. Metal Guide Posts And Flexible Delineator Posts

A. Description

Metal guide posts, conforming to the dimensions and details shown on the State Standard Plans and identified as Metal Delineator post shall be furnished with the following provisions:

1. The metal post shall be manufactured of 0.093-inch thick steel either fabricated of pregalvanized material which conforms to the requirements of ASTM Designation A-526, Coating Designation A-90 or shall be a mild, commercial quality weldable steel, galvanized after fabrication in accordance with the requirements of ASTM Designation A-123. The posts shall be straight, and shall be manufactured as one continuous piece of metal with no welded joints, and shall be free of sharp corners or rough burred surfaces or edges.
2. The bottom and top ends of all posts shall be properly formed or pointed. All slots shall be cut in the guide posts as indicated and within the tolerances indicated.
3. Any evidence of damage or removal of zinc coating shall be cause for rejection of the entire lot.

B. Class I Flexible Delineator Posts

Flexible delineator posts shall be of a durable white plastic which shall be resistant to impact, ultra violet light, ozone, and hydrocarbons. They shall be free of burns, discoloration, contamination, and other objectionable marks or defects.

Each flexible delineator post shall be faced on the side facing traffic with a 3"x12" piece of 3M hi intensity sheeting and on the back side with a 3"x3" piece of 3M hi intensity sheeting in the color specified in the individual purchase orders.

C. Guide Marker Plates

1. Type 1 - Marker plates shall be aluminum alloys 6061-T6 or 5052-H38. The aluminum plates shall be prepared for painting by suitable cleaning to remove contaminants and by the uniform application of an acid-chromate-fluoride phosphate or equivalent chemical conversion coating. The minimum nominal thickness of aluminum sheet shall be 0.080-inch thick.

2. Type 2 - Type 2 marker plates shall meet fabrication specifications for Type 1 above. One face of the Type 2 Plate will be faced with encapsulated lens sheeting in the color specified.

8. Street Name Signs

Street name sign panels shall be 0.80-inch thick with rounded corners having a radius of ¼-inch. Dimensions of the street name sign and message shall be as detailed on Standard Drawing RD-10 of these specifications. Reflective sheeting shall be applied to the full surface of the street name sign.

The message for street name signs shall be high intensity green background with letters using die cut or silk screen processed only, using silver silk screen paste. The alphabet shall be Federal Highway Administration Standard Highway styles, using series A, B, C, or D as necessary, to best fit the sign for legibility. The alphabet will vary due to fixed length of sign plate. The widest alphabet must always be used which will best fill the horizontal space. Abbreviations shall be AVE., ST., DR., RD., BLVD., CT., LN., CIR., PL., and TERR. Periods are not necessary following the abbreviations. The top of the abbreviation letters shall align with the top of the main copy letters; the same applying to TH., RD., and ND., when used after numerical designations. All street name signs must be complete with "CITY OF FOLSOM."

Street name signs shall be mounted on 1¾-inch square 12 gage tube steel posts, green. Posts shall be Unistrut Telespar Sign Support System units or approved equal in all specifications. Standard Drawing RD-11 gives street name sign placement details. Standard Drawings RD-12 and RD-13 give details for installation of street name signs on street light poles. The post shall be set to the depth recommended in the supplier's standards, and the bottom of the lower sign shall be a minimum of 7 feet above the sidewalk grade or edge of pavement.

9. Inspection

All material and finished signs are subject to inspection and release by the City at the place of manufacture, and shall be subject to final inspection at the Department of Public Works at the time of delivery. The City shall have free entry at all times to such parts of the contractor's plant as concerns the manufacture or production of signs. Adequate facilities required for inspection shall be furnished without charge to the City.

12"x12" test panels representative of any stage of production, shall be furnished upon the request of the City. These panels shall be processed along with the regular production run and witnessed by the City. Should there be any question as to the validity of any test panel, a complete sign shall be furnished upon request. Signs not conforming in all respects to the requirements of these Specifications will be rejected.

10. 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 and save harmless the County of Sacramento, and all of its duly authorized representatives from all suits at law, or actions of every nature for, or on account of, the use of any patented materials, equipment, devices or processes.

STANDARD DRAWINGS

RD-01	Curb and Gutter
RD-02	Commercial Driveway Type A-6
RD-03	Commercial Entrance Type A-7
RD-04	Curb Ramps
RD-05	Dual Curb Ramps
RD-06	Curb Ramp Specifications
RD-07	Street Closure Timber Barricade
RD-08	Signs and Barricades at End of Pavement Widening
RD-09	Sidewalk Barricade
RD-10	Pedestrian Lane with Bike Barrier
RD-11	Street Sign Fully Reflectorized
RD-12	Street Name Sign On Signal Pole
RD-13	Street Name Sign Placement
RD-14	Street Light, Stop Sign, Street Sign, & Crosswalk Placement
RD-15	Street Name Sign Location
RD-16	Street Name Sign Support Arm Clamp
RD-17	Street Name Sign Installation on Street Light Pole
RD-18	Street Name Sign Installation on Signal Pole
RD-19	Bus Stop
RD-20	Under Sidewalk Drain
RD-21	Typical Trench Sections
RD-22	Emergency Vehicle Mountable Median Curb
RD-23	Concrete Survey Monument
RD-24	Trash and Recycling Enclosure
RD-25	Residential Driveway Profile
RD-26	Standard Alley Right-Of-Way
RD-27	Standard Residential Cul-De-Sac Right-Of-Way
RD-28	Standard Minor Collector Right-Of-Way
RD-29	Standard Collector Right-Of-Way
RD-30	Standard Minor Arterial and Divided Major Arterial Rights-Of-Way
RD-31	Right Turn Deceleration Lane
RD-32	Type A Lot Grading
RD-33	Type B and C Lot Grading
RD-34	Property Line Grading

SECTION 3: SIGNALS AND STREET LIGHTING

3.1 TRAFFIC SIGNALS AND STREET LIGHTING

1. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a lump sum price for each of the various items shown on the Proposal. The price bid shall include full compensation for furnishing, installing, and doing all necessary work to complete the item as an operating unit.

2. Specification

All work shall be done in accordance with the applicable State Standard Plans and Section 86 of the State Standard Specifications and these specifications and the Special Provisions.

3. Vendor Order and Warrant

The Contractor shall furnish the City with a statement from the vendor that the order for the electrical material required for the contract has been received and accepted by said vendor(s). Said statement shall be furnished within 10 days after receiving notice that the contract has been executed for the City. Said statement shall give the date that the electrical equipment will be shipped.

The term "ample time" for the submission of equal items as specified in Article 5 Section 5.12 of these specifications shall be 35 calendar days after award of the contract.

4. Notice to Equipment Suppliers

The supplier shall include on the equipment list and on the equipment itself, the installation location of material supplied (by the use of intersection names and the alphabetical letter designation used on the plans).

All signal head framework supplied shall indicate the quadrant of the standard (in the case of side post mounted frameworks), in which said framework is to be mounted.

5. Order of Work

The Contractor shall not perform any above ground electrical work at any one intersection site of the project, until all electrical materials are delivered for that intersection, except as noted on the plans. The Contractor shall notify the Engineer, in writing, of the date that all electrical materials are received and shall begin work immediately.

6. Removing and Replacing Improvements

Removing and replacing improvements shall conform to Section 86-2.02 of the State Specifications except that the words "and in pavements" in the first sentence of the third paragraph shall be deleted.

7. Foundations

Foundations for poles, posts, and pedestals shall conform to Section 86-2.03 of the State Standard Specifications except as herein modified.

The Contractor shall install the foundations for the controller cabinets when City furnished cabinets are supplied.

When cast-in-drilled hole pile foundations are specified the work shall be done as outlined on the plans and drawings, and as required in Section 49 of the State Specifications. Payment shall be included in the bid price paid for the intersection under consideration and no additional compensation will be allowed.

8. Poles, Steel Pedestals, and Posts

Poles for traffic signals and electroliers, and steel pedestals for cabinets and other similar equipment shall be located as shown on the plans and to the following requirements:

- A. Anchor bolts and nuts required for relocating existing poles shall be furnished by the Contractor.
- B. All signal poles shall be installed so as to be within one-half of 1 degree of plumb. Portions of signal and luminaire arms, which are shown in the drawings to be horizontal, or otherwise, specified to be horizontal, shall be installed level with a tolerance of -0 degrees to +2 degrees.
- C. Two to four threads of anchor bolt shall be exposed above the nut with the pole in place.

9. Conduit

Conduit shall conform to the provisions of Section 86-2.05 of the State Specifications as herein modified.

Unless otherwise specified, the minimum size conduit between the controller and the nearest pullbox shall be 4-inches. 5-inch conduit nipples shall be attached, by use of a coupling, to any conduit run which terminates inside any signal standard. Top of nipple shall be 3-inches above the finished grade of the signal standard foundation.

"Conduit Installation" of the applicable sections of the State Specifications shall be amended as follows:

At the option of the Contractor conduit may be placed under the existing pavement or sealed shoulders by the method described in 10.2.4.E of these Specifications.

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

All new conduit installations shall be blown out with compressed air prior to pulling conductors.

10. Wiring

Wiring shall conform to the provisions in Section 86-2.09 of the State Standard Specifications and the following modifications:

A. Signal light conductors

On the same phase may be spliced into the through conductors in pullboxes. The conduit and conductor schedule shall be the guide by which pullboxes can be identified for splicing. The Engineer shall make the final determination of which conductors may be spliced and at what pullbox location splicing can take place.

B. Splice Insulation

On 600 volt conductor splices, of solid or standard conductor of #14 AWG to #6 AWG, the Contractor may use, at his option, an electrical spring connector of three part construction. The three part construction shall consist of a zinc coated free expanding steel spring enclosed in a steel shell, with an outer jacket or polyvinyl chloride. The outer jacket shall have a flared skirt, be flexible, and able to withstand 221 degree Fahrenheit temperature continuously. Each splice must have the spring connector sized in accordance with the manufacturer's recommendations for the number of conductors and gauges being spliced. Wire strip lengths shall also be in accordance with the manufacturer's recommendations. After spring connector has been applied to the connection, the splice shall be coated (by submersion) with a corrosive-resistant, solvent-resistant, sealing/bonding, flexible electrical coating, having at least 100 volt/mil electrical strength. Upon coating of the splice, the flared skirt end shall be positioned in an upright alignment and maintained there until the electrical coating is dry.

C. Heat shrinkable insulating tubing

Will not be allowed, contrary to Section 86-2.09E of the State Specifications.

11. Service

The service shall conform to the provisions of Section 86-2.11 of the State Specifications except as herein modified.

The service shall be a three wire AWG No. 4 or as shown on the plans and drawings. The service shall conform to Standard Drawing SL-03. It shall contain main breakers, auxiliary breakers, test switch and contactor in accordance with Standard Drawing SL-03.

The Contractor shall provide Master padlocks for the service cans to unlock with key 2214.

Photo electric units are supplied by the serving utility. The Contractor shall supply three #14 AWG conductors from the service can to the photoelectric unit.

12. Painting

Painting shall conform to the provisions of Section 86-2.16 of the State Standard Specifications.

13. Controller Cabinets

1. All cabinets shall have the following minimum features:
 - a. The Modified Type M cabinet with a depth of 19 -inches, width of 31-inches, and height of 68-inches (McCain "M" NEMA TS 2 Type 2 Stretch controller cabinet, or approved equal).
 - b. Furnace type fiberglass duct filter on louvered front door.
 - c. Louvers shall have available air flow area of 30-square-inches for Modified Type M cabinets and shall be located in the lower one-half of the front door.
 - d. The door latching mechanism shall be a three-point draw roller type. The center catch and pushrods shall be cadmium plated. Pushrods shall be turned edgewise at outward supports and shall be 0.25-inch by 0.75-inch minimum with supports U-graded and D slot of 12-gauge steel or equivalent. Rollers shall be 0.875-inch minimum diameter with ball bearings and nylon wheels. The center catch shall be machined from 0.1875-inch minimum plate steel. The cabinet doorframe shall be double-flanged out on all four sides and shall provide strikers for nylon rollers.
 - e. Door lock set above door handle or in door handle. The latching handle shall have provisions for padlocking in the latched position. The operating handle shall be stainless steel with 7.5-inch handle.
 - f. An incandescent lamp holder with door-actuated switch shall be installed near top front of cabinet to provide for illumination of control equipment.

2. Each controller cabinet shall be equipped with two (2) each electric fans with ball or roller bearings and a capacity of at least 100-cubic-feet per minute. Each fan shall be separately fused.
3. Cabinets shall be fabricated from stainless steel and shall conform to the following:
 - a. Annealed or quarter hard stainless steel sheet shall be used and shall comply with the requirements of ASTM Designation: Type 304, with #2D finish, plastic wrapped during fabrications.
 - b. Welding on stainless steel cabinets shall be by the gas Tungsten arc (Tig) process using bare stainless steel welding electrodes. Electrodes shall conform to the requirements of the American Welding Society (AWS) A5.9 for ER308 chromium-nickel bare arc welding electrodes.
 - c. Procedures, welders and welding operators for welding on stainless steel shall conform to the requirements and practices recommended in AWS C5.5.
 - d. The stainless steel cabinet shall not show any rust discoloration when subjected to the following:
 - (i) Forty-eight hours of exposure in a salt spray cabinet in accordance with Designation: B117;
 - (ii) Twenty-four hours of exposure in a tap water spray cabinet with the water temperature between 100°F and 113°F.
 - e. Any cabinet, which shows any rust discoloration anywhere on its surface after the test will be rejected.
 - f. Minimum 14 gauge stainless steel.
 - g. Cabinets to be free of weld spatter and heat discoloration around welds. Grinding or wire brushing shall not be used to clean welds.
4. All circuits appearing at the controller plugs shall be wired to a terminal board.
5. The auxiliary field wire and control terminal blocks shall be barrier type with marker strips and shall be provided with 8-32 by $\frac{5}{16}$ -inch minimum nickel or cadmium plated brass binder head screws and metal inserts. The field terminal blocks for the signal indications, the detector terminal blocks, the power distribution assembly and the required unused blocks shall be as specified above, except that screws shall be 10-32 minimum. The terminal blocks shall be readily accessible through the cabinet door and shall be rated for 20 amperes and 1000 volts RMS minimum.
6. Each controller cabinet shall be provided with enough shelves to house the controller, detector track and any other equipment supplied, mentioned in

the specifications and/or shown on the plans. In any case no less than three (3) shelves shall be supplied.

7. All connecting cable leads shall terminate at terminal blocks. Do not tape any lead-in cables.
8. The field connection terminals shall be located along the bottom back of the cabinet with minimum clearance as shown on the detail plan of Modified Type M cabinet.
9. All identification shall be by means of silk screening or engraved labels. Silk screening shall be of a color contrasting to the cabinet door. Engraved labels shall be engraved into the panel or shall be made from multi-layer color contrasting plastic and shall be secured with chrome-plated or stainless steel machine screws.
10. On each copy of circuit diagrams for each piece of control equipment, operation manual and external solid-state logic circuits shall be provided for each cabinet.
11. Machine screws used for mounting equipment on door or walls of the cabinet shall have nuts on the inside.

14. Type 90 Controller Assemblies

The Contractor shall arrange to have a signal technician, qualified to work on the controller unit and employed by the controller unit manufacturer or his representative, present at the time the equipment is turned on. Controller type shall be determined by the City. The Contractor shall deliver the controller assembly to the City of Folsom Corporation Yard for testing three weeks prior to signal turn-on. The Contractor is also responsible to pick-up the tested controller assembly at the City of Folsom Corporation Yard and deliver to the job site. The Contractor shall notify the City inspector, telephone (916) 355-7200, at least five days prior to date of anticipated turn-on of the signal system.

15. Conflict Monitoring Device

New conflict monitoring devices shall be installed at all traffic signals including those being modified.

Conflict monitoring devices shall be Reno MMU-1600G or Edi MMU-16 LEip, or approved equal with 16 channels. And shall be installed by the Manufacturer

16. Emergency Vehicle Preemption System

The systems shall employ optical communication to identify the presence of designated priority vehicles and cause the traffic signal controller to advance to and/or hold a desired traffic signal display selected from phases normally available. The matched set of

components, which make up the system will cause the traffic controller to be manipulated upon recognition of the signal from the vehicle.

Preemption shall be provided for each through phase and its associated left turn phase, if any, as a varied phase.

Contractor shall furnish and install emergency vehicle preemption equipment for the new signal(s). Detectors shall be installed as shown on the plans. The controller cabinet shall be equipped with discriminator, which shall be wired to provide emergency vehicle preemption for the phases shown on the plans. Said equipment shall be Opticom Model No. 521 Optical Detector, Opticom Model No. 138 lead-in cable, and Opticom Model No. 262 Discriminator, or approved equals.

17. Ballasts

Ballasts for luminaires to be mounted on mast arms, brackets or lowering assemblies shall be the regulator type and shall be located within the luminaire housing. The ballast for each horizontally mounted luminaire shall consist of components mounted on the luminaire housing, components mounted on a down opening door. The door shall be hinged and secured to the luminaire housing separately from the refractor or flat lens frame. The door shall be easily removable and replaceable. The door shall be secured to the housing in a manner to prevent its accidental opening when the refractor or flat lens frame is opened.

At the option of the Contractor, the ballast shall be as specified or shall be a nonregulating reactor, autotransformer, or high reactance type ballast.

Section 86-6.10A, "Regulator Type Ballasts", of the Standard Specifications is amended to read:

Regulator type ballast shall be lag-type or lead-type and shall conform to the following:

86-6.10A(1) LAG-TYPE REGULATOR BALLASTS - Each lag-type regulator ballast shall have the primary and secondary windings electrically isolated and, when operated with the appropriate lamp, shall have the following characteristics and shall maintain the following lamp operation:

1. The power factor shall be not less than 9% throughout the life of the lamp at nominal line voltage with a nominally rated reference lamp.
2. Lamp wattage regulation spread at any lamp voltage from nominal through life shall not vary by more than 18% for $\pm 10\%$ input voltage variation.
3. For nominal input voltage and lamp voltage, the ballast design center shall not vary more than $7\frac{1}{2}\%$ from rated lamp watts.

4. The ballast shall be designed so that a capacitance variance of $\pm 6\%$ will not cause more than a $\pm 8\%$ variation in lamp wattage regulation throughout rated lamp life for nominal input voltage.
5. The lamp current crest factor shall not exceed 1.8 for input voltage variation of $\pm 10\%$ at any lamp voltage from initial through life.

Section 86-6.10A(2)a., LEAD-TYPE REGULATOR BALLASTS - Each lead-type regulator ballast (CWS-constant wattage autoregulator) shall, when operated with the appropriate lamp, have the following characteristics and shall maintain the following lamp operation:

1. The power factor shall be not less than 90% when the ballast is operated at nominal line voltage with a nominally rated reference lamp.
2. Lamp wattage regulation spread at any lamp voltage, the ballast design center shall not vary by more than $7\frac{1}{2}\%$ from rated lamp watts.
3. The ballast shall be designed so that a capacitance variation of $\pm 8\%$ variation in lamp wattage regulation throughout rated lamp for nominal input voltage.
4. The lamp current crest factor shall not exceed 1.8 for input voltage variation of $\pm 10\%$ at any lamp voltage from initial through life.

Section 86-6.10B, "High Power Factor Autotransformer or Reactor Type Ballasts," of the Standard Specifications is amended to read:

Each non-regulating reactor, autotransformer, or high reactance ballast shall, when operated with the appropriate lamp, have the following characteristics and shall maintain the following lamp operations:

1. The power factor shall be not less than 90% when the ballast is operated at nominal line voltage with a nominally rated reference lamp.
2. Lamp wattage regulation spread at any lamp voltage from nominal through life shall not vary by more than 25% for $\pm 5\%$ input voltage variation.
3. For nominal input voltage and lamp voltage, the ballast design center shall not vary more than $7\frac{1}{2}\%$ from rated lamp watts.
4. The lamp current crest factor shall not exceed 1.8 for input voltage variation of $\pm 5\%$ at any lamp voltage from initial through life.
5. Ballast voltage for new luminaires shall be 120 volts.

18. Backplates

Backplates shall conform to Section 86-4.03 of the State Standard Specifications except as herein modified.

All signal heads shall have backplates. Backplates for 8-inch signals shall have 8-inch borders. Backplates for 12-inch signals shall have 5½-inch borders. Backplates for combination signals shall have 5½-inch borders around the 12-inch section and 9-inch borders around the 8-inch sections. The signal heads must be located upon the standard in such a manner that when the backplates are installed they will not cover the terminal compartments or prevent easy access to same. Backplates shall not be cut, bent, or mutilated in any way to facilitate the above-mentioned requirements.

19. Pedestrian Signals

Pedestrian signals shall conform to Section 86-4.06 of the State Standard Specifications except as herein modified.

All pedestrian signals supplied shall be LED count down..

The message plate shall be ¼-inch nominal thickness, ultraviolet- stabilized, prismatic-- patterned polycarbonate plastic; ⅜-inch nominal thickness hammered wire-glass; or ⅜-inch nominal thickness ultraviolet- stabilized, prismatic-patterned acrylic plastic. The message plates shall have a flat-black surface over the entire projected area except where the symbols are located. The material used to mask the message plate shall be hard and durable and shall bond such that it will not flake or peel when the message plate is in use or is washed. The symbols shall be the only illuminated portion of the message plate.

The message plate shall be sealed to a polycarbonate case to form a dust-tight and weatherproof module. The module shall contain and properly support the luminous tubing and power supplies.

Each light source shall have a separate power supply. Each power supply shall require less than 30 watts with a power factor of not less than 90% over a range of input voltages from 105 to 130, at a frequency of 60 (±1) Hz.

Each symbol shall be not less than 11-inches high and not less than 7-inches wide.

A 1½-inch deep egg crate type screen either of 0.020-inch minimum thickness 3003 H14 aluminum alloy or of 0.030-inch nominal thickness polycarbonate. The assembly shall be mounted in a frame constructed of 0.040-inch minimum thickness aluminum alloy or polycarbonate.

The vertical spacing of the horizontal members shall be ½-inch starting approximately ¼-inch below the message.

Additional members may be employed outside the 2 message areas for structural strength.

The eggcrate screen shall be installed parallel to the face of the upraised hand and walking person message and shall be held in place by the use of stainless steel screws.

The screen and frame shall be anodized flat black or may be finished with flat black enamel as specified in Section 91-4.01 of the State Specifications. Said enamel shall be applied in the shop at the Contractor's expense.

Alternate methods may be substituted for the above screening, providing the results are equal to or superior to those obtained with the above specified screens as determined by the Engineer.

20. Vehicle and Pedestrian Signals And Fittings

Signal faces, signal heads, and auxiliary equipment, as shown on the plans, and the installation thereof, shall be LED count down and conform to the provisions in Section 86-4.01 through 86-4.05, inclusive, of the State Standard Specifications and these Special Provisions.

The signal heads must be located upon the signal standard in such a manner that when the backplates are installed, they will not cover the terminal compartments or prevent easy access to the same. Backplates shall not be cut, bent, or mutilated in any way to facilitate the above-mentioned requirement.

Signal section housing and backplates shall be metal type only.

Signal mounting shall be oriented so as to provide maximum horizontal clearance to the adjacent roadway.

Reflectors shall be made of silvered glass, or specular aluminum with an anodic coating. No plastic reflectors will be allowed.

Lenses shall be glass. Plastic lenses will not be allowed.

Slip-fitters and terminal compartments shall be cast bronze, type 356-T6 aluminum, hot dip galvanized ductile iron or ductile iron.

When galvanized steel pipe is used, the terminal compartment must be galvanized.

Mixing of galvanized and non-galvanized assemblies shall not be allowed at any new traffic signal installation.

Galvanized signal mounting assemblies shall not be painted.

21. Programmed Visibility Vehicle Signal Faces

Programmed visibility traffic signal heads shall conform to the provisions in Section 86-4.05 of the State Standard Specifications and the Special Provisions.

Lamps for signal units other than arrow indications shall be 75 watt, 120 volt, incandescent lamps with a minimum average rated life of 6,000 hours.

Lamps for arrow indicators shall be 150 watt, 120 volt, incandescent lamps with a minimum average rated life of 6,000 hours.

The Contractor will not be required to program said signal heads; however, he shall mount heads and provide the masking tape for programming.

22. Inductive Loop Detectors

Inductive loop detector sensors with power supply installed in the traffic signal controller cabinet shall conform to Section 3.1.13. The Contractor shall supply and install the conductor loops and lead-in cable as shown on the plans.

1. Section 86-5.01A(4) of the State Standard Specifications, shall apply, except as herein modified:

Loop detector lead-in cable from the pullbox adjacent to the loop to the field terminals in the cabinet, shall be Type "D" lead-in cable only. Type "D" lead-in cable shall consist of four, No. 18 AWG stranded copper conductors insulated with 10 mils minimum of polypropylene, color coded, parallel laid, twisted together with four to six turns per foot and shielded with metallic foil. An amorphous interior moisture penetration barrier shall be provided to prevent hosing, siphoning, or capillary absorption of water along cable interstices. The outer jacket shall be 35 mils minimum thickness, high density, polyethylene conforming to ASTM Designation: D-1248, 65T for Dielectric Material, Type I, Class C, Grade 5, J3.

2. Inductive Loop Detector Installation Details: Section 86-5.01A(5) of the State Standard Specifications, shall be deleted and the following shall be substituted:

Loop lead-ins shall be individually identified as shown on the plans. Identification shall be by means of bands placed on the lead-in.

No detector loop wires shall be located less than 2 feet from a manhole rim, water/valve box, or any other utility access that may require future height adjustment. Loop wire cuts shall be field adjusted or directed by the Engineer to meet this requirement.

If asphalt concrete is to be placed, the loop conductors shall be installed prior to placing the final layer of asphalt concrete.

The ends of all lead-in cables and all loop conductors shall be sealed and made waterproof prior to being installed in conduit and prior to being left for splicing.

Installation and tests shall conform to details and notes shown on the plans and drawings.

Unless shown otherwise, each loop shall consist of three turns of conductor.

Slots cut in the pavement shall be immediately cleaned by washing with water to remove all sawing residue and blown out and dried before installing inductive loop detectors.

After conductors are installed in the slots cut in the pavement, the slots shall be filled with sealant. The sealant shall be at least $\frac{5}{8}$ -inch thick above the top conductor in the saw cut.

All inductive loops and lead-in shown in areas paved with "Open Graded Asphalt Concrete" shall be installed a minimum of $\frac{1}{2}$ -inch deeper, as measured from the pavement surface, than shown on the drawings.

Conductors of all loops to be operated by each sensor unit shall be run continuous to the nearest pullbox.

All loop conductors for traffic counters shall terminate in a pullbox or on a terminal strip in the traffic count station cabinet when a cabinet is installed.

Inductive loop conductors for traffic signal and traffic counting installations shall be identified and banded, in pairs, by lane in the pullbox adjacent to the loops and near the termination of the conduit in the controller or traffic count station cabinet. Bands shall conform to the provisions in Section 86-2.09 of the State Standard Specifications.

All splices between lead-in cable and the loop conductors shall be made by the Contractor after testing has been completed and accepted by the Engineer.

Splicing shall only be done in the presence of the Engineer. It shall be the Contractor's responsibility to contact the Engineer 24 hours in advance of any proposed splicing.

The ends of all lead-in cables and loop conductors shall remain sealed and waterproof until the splice is to be made.

The splice between the lead-in cable and the loop conductors in the adjacent pullbox shall be a soldered waterproof type. This shall be accomplished by stripping and cleaning ends of wires, twisting ends together, dipping twisted ends in flux, then soldering by the solder pot dip method. The soldered splice shall then be protected with an electrical spring connector of three-part construction. The three-part construction shall consist of a zinc coated, free expanding steel spring enclosed in a steel shell, with an outer jacket of polyvinyl chloride. The outer jacket shall have a flared skirt, be flexible, and able to withstand 105 degrees C

temperature continuously. Each splice must have the spring connector sized in accordance with the manufacturer's recommendations for the number of conductors and gauges being spliced. Wire strip lengths shall also be in accordance with the manufacturer's recommendations.

After spring connector has been applied to the connection, the splice shall be coated (by submersion) with a corrosive-resistant, solvent-resistant, sealing/bonding, flexible electrical coating, having at least 100-volt/mil electrical strength. Upon coating of the splice, the flared skirt end shall be positioned in an upright alignment and maintained there until the electrical coating is dry.

23. Detector Sealant

Sealant for inductive loop detectors shall be "hot rubberized" and supplied and installed by the Contractor in accordance with Section 86-5.01A(5) of the State Standard Specifications.

Only elastomeric sealant will be used. Epoxy sealant will not be allowed. However, the Engineer may allow the use of asphaltic emulsion sealant in areas scheduled for asphalt concrete overlay.

24. High Pressure Sodium Luminaires

Street lights shall be high pressure sodium as specified on the plans, and shall conform to the following requirements:

1. Street light luminaires shall have their ballasts integral to the housing. Glare shields shall not be required. Luminaires shall be as provided in Section 86-6.01 of the State Standard Specifications.

Unless otherwise specified, light distribution shall be ANSI Type.

2. Lamps for high pressure sodium luminaires shall be as follows:

Each high pressure sodium luminaire shall be furnished with a sodium lamp of wattage as shown on the plans. The lamps shall be ANSI S54 for 100 watts, ANSI S55 for 150 watts and ANSI S56 for 200 watts and ANSI S50 for 250 watt lamps. All lamps shall have a minimum rated average life of 20,000 hours based on 10 hours burning per start. Lamp voltage shall be 55 volts.

25. Ballasts

All ballasts shall be designed to operate on a nominal primary voltage of 120/240 volts.

High pressure sodium ballasts shall be as provided in Sections 86-6.01A and Section 86-6.01A(1) of the State Standard Specifications.

26. Traffic Signal Salvage

All electrical and traffic signal equipment designated as "salvage" on the plans shall be delivered to the Department of Public Works. Poles and all their appurtenances shall be delivered at the same time. Payment shall be included in the bid price paid for the intersection under consideration and no additional compensation will be allowed. All poles, signal arms, luminaire arms, tie rods, etc., must be tagged with a suitable waterproof tag and marking pen before removal from the jobsite. The tag must give the date, the intersection name, corner, and location from which it was removed as shown on the plan. The Contractor shall contact the Department of Public Works 24 hours before delivery of salvaged materials. Salvaged materials will be accepted Tuesday through Thursday only. The Contractor shall provide the means to safely transport, unload and stockpile all salvaged equipment.

27. Traffic Signal Interconnect System

A. Measurement and Payment

Under this item of the proposal the Contractor shall bid a price to install a complete traffic signal interconnect system as shown on the plans. The price bid shall include the installation of all interconnect cable, and all conduit and pullboxes as shown on plans.

B. Cable Type, Specifications, and Initial Testing

The interconnect cable shall be fiber-optic, ALTOS Gel-Free, All Dielectric Cables 12-288 Fibers, Enhanced, or approved equal

C. Fiber-Optic Cable Installation

Fiber-optic cable shall be installed in conduit between termination points. Termination points are identified as controller cabinets, terminal cabinets, or master controller building. A minimum of 5 feet of slack cable shall be left coiled at each termination point. Splicing of interconnect cable shall not be allowed.

D. Fiber-Optic Testing and Documentation

Prior to conducting any tests, the Contractor shall provide the Engineer with detailed descriptions of test procedures for review and approval. Documentation of all test results shall be provided within 2 weeks to the Engineer for review and approval. System documentation shall incorporate test results, ongoing maintenance, and performance measurements.

The Contractor shall provide the Engineer with a copy of the manufacturers' test procedures and quality assurance procedures for information. If the Engineer determines that these procedures are not adequate, the Engineer may require that additional tests be conducted by the Contractor prior to installation. Additional testing

ordered by the Engineer will be paid for as extra work, as provided in Section 4.12 of the General Provisions.

There are two progressive broad levels of testing: (1) Component Tests and (2) Operational test Period. Progression to the next level of testing is built upon successful completion and acceptance of the previous level. Testing for the various system components shall be as specified herein and may include tests at (1) the factory, (2) upon arrival at the job site, (3) during installation, and (4) upon completion of the installation.

All test procedures and equipment required for this testing shall be furnished and maintained by the Contractor. Testing shall be performed in the presence of the Engineer.

The Contractor shall submit documents containing proposed test procedures, test equipment and expected results to the Engineer for review and approval at least ten (10) calendar days prior to performing any test. The test shall be complete in all details as determined by the Engineer. If the Engineer determines that the test procedure proposed by the Contractor is incomplete, the Contractor shall make modifications required by the Engineer. Tests shall not be performed without written approval of the Engineer.

A complete report of each test performed shall be submitted to the Engineer following completion of the test. The report shall include all actions and results and all failures and corrective or preventative measures taken.

The Contractor shall notify the Engineer of his/her intention to conduct any test at least ten (10) calendar days in advance. The Engineer shall have the right to delay the start of the testing up to seven (7) calendar days to accommodate personnel schedules. The Contractor shall plan on this possible delay, and if exercised by the Engineer, this delay shall not be considered a valid cause for time extension, missed milestones, or additional compensation. If any piece of equipment fails during the individual testing, the Contractor shall request that the tests be rescheduled with appropriate notification and the approval by the Engineer. All equipment must be repaired and restored to full operation before being resubmitted for inspection or testing.

Component Tests:

Testing under this section applies to the components pertaining to the transmission of traffic data via the fiber-optic hardware installed by the Contractor. All other testing is contained elsewhere in other sections of these Specifications.

Factory Tests:

Fiber-Optic Cables: While on the shipping reel, after cabling but before shipment, 100 percent of all Fiber-Optic line fibers shall be tested for attenuation. Copies of the results shall be (1) maintained on file, (2) attached the cable reel in a waterproof pouch, and (3) submitted to the Contractor and to the Engineer prior to the delivery of the cable to the job site.

Attenuation tests shall be performed with an Optical Time Domain Reflectometer (OTDR) capable and calibrated to show anomalies of 0.2 db as a minimum. Single mode fibers (SM) shall be tested at 1,310 nm and 1,550 nm. The OTDR used shall have a printer capable of producing a verifying test trace with able identification, numerical loss values, date, and operator name. It shall be Windows based and have associated software to do comparisons and reproductions on 8½-inch by 11-inch paper, via a personal computer (e.g. for example 383 PCW). OTDR for testing shall be provided by the Contractor at no cost to the City.

Pre-Installation Tests:

Prior to installation, the contractor shall conduct pre-installation tests on all equipment to be used for this project.

Fiber-Optic Cables: Upon arrival at the site, the cable and reel shall be physically inspected for damage and 100 percent of the fibers shall be tests with the OTDR for attenuation. Test results shall be recorded and compared with the filed copy stored with the shipping reel. The cable shall not be installed until the completion of this test sequence. Copies of traces and test results shall be submitted to the Engineer. If the OTDR tests are unsatisfactory, the Fiber-Optic cable segments shall be unacceptable and shall be replaced with a new segment of equal cable at the Contractor's expense. The new segment of cable shall then be tested to demonstrated acceptability. Copies of the test results shall be submitted to the Engineer.

Post Installation Tests:

The Contractor shall test each item after installation to ensure that the equipment has been installed without damage and operates correctly.

Fiber-Optic Cables: After the fiber-optic cable has been pulled, but before termination, 100 percent of all the fibers shall be tested with the OTDR for attenuation. Test results shall be recorded, compared, and filed with the previous copies of these tests. Copies of traces and test results shall be submitted to the Engineer. If the OTDR test results are unsatisfactory, the fiber-optic cable segment shall be unacceptable. The unsatisfactory segments of cable shall be replaced with a new segment of cable at the

Contractor's expense. The new segment of cable shall then be tested to demonstrated acceptability. Copies of the test results shall be submitted to the Engineer.

Outdoor Fiber-Optic Cable Splices-At the conclusion of all outdoor fiber-optic cable splices at one location, and before they are enclosed and sealed, all splices shall be tested with the OTDR, in both directions, at 1,550 nm (SM). Individual fusion splice losses shall not exceed 0.3 db. Measurement results shall be recorded, validated by trace and filed with the records of the respective cable runs. Copies of test results shall be submitted to the Engineer. If the OTDR test results are unsatisfactory, the fiber-optic cable segment shall be unacceptable. The unsatisfactory segments of cable shall be replaced with a new segment of cable at the Contractor's expense. The new segment of cable shall then be tested to demonstrate acceptability. Electronic Copies of the fiber-optic traces shall be saved in Bell-core Standard and a copy of all traces shall be submitted to the Engineer for analysis. Hard copies of the test results shall be submitted to the Engineer. End-to-End testing shall also be done from one direction using a transmission test set to measure attenuation at 1550 nm using a one jumper reference. Attenuation results shall be submitted to the Engineer for records in a hard copy format.

Acceptance of Communication Functional Tests – Successful completion of the functional tests as described above, shall constitute acceptance of the work and equipment for this area of testing.

Operational Test Period:

The Contractor shall furnish the Engineer with a list of names and telephone numbers where persons designated by the Contractor can be reached to give notification of any alleged defects for which the Contractor has repair or replacement responsibility.

Any day during which the Contractor fails to restore the system to use within twenty-four (24) hours of the Engineer's notification to Contractor of a failure other than due to power failure, will extend the operational period by one (1) working day, for which no additional compensation will be allowed.

Should the Contractor fail to respond to the Engineer in this respect within twenty-four (24) hours of the Engineer's notification to the Contractor, the Engineer will cause the defective equipment to be removed and returned to the Contractor and shall be entitled to deduct freight and labor charges from any monies due to or become due to the Contractor. Alternatively, the Engineer may have defective parts or parts repaired or replaced at the sole expense of the Contractor. The Engineer's decision shall be final as the nature and cause of such defects and the necessity and means of remedying them.

The Contractor shall assume full responsibility to maintain the equipment supplied, and every part thereof, in complete repair for the period of the Operational Test Period and make good in a permanent manner, satisfactory to the Engineer, any and all damages or injury to equipment.

Documentation:

Following project completion, the Contractor will submit one copy of redlined construction drawings showing the actual depths of the conduit installation. A blank copy of the plans with a grid will be provided to the Contractor. The redlined drawings will be provided without additional cost to the Engineer. These redlined drawings will be used to prepare final as-built drawings.

The redlines will include the following information of actual field configuration or details deviates from the Final Work Plans due to field changes made during performance of the work.

- Actual location of buried or submerged fiber-optic cable
- Position of all conduit and inner duct (and a “butterfly” illustration of same, using templates provided), utility crossings, reference points, permanent structures, transitional points, and street names
- Contact information for the owner(s) of any land directly impacted by the work
- Description of the cable including cable type, fiber type, reel number, cable composition (standard vs. dispersion shifted)
- Border locations by municipality
- Location, quantity, size, and ownership of all splice vaults
- All splice locations, slack coil locations, cable foot markings at splice points and slack coils, and types of splice enclosures
- Attachment height(s), pole numbers(s), bore locations(s), bridge/tunnel attachment(s), strand size, and offset and depth information – all as applicable.

The Contractor shall provide as built drawings of conduit depths on the provided plan grids, fiber configurations, and test results.

Each submission shall be prominently identified including the date, name and address of the contractor, and shall further indicate the specific individual (mailing address, telephone and fax number) to contact relative to matters in the submission. If more than one volume is used, each should be so identified.

Complete documentation shall be delivered at least fifteen (15) calendar days prior, and approved at least seven (7) days prior (unless otherwise approved by the Engineer), to conducting any training sessions.

The City shall have the right to reproduce copies of all documentation provided by the Contractor hereunder, provided that such reproduction is solely for the use of the City and its designated representatives.

Throughout the testing period, the Contractor shall correct all errors in documentation. Such corrections shall be made within 15 calendar days after discovery of error and shall be at no cost to the City.

E. Intersection Cameras

(To be inserted at a later date)

F. Work On Existing Signals

No work shall be done on functioning electrical components of existing traffic signals on Fridays and without notifying the City 48 hours in advance.

G. Signal Turn-On

Traffic signals shall not be turned on operational until all signal heads, pedestrian heads, backplates, luminaires, detectors, pushbuttons, signs, and striping have been installed. The Contractor must give written notice of intentions of signal turn-on 72 hours prior to actual turn-on time so that City forces can accomplish the proper signing. The written notice shall be given to the Department of Public Works to allow for a review of the signal prior to turn-on. City personnel may request a new turn-on date and review, pending results of their initial review. All City installed signs that have been installed prior to signal turn-on and are covered shall be uncovered by the Contractor prior to actual turn-on time. Turn-ons shall take place between 11:00 AM and 2:00 PM Monday through Thursday. All work done by the Contractor to accomplish these objectives shall be considered paid in the price bid for the intersection under consideration and no additional compensation will be allowed.

Following signal turn-on, the Contractor shall remove and dismantle "Stop" and "Stop Ahead" signs for the intersection, and deliver them to the Department of Public Works. The Contractor shall likewise remove, dismantle, and deliver other unneeded signs if noted on the plans. Payment for this work shall be included in the lump sum price paid for the traffic signal.

3.2 STREET LIGHTING SYSTEM

1. Measurement and Payment

Under these items of the proposal, the Contractor shall bid a lump sum price for each of the various items shown on the proposal. The price bid shall include full compensation for furnishing, installing, and doing all necessary work to complete the item as an operating unit.

2. Specification

All work shall be done in accordance with Section 86 of the State Specifications, these specifications and the Special Provisions.

3. Vendor Order And The Warrant

The Contractor shall furnish the City with a statement from the vendor that the order for the electrical material required for the contract has been received and accepted by said vendor(s) and said statement shall be furnished within 10 days after receiving notice that the contract has been executed for the City. Said statement shall give the date that the electrical equipment will be shipped.

4. Notice To Equipment Suppliers

The supplier shall include on the equipment list and on the equipment itself, the installation location of material supplied. This shall be done by the use of street names, the alphabetical letter designation used on the plans, or a location as otherwise noted on the plans. Equipment lists and drawings shall conform to Section 86-1.04 of the State Specifications.

5. Requirements Relating To General Conduct of Work

Removal of excess dirt shall take place immediately after a hole is dug and in no circumstances shall it be allowed to remain overnight in any location. Excess concrete shall likewise be removed each day. Lawns, shrubberies, and other landscape features shall be protected at all times. Should any small bushes or shrubbery have to be removed during construction, the Contractor shall replace them. Trucks and hole digging rigs shall not be allowed to pass over any lawns. The installation of conduit in lawn areas shall be done by approved boring method or by trenching at the Contractor's option unless otherwise specifically set forth on plans and in the Special Provisions. If the trenching method is used through the established lawn areas, the Contractor shall first remove the sod before trenching. A sod-cutting machine shall do the removal of sod over jack holes or over trenches. Removal of sod by other means will not be accepted. Each strip of sod removed shall be rolled into a neat roll without damage. All sod removed shall be replaced and irrigated within 24 hours. Suitable lighted barricades shall be placed over each hole or footing until the pole is erected. Permission for parking equipment overnight shall be obtained by the Contractor from the homeowner whose property will be blocked by such equipment. It shall be the responsibility of the Contractor to ascertain the exact location of any yard lighting or sprinkler system and no additional compensation will be paid for any damage to any yard lighting or sprinkler systems. Removing and replacing improvements shall conform to Section 86-2.02 of the State Specifications except that the word "and in pavements" in the first sentence of the third paragraph shall be deleted.

6. Foundations

Foundations for poles, posts, and pedestals shall conform to Section 86-2.03 of the State Specifications except as herein modified. Standard bases shall conform to sizes shown on the drawings or as detailed on the plans. All concrete shall be Class "B".

7. Lighting Poles

All poles shall be galvanized steel, aluminum or concrete. The type of standard shall be as shown on the plans or in the Special Provisions.

A. Galvanized Steel Poles

1. Type "A" street lights shall use the "A" series poles as detailed on the drawings.
2. Type "B" street lights shall use the "B" series poles as detailed on the drawings.

Galvanizing shall be as provided in Section 75-1.05 of the State Standard Specifications.

B. Aluminum Poles and Concrete Poles

Aluminum and concrete lighting poles will conform to the American Association of State Highway and Transportation Officials (AASHTO) "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals", and these specifications. Poles shall be round in cross-section and have continuous tapered shafts and arms of approximately ¼-inch per foot. A wind velocity of 70 mph and a projected area of 3 square feet of luminaire will be used for the design of the pole. Hand holes for poles will be reinforced in such a manner as to distribute the load. Hand holes will be provided on the side normal to the luminaire and have tamper-proof hand hole cover. Eight nuts and flat washers will be provided for plumbing the poles. Shop plans for poles will be submitted for approval before any fabrication is begun.

1. Type "A" street light poles shall be equipped with a 2-inch diameter by 7-inch long tenon. Arm to pole connections will be a three bolt simplex type with 5/8-inch H.S. cap screws. Poles with arms shall be provided with a rain-tight metal cap. Base plates for aluminum poles will be provided with 11½-inch bolt circles. Bolt circles for concrete poles shall be 12½-inches.
2. Type "B" streetlights shall have poles with a 27/8-inch to 3-inch diameter by 3½-inch long tenon. Base plates will be provided with 9½-inch bolt circles for aluminum poles and 12½-inch bolt circles for concrete poles.

8. Luminaires

High Pressure Sodium Luminaires as specified on the plans:

A. Type "A"

Street light luminaires shall have their ballasts integral to the housing. Luminaires shall be as provided in Section 86-6.01 of the State Standard Specifications and shall be cut off type only.

B. Type "B"

Street light luminaires shall be high pressure sodium vertical burning type. Unless otherwise specified, light distribution shall be ANSI Type II. Luminaire housing shall be die cast aluminum with a removable access door providing direct exposure to all electrical components, and shall be equipped with a slipfitter mounting unit for attachment to a 3½-inch tenon with a 2⁷/₈-inch to 3-inch tenon diameter. The housing shall contain the ballast, capacitor assembly, a terminal block for the necessary wires and a porcelain lamp socket. Hood shall be spun or formed aluminum, 22-inch minimum diameter. Refractor shall be acrylic plastic. All gaskets shall be composed of material capable of withstanding the temperature involved and they shall be securely held in place. All parts of the luminaire shall be manufactured from corrosion resistant materials. Ballasts shall be integral to the housing. Color shall be aluminum baked enamel finish and shall resist heat, abrasion and weathering.

LED streetlights must meet Caltrans standards including ES-10A Electrical Systems (Iso foot-candle Diagrams)

9. Lamps

Lamps for high-pressure sodium luminaires shall conform to Section 86-6.01B of the State Standard Specifications.

Each high-pressure sodium luminaire shall be furnished with a sodium lamp of wattage as shown on the plans. The lamps shall be ANSI S54 for 100 watts, ANSI S55 for 150 watts, ANSI S56 for 200 watt and ANSI S50 for 250 watt lamps. All lamps shall have a minimum rated average life of 20,000 hours based on 10 hours burning per start. Lamp voltage shall be 55 volts.

10. Ballasts

Ballasts shall be designed to operate on a nominal primary voltage of 120/240 volts.

High pressure sodium ballasts shall be as provided in Sections 86-6.01A and Section 86-6.01A(1) of the State Standard Specifications.

11. Conductors

Conductors for street lighting shall conform to Sections 86-2.08, 86-2.08A, and 86-2.08B, of the State Standard Specifications. Contractor shall use color-coded wires using a different color for each circuit with continuous color maintained throughout each circuit. Color-coding shall be as required by the Engineer or as detailed on the plans or in the Special Provisions.

12. Wiring

Wiring for street lighting shall conform to Section 86-2.09 of the State Specifications", except as herein modified. Section 86-2.09E which provides for use of heat shrinkable insulating tubing shall not be allowed. Splice insulation--on 600-volt conductor splices, of solid or stranded conductor of #14 AWG to #6 AWG, the Contractor may use, at his option, an electrical spring connector of three-part construction. The three-part construction shall consist of a zinc coated free expanding steel spring enclosed in a steel shell, with an outer jacket of polyvinyl chloride. The outer jacket shall have a flared skirt, be flexible, and able to withstand 105 degree centigrade temperature continuously. Each splice must have the spring connector sized in accordance with the manufacturer's recommendations for the number of conductors and gauges being spliced. Wire strip lengths shall also be in accordance with the manufacturer's recommendations. After spring connector has been applied to the connection, the splice shall be coated (by submersion) with a corrosive-resistant, solvent-resistant, sealing/bonding, flexible electrical coating, having at least 100 volt/mil electrical strength. Upon coating of the splice, the flared skirt end shall be positioned in an upright alignment and maintained there until the electrical coating is dry. In addition to the requirements of Section 86-2.095, the standard midget ferrule type fuse shall be further interpreted as being rated at 30 amps at 600 volts. It shall also be constructed to accommodate a $1\frac{3}{32}$ -inch diameter by $1\frac{1}{2}$ -inch long fuse. Fuses shall be located in the hand hole section of the pole.

13. Pullboxes

Pullboxes shall conform to Section 86-2.06 of the State Specifications.

14. Fuses

Luminaires with up to 200-watt bulbs shall have 6 amp fuses installed. Luminaires with 250 to 400 watt bulbs shall have 10 amp fuses installed. All fuses shall be the fast blowing type.

15. Photoelectric Unit

The photoelectric units shall be installed where shown on the plans and in accordance with State Specifications 86-6.07.

16. Service

The service shall conform to Standard Drawing SL-04 and to the provisions of Section 86-2.11 of the State Specifications, except as herein modified. The service shall be a three wire A.W.G. No. 4 or as shown on plans and drawings. It shall contain main breakers, auxiliary breakers, test switch and contactor in accordance with the drawing. The Contractor shall provide "Master" padlocks for the service cans to unlock with key 2214. The Contractor shall supply three No. 14 A.W.G. conductors from the service pedestal to the photoelectric unit. The location of service points will be as shown on the plans with the concurrence and approval of the serving utility.

All components within the service box shall be clearly marked with the manufacturer's name and part number with a metallic or permanently marked engraved stencil for future identification. All control and switching equipment and fusing of the circuits shall meet the requirements of the National Electrical code, the Electrical Safety Orders of the Industrial Accident Commission of the State of California, the rules of the National Board of Fire underwriters, and the City of Folsom.

17. Painting

Painting of electrical equipment and materials shall conform to the provisions in Section 59 of the State Specifications with the following additions and modifications.

1. Paid material for electrical installations, unless otherwise specified, shall conform to the provisions in Section 91 of the State Specifications.
2. In lieu of the temperature and seasonal restrictions for painting as provided in Section 59 of the State Specifications, paint may be applied to equipment and materials for electrical installations at any time approved by the Engineer.
3. All ferrous surfaces to be painted shall be cleaned as provided in said Section 59, prior to applying the vinyl wash primer or prime coat. Blast cleaning of galvanized metal surfaces in good condition, as determined by the Engineer, will not be permitted.
4. Existing equipment to be painted in the field shall be washed with a stiff bristle brush using a solution of water containing 2 tablespoonfuls of heavy-duty detergent powder per gallon. After rinsing, all surfaces higher than 8 feet above ground level shall be wire brushed with a coarse, cup shaped, power driven brush to remove all poorly bonded paint, rust, scale, corrosion, grease or dirt. Any dust or residue remaining after wire brushing shall also be removed prior to priming. All surfaces between the ground level and 8 feet in height shall have all paint, rust, scale, corrosion, grease and dirt removed to bare metal.

5. Immediately after cleaning, all bare metal surfaces shall be coated with one application of un-thinned zinc-rich paint conforming to the requirements of Military Specification DOD-P-21035A. After the application of zinc-rich paint, one application of Pre-Treatment Vinyl Wash Primer, Section 91-2.07, or wash primer conforming to Military Specification MIL-P-15328D, shall be applied by brushing to produce a uniform wet film thickness on the surface.
6. Equipment previously finished as specified shall be given a spot finishing coat on newly primed areas, followed by one finishing coat over the entire surface.
7. All paint coats may be applied either by hand brushing or by approved spraying machine in the hands of skilled operators. The work shall be done in a neat and workmanlike manner. The Engineer reserves the right to require the use of brushes for the application of paint, should the work done by the paint spraying machine prove unsatisfactory or objectionable, as determined by the Engineer.

18. Cleanup

During the progress of the work, the Contractor shall keep the entire jobsite in a clean and orderly condition. The Contractor shall remove spillage resulting from hauling operations along or across existing streets or roads immediately. He shall govern his operations and methods at all times to minimize dust problems within the area of the work or along adjacent properties. Water or dust palliative shall be applied as required to provide adequate control of dust to the complete satisfaction of the Engineer. Upon completion of all construction operations, the entire rights-of-way and/or easements, which have been disturbed by the construction operations, shall be cleaned and finished as provided in Section 22 of the State Specifications.

Full compensation for keeping the site of the work in a clean and orderly condition during the course of the work and the final cleanup as set forth herein shall be included in the prices paid for various items of work in the contract and no additional compensation will be allowed therefore.

19. Acceptance Test

After completion of the installation of the street lights, the Contractor shall test all street lights in the presence of the Engineer. The Contractor shall furnish all material and equipment for such testing. The street light system shall be energized for a period of one hour, or 20 minutes per lamp, whichever is greater. The test will identify light distribution patterns, acceptability of the ballasts, fixtures and lamps for electrical and noise standards, to verify that all connections are electrically and mechanically sufficient, and other purposes as directed by the Engineer.

20. Street Light Salvage

All electrical and street lighting equipment designated as "salvage" on the plans shall be delivered to the Department of Public Works, Corporation Yard, Street Maintenance Division. All poles, arms, heads, and other hardware shall be delivered at the same time. All poles, arms, etc. must be tagged with a suitable waterproof tag and marking pen before removal from the job site. The tag must be attached with wire and must give the date and title of plans under which the work was done. The Contractor shall contact the Department of Public Works, Street Maintenance Division, 24 hours before delivery of salvaged materials. Salvaged materials shall be accepted Tuesday through Thursday only. The Contractor shall provide the means to safely transport, unload, and stockpile all salvaged equipment.

STANDARD DRAWINGS

SL-01	Loop Detectors
SL-02	Loop Detector Location
SL-03	Service Cabinet and Meter Socket
SL-04	Unmetered Service Enclosure
SL-05	Standard Splicing
SL-06	Direct Service Installation for Street Light Power
SL-07	Standard Pullbox
SL-08	Traffic Rated Pullbox
SL-09	Standard Controller Cabinets
SL-10	Local Solid State Pedestrian Controller Base
SL-11	Base Design for Street Light Standard
SL-12	Base Location for Street Light Standard
SL-13	Direct Service Installation to Street Light Standard
SL-14	Type 'A' Street Light Standard
SL-15	Type 'B' Street Light Standard
SL-16	Fiber Splice Vault

Section 4: DOMESTIC WATER SUPPLY SYSTEM CONSTRUCTION

4.1 GENERAL

1. General

The potable water system shall be installed in conformance with the requirements of the American Water Works Association (AWWA), these Standard Construction Specifications, and as recommended by the manufacturer. The Construction Specifications and manufacturer's guidelines shall be present at the construction site at all times. All pipe materials must be NSF 61.

"Construction Inspector" is referenced in this Section as a representative of the City of Folsom Environmental & Water Resources Department, in accordance with Title 22 California Code of Regulations California Safe Drinking Water Act & Related Laws and Regulations, Section 63770, responsible for the inspection of water and waste water facilities.

2. Safety

Refer to Article 10 of the General Provisions for safety requirements.

3. Measurement and Payment

Full compensation for mobilization, demobilization, surveying, geotechnical, construction staking, trenching, dewatering, backfilling, pipe and appurtenances, installation, testing, etc. as herein specified, shall be included in the price bid per lineal foot for the respective sizes, classes, and types of pipes and conduits listed in the Contract documents, and no additional compensation will be allowed.

4. Connection to Existing Facilities

Connection to existing City water facilities, and the procedure thereof, shall be made upon approval of the Construction Inspector after following requirements for construction and testing conforming to these Specifications.

5. Water System Pipe Material

Unless otherwise specified in the Contract documents, all water system mains less than or equal to 16 inches in diameter shall be polyvinyl chloride pipe C-900, Ductile Iron Pipe (DIP), or Cement Mortar Lined and Coated (CMLC) steel. However, all transmission mains shall be CMLC steel or ductile iron pipe regardless of diameter. All water system distribution mains greater than 16 inches in diameter shall be Ductile Iron Pipe (DIP) or CMLC. When DIP or

steel pipe is specified, installation of a cathodic protection (CP) system is required. See section 4.9.F – Cathodic Protection.

6. Sampling Station

A permanent sampling station shall be installed in each new subdivision, per Standard Drawing WR-16. It shall be located on the side of the main closest to the right-of-way line, and in a common area or on a common property line. An approved sampling station assembly is the American Machine & Conveyor Model EZ-01F Sampling Station.

7. Water Use Permit

The Contractor shall obtain a Water Use Permit prior to drawing water for construction. The permit shall be obtained from the main office of the City Water Treatment Plant at 194 Randall Drive, Folsom CA 95630. Following relay of the permit to City personnel, the arrangement will be made to meet the contractor at the project to install a hydrant meter, to confirm the location of the respective hydrant, and to confirm the contractor's water truck is equipped with an air gap. Violations of this provision may result in prosecution in accordance with Section 1.12 of the Folsom Municipal Code. This requirement for a permit applies to both City and privately-funded projects.

8. Approved Equal Product Submittals

To every material listed in these Specifications by product name, the term "or approved equal" applies. Contractors may propose to use materials which are not City-specified and submit documentation to allow review of said material for use as an "approved equal" product. Notwithstanding Section 5.10 Submittals, of the City General Provisions for City-funded projects, the Contractor shall include the following information in the material submittal for development work:

- A. Product - A description and appropriate catalogue information of the product and the related section number of the City specification.
- B. Contact - The name and telephone number of the contact representative for the proposed product.
- C. Reference - A list of a minimum of three agencies who are using the proposed product (include names and telephone numbers).
- D. Performance - Information and reference for three locations with a performance record of three years in operation of the installation.
- E. Address - Address the letter to the City of Folsom Environmental and Water Resources Department, 50 Natoma Street, Folsom, CA 95630, Attn: Utilities Section Manager.
- F. City staff may request a sample of the product for review.

G. Submittal Time - The Contractor shall submit all material for review 35 days prior to development contract award. All submittals shall include documentation verifying contract award date. Contractors shall allow two to four weeks' review time by the Environmental and Water Resources Department.

8.1 Conditionally Approved Material

Materials or products that have met the reference and performance requirements shall be conditionally approved for a minimum trial period of 2 years. Upon completion of the two year period, the product may be approved or the evaluation period may be extended as required by the City. A list of conditionally approved products may be obtained from the Environmental & Water Resources Department.

8.2 Material Defects and Failures

Defective material and failures shall be reported immediately. The date of sale, manufacturing dates, lot numbers, and all other identifications shall be provided to the Construction Inspector.

8.3 Unapproved Materials

In order to avoid installation of unapproved materials, those materials shall be removed from the site within 24 hours as requested by Construction Inspector.

9. Punch List Process

When the Contractor/Developer is satisfied all project improvements are substantially complete, have inspected the project thoroughly and is aware of no punch list items, a final punch list may be requested of the Construction Inspector.

The Inspector will have 21 calendar days to complete the inspection and issue the final punch list to the Contractor/Developer. Upon the Inspector's receipt of the Developer's request for inspection, the City Water Maintenance Division will be informed of the request for inspection, and will have the opportunity of visiting the site and commenting in writing to the Inspector during the first 14 days of the 21.

Note: If, upon beginning the final inspection an excessive number of punch list items are found, the inspection will be terminated and rescheduled.

4.2 CONSTRUCTION STAKING

1. General

- A. Construction staking shall be conducted by a surveyor with a current license in the State of California.
- B. Construction staking will be provided by the Contractor to establish the vertical and horizontal controls necessary to lay out the work.

- C. Construction staking will include line and grade and location of manholes. Easement boundaries will not be staked.
- D. Contractor shall bear the cost of replacement staking if the initial staking is damaged and must be replaced.

2. Layout and Measurement to be Performed by Contractor

- A. The Contractor shall be responsible for laying out the work from the lines and grades provided by the Owner and from the dimensions and elevations provided on the drawings and shall be responsible for all measurements required for the execution of the work.
- B. The Contractor shall furnish stakes, equipment, tools, materials, and all labor as required for layout work.

4.3 CONTROLLED LOW STRENGTH MATERIAL

1. General

- A. Requirements for controlled low strength material (CLSM) as backfill material in specific locations.

2. Definitions

- A. Controlled Low Strength Material (CLSM): A highly flowable, lean concrete mix consisting of a mixture of cement, fly ash, densely graded mineral aggregates, water and admixtures. Characteristics include:
 - 1. Capable of freely flowing to fill excavations and voids without compaction or other additional effort.
 - 2. Used in trenches and for backfill adjacent to structures where clearance is limited, and in other areas specifically identified on the Drawings or specified.
 - 3. Low permeability to prevent migration of adjacent fines into the set mix.
 - 4. Easily excavated after curing with minimum risk of damage to buried utility.

3. Submittals

- B. A. Submit one copy of the Mix Design to the City of Folsom. Identify name and/or number of the mix design. Provide the proportions and gradations of materials proposed for CLSM.

4. Quality Assurance

- C. A. Demonstrate that the CLSM mix meets the specified requirements, including compressive strength.
- D. Enlist the services of a testing laboratory to prepare test cylinders and to transport cylinders to the laboratory for testing.
- E. Testing expenses shall be borne by the Contractor.

- F. Test Cylinders
 1. Procedure: Make 6-inch diameter by 12-inch high test cylinders in accordance with ASTM C31.
 2. Required Number: Not less than 3 cylinders for each 200 cubic yards of CLSM placed, with a minimum of 3 cylinders for each location where CLSM is used.
 3. Test two cylinders at 28 days, third cylinder is spare.
- G. Field Testing: Furnish slump testing equipment and test slump in accordance with ASTM C 143.

5. Materials

CLSM Mix: A mixture of Portland cement, fly ash, aggregate, water, and admixtures that produce a material of controlled density and of low compressive strength capable of filling all spaces between the pipe, the bedding and the trench walls.

- A. Cement: Conforming to ASTM C150, Type II or III with total alkali content not more than 0.8 percent.
- B. Water: Clean, potable water.
- C. Fly Ash
 1. Mix Designs used for Pipe Bedding and Trench Backfill: Class C in conformance with ASTM C 618.
 2. Mix Designs used for Backfill of Excavations: Class F in conformance with ASTM C 618.
- D. Aggregate Materials
 1. Densely graded rock conforming to the following gradation:

Sieve Size	Percentage Passing
1"	100
No. 8	50-100
No. 200	0-5

6. Design Requirements

- A. Water-cement Ratio: Not to exceed 3.5.
- B. Minimum Cement Content: 50 pounds per cubic yard.
- C. Use fly ash to improve flow-ability of the fresh CLSM and to regulate the strength. Do not use more than 300 pounds per cubic yard.
- D. Unit Weight Requirements
 1. Density of CLSM when used as backfill of excavations: Between 100 pounds per cubic foot and 130 pounds per cubic foot in the as-placed condition as determined by ASTM D 6023.

- E. Compressive Strength Requirements
 - 1. Mix Designs used for Pipe Bedding and Trench Backfill: Compressive strength at 28 days between 100 psi and 150 psi as determined in accordance with ASTM D 4832.
- F. Slump: Between 6 inches and 8 inches when tested in accordance with ASTM C143.

7. Placement

- A. Thoroughly settle and consolidate CLSM as the material is placed in excavations. Fill the entire depth of the layer that is being consolidated, into a dense, homogeneous mass, filling all spaces and voids and bringing only a slight excess of water to the exposed surface. Place and consolidate CLSM by means that will not cause segregation of the mix.
- B. Do not place CLSM under the following conditions:
 - 1. When the air temperature is below 40 degrees Fahrenheit.
 - 2. When the excavation contains water or when the bottom or walls of the excavation are frozen or contain frozen material.
- C. Prevent flotation of pipes by placing CLSM in two or more lifts, with each lift reaching an initial set before the succeeding lift is placed. Correct any flotation and displacement of pipelines.
- D. Placement of CLSM in Excavations: Limit lift thickness to 10 feet, place subsequent lifts after CLSM has achieved the minimum specified compressive strength.

8. Protection of CLSM

- A. Protect CLSM from equipment, traffic and backfilling operations until the surface has achieved an initial set and has hardened enough to develop a minimum penetration number of 650 when tested in accordance with ASTM C 403.
- B. If the trench backfill is not to be placed over the CLSM within eight hours after CLSM placement, place a 6 inch layer of moist backfill over the CLSM.

4.4 ABANDONMENT OF PIPELINES AND STRUCTURES

1. General

- A. The Work of this Section shall include, but shall not be limited to, the following items:
 - 1. Demolition and disposal of asphalt pavement, concrete pavement, curbs and gutters, and other pavement features, concrete pavement, concrete driveways, and other property improvements. It also includes abandonment, demolition, salvage and disposal of existing water and sewer, as required to complete the work. Salvaged items shall include all manhole frames, covers, and other castings removed for abandoned structures.

2. Protection of Existing Work and Repair of Damage

- A. The Contractor shall take all necessary precautions to prevent damage to existing facilities which are to remain in place. Any damage to remaining street work improvements, building elements to remain, and other existing facilities to remain, as caused by the Contractor's operations, shall be repaired at the Contractor's expense. Damaged items shall be repaired or replaced with new materials as required to restore damaged items or surfaces as closely to their original condition.

3. Concrete & Controlled Low Strength Material

- A. Concrete for pipeline plugs & Controlled low strength material (CLSM) for filling pipeline to be abandoned in place shall be Type E.

4. Abandonment

- A. No existing pipeline facility shall be abandoned until all new facilities serving the same area are in operation and as authorized by the Construction Manager. In the case of water or sewer pipeline that are to be removed due to conflicts with new work, the existing pipelines may be removed after the bypass system has been installed and tested.
- B. Where existing piping is to be abandoned, the Contractor shall cut back the abandoned pipe for a distance of five feet from any connecting structures. All holes at the existing structures shall be repaired. The abandoned pipe shall be filled with CLSM or approved alternate pumpable mix design and capped or plugged with at least a 2 foot depth of concrete at both ends prior to backfill.

5. Structure and Piping Rehabilitation

- A. When new piping is installed in existing structures, the Contractor shall accurately position core-drilled openings in the concrete. Openings shall be of sufficient size to permit a final alignment of pipelines and fittings without deflection of any part and to allow adequate space for satisfactory packing where the pipe passes through the wall to ensure water tightness around openings so formed. Before placing the non-shrink grout, concrete surfaces shall be sandblasted, thoroughly cleaned of sand and any other foreign matter, and shall be coated with epoxy bonding compound.
- B. When new piping is to be connected to existing piping, the existing piping shall be cut square and ends properly prepared for the connection required. Any damage to the lining and coating of the existing piping shall be repaired by the Contractor. Dielectric insulating joints shall be installed at connections between new and existing piping, if required.
- C. Existing reinforcement to remain in place shall be protected, cleaned, and extended into new concrete. Existing reinforcement not to be retained shall be cut off as follows:
 - 1. Where new concrete joins existing concrete at the removal line, reinforcement shall be cut off flush with the concrete surface at the removal line.

2. Where the concrete surface at the removal line is the finished surface, the reinforcement shall be cut back two (2) inches below the finished concrete surface, the ends painted with epoxy paint, and the remaining holes patched with cement mortar grout.

4.5 DEWATERING

1. General

- A. Section Includes: Control of water and dewatering of trench and structure excavations.

2. Performance Requirements

A. General

1. Design dewatering systems in accordance with requirements of applicable laws and regulations.
2. Groundwater control systems may include single-stage or multiple-stage well point systems, sump pumps within excavations, or combinations of these types of dewatering systems.
3. Locate groundwater control and drainage systems so as not to interfere with utilities, construction operations, vehicular traffic, adjacent properties, or adjacent water wells.
4. Remove dewatering system when no longer needed.

B. Requirements for Dewatering of Excavations:

1. Design dewatering systems of sufficient scope, size, and capacity to accomplish the following results:
 - a. Control the flow of surface water into trench and structure excavations by grading, dikes, or other means.
 - b. Lower groundwater levels, reduce piezometric pressures, and eliminate infiltration of groundwater into trench and structure excavations, allowing construction to proceed on dry, stable subgrades.

- C. Provide, operate and maintain dewatering systems of sufficient size and capacity to protect existing structures from hydrostatic uplift when the structure is drained of water.

- D. In areas of flowing groundwater filter fabric shall be placed around the entire pipe zone with a 1-foot overlap. Bedding and shading in accordance with on-site geotechnical engineer. In addition, the Contractor shall follow the Geotechnical Engineer's recommendation for collecting and conveying flowing groundwater safely away from the underground roadway and infrastructure.

3. Environmental Requirements

- A. Contractor is responsible for complying with all environmental requirements necessary associated with dewatering. This may include but is not limited to the preparation, submission and implementation of a Water Pollution Control Plan, erosion control plan, obtaining coverage under the State Water Resources Control Board General Permit, obtaining coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity, etc.

4. Submittals

- A. Submit one copy to the City of Folsom of all documentation required for dewatering. This may include but is not limited to the preparation, submission and implementation of a Water Pollution Control Plan, erosion control plan, obtaining coverage under the State Water Resources Control Board General Permit, obtaining coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity, etc.

5. Dewatering and Water Control Equipment

- A. Maintain sufficient standby equipment and materials available at the site to ensure continuous operation, where required.

6. Surface Water & Ground Water Control

- A. Intercept surface water or ground water and divert it away from excavations through use of dikes, ditches, curb walls, pipes, sumps or other means. This requirement extends to temporary works required to protect adjoining properties from surface drainage caused by construction operations.
- B. Operate and maintain surface water and groundwater control systems in accordance with the Erosion and Sediment Control Plan.
- C. Remove all surface water or groundwater control systems upon completion of construction.

4.6 TRENCHING

1. General

- A. Section Includes: Trench excavation and backfilling for pipe and pipeline accessories.

2. Submittals

- A. Submit one copy to the City of Folsom for all proposed fine grading and pipe bedding material, clay material, Native Material, imported backfill material, and other soil materials. Submittal shall include: material sources, gradation, moisture-density curves, permeability tests, etc.

3. Quality Assurance

- A. Obtain representative soil samples as follows:
 - 1. Two soil samples every 500 feet along the pipeline alignment.

2. Two soil samples whenever the character of the soil changes.
3. One soil sample when directed by the Construction Manager.

4. Soil Testing and Compaction Testing

- A. Demonstrate that trenching and compaction procedures are in accordance with specified requirements and that these procedures accomplish the specified performance requirements.
- B. Refer to “Field Quality Control”, below.

5. Materials

- A. Native Material: Soil excavated for the pipe trench and having maximum particle size not exceeding 3 inches in greatest dimension and that is free of leaves, grass, roots, stumps, and other vegetable matter.
- B. Water for Moisture Conditioning of Fill Material: Use potable water.
- C. Class 2 Aggregate Base
 1. Class 2 Aggregate Base shall conform to the following gradation:

Sieve Size	Percent Passing Sieve by Weight 3/4" Maximum
2"	100
1-1/2"	100
3/4"	90-100
No. 4	35-60
No. 30	10-30
No. 200	2-9

- D. Controlled Low-Strength Material (CLSM)
 1. Refer to Section 4.3 For CLSM specifications
- E. Granular Fill: Clean gravel, ¾-inch minus with no material passing the No. 4 sieve.

6. Trench Excavation

- A. Trench Bottom: Excavate and shape trench bottoms to provide uniform subgrade for placement of Bedding Material.
 1. Unsuitable Hard Trench Bottom: If bottom of excavation is found to consist of rock or any material that cannot be excavated to provide uniform bearing surface:

- a. Notify Engineer of the conditions encountered and obtain concurrence that an unsuitable trench bottom condition is present.
 - b. Remove such rock or other material to a depth of not less than 3 inches below the original design elevation of the bottom of the trench.
 - c. Place aggregate base course material to restore the trench bottom to the original design elevation. Place material in a single lift and compact to 95 percent of maximum density (Modified Proctor D1557).
 - d. Work outlined above shall be completed by the Contractor without additional compensation or extension of the Contract Time.
2. Unsuitable Soft Trench Bottom: If bottom of excavation is found to consist of soft or unstable material which is incapable of properly supporting pipe:
- a. Notify Engineer of the condition encountered and obtain concurrence that an unsuitable trench bottom condition is present.
 - b. Remove such material to a depth and for the length required, as determined by the Engineer.
 - c. Place aggregate base course material to restore the trench bottom to the original design elevation. Place in lifts not exceeding 8-inches in un-compacted thickness and compact to 95 percent of maximum density.
 - d. Work outlined above shall be completed by the Contractor without additional compensation or extension of the Contract Time.
- B. For Manholes, Vaults and Other Pipeline Accessories
1. Provide excavations sufficient to leave at least 24-inches clear between their outer surfaces and the face of the excavation or any shoring, which may be used to support the face of the embankment.

7. Bedding & Pipe Zone Material

- A. Bedding and Pipe Zone Material: As shown on WR-15
- B. After the pipe is laid, place bedding and backfill material in lifts:
 1. First Lift: Carefully place and compact Bedding Material around the pipe to a level even with the spring line of pipe. Place Bedding Material in a single lift and compact to 95 percent of maximum density.
 2. Second and Subsequent Lifts: Place Bedding Material from the spring line of the pipe in loose lifts of approximately eight inches in uncompacted depth and compact to 95 percent of maximum density. Provide compacted Bedding Material over the top of the pipe to a total depth as indicated on the Drawings.
- C. Pipe Displacement

1. Take necessary precautions in placement and compaction of Bedding Material to prevent displacement of piping.
 2. In the event there is movement of the pipe, re-excavate re-lay, and backfill the pipe.
- D. Consolidation: Do not use water-settling methods to consolidate Bedding Material.

8. Trench Backfill

- A. Trench Backfill Material: As indicated on WR-15.
- B. Backfill voids that may form when removing shoring and bracing.
- C. Do not use water-settling methods to consolidate Trench Backfill Material.
- D. In Roadways, paved areas of Roadway Shoulders, and other AC Pavement Areas
1. Trench Zone backfill requirements, see WR-15.
 2. Backfill trench street zone with 3/4" inch class II aggregate base. Place in loose lifts not exceeding 8-inches in uncompacted depth and compact to 95 percent of maximum density.
- E. In areas outside of paved roadways, in unpaved areas of Roadway Shoulders or in Open Areas
1. Trench zone intermediate backfill shall be 3" minus native soil placed in loose lifts not exceeding 18-inches in uncompacted depth and compact to 90 percent of maximum density.
 2. In Open Areas, replace topsoil with material that was removed and stockpiled prior to trench excavation.
- F. Under Existing Intersecting Pipes or Conduits Larger than 3-inches in Diameter
1. Backfill to the spring line of the intersecting pipe or conduit with Class 2 Aggregate Base material. Place in loose lifts not exceeding 8-inches in compacted depth and compact to 95 percent of maximum density.
 2. Extend Class 2 Aggregate Base Course material 2-feet on either side of intersecting pipe or conduit to ensure that material remains in place while other backfill is placed.
 3. Backfill remainder of trench in accordance with requirements outlined above.

4.7 POLYVINYL CHLORINE (PVC) PRESSURE PIPE

1. General

- A. Polyvinyl chloride (PVC) pipe for pressurized service applications.
- B. Submittals

The Contractor shall prepare and submit one copy to the City of Folsom information on materials, pipe dimensions and gaskets, thrust restraint devices catalog data, materials of construction, coatings and dimensions.

2. Materials

A. Polyvinyl chloride (PVC) Pipe – Pressure Class Type

1. 4-inch diameter to a 16-inch diameter in nominal size: Conform to AWWA C900, Pressure Class 235 and DR of 18 unless otherwise indicated.
2. Greater than 16-inches in diameter or for water transmission mains: Refer to Ductile Iron, Specification 4.8.
3. Pipe Materials: Manufactured from Class 12454A or 12454B virgin compounds as defined in ASTM D1784.
4. Outside Diameter of Pipe: Conform to outside diameter of cast iron pipe to allow connection directly into cast or ductile iron fittings without adapters.
5. Joint Design: Gasketed push-on.
 - a. Gaskets: Elastomeric with solid cross section, meeting the requirements of ASTM F477.
 - b. Pipe Lengths: Standard laying length of 20 feet. Shorter pipe lengths may be used in curved alignments to meet manufacturer's joint deflection limitations.
 - c. Color: Blue.
 - d. Markings: "Caution: Water Main". Stamp on opposite sides of pipe every 3-feet.

B. Polyvinyl chloride (PVC) Pipe – Schedule Type

1. Use Schedule type PVC pipe for pipes less than 4-inch in diameter.
2. Material: Type PVC 1120 conforming to ASTM D 1785. Extrude pipe and fittings from Type 1, Grade 1, Class 12454-B material in accordance with ASTM D 1784.
3. PVC Schedule Type Pipe: Schedule 40.
4. Fittings: In accordance with ASTM D 2466 or ASTM D 2467, solvent welded in accordance with ASTM D 2564.

C. Restrained Joint Devices

1. Pressure Class Pipe
 - a. 4-inch diameter to 16-inch diameter in nominal size:
 1. Integral Pipe Restraints: Restraint devices shall utilize machined grooves on the pipe spigot ends and the coupling/pipe bell. When assembled, splines are

inserted through entry holes in the coupling/pipe bell, resulting in a continuous circumferential restrained joint, including flexible elastomeric gaskets to providing a hydraulic pressure seal. The pipe restraint system shall contain no metal components.

a. Manufacturers:

- i. NAPCO, C900/RJ Certa-Lok.
- ii. NAPCO, C900/RJIB Certa-Lok.
- iii. Or approved equal.

2. Wedge Style Mechanical Joints: Restraint devices shall consist of multiple gripping wedges incorporated within a mechanical joint follower gland, that when actuated, impart increasing resistance to pipe separation as pressure increases. Restraint nuts must be shear type torque design. Restraint devices shall meet or exceed the performance specifications of: AWWA C110, AWWA C153, and AWWA C110.

a. Manufacturers:

- i. EBAA, Megalug 2000PV.
- ii. Tyler Union, Series 2000 Tufgrip.
- iii. Star Pipe Products, Stargrip 4000 Series.
- iv. Or approved equal.

- b. Restrained Joints on straight pipe, larger than 16 inches in nominal diameter, refer to Section 4.8 Ductile Iron Pipe

2. Restrained Joints on Pipe Fittings and Valves

- a. Use concrete thrust block as outlined on Standard Construction Drawing WR-04 at location indicated on the drawings as the primary method of restrain for PVC C-900 pressure pipe size 4-inch to 16-inch in diameter.
- b. Restrained Joints on Pipe, Larger than 16 inches in nominal diameter, refer to Section 4.8 Ductile Iron Pipe

D. Product Delivery, Storage and Handling

1. Handling

- a. Use wide fabric choker slings, do not drop pipe, do not use hooks, use extra care when handling and installing PVC pipe during cold weather due to reduced impact resistance.
2. Storage
 - a. Protect piping from exposure to sunlight, store and use lubricants in a manner that will avoid contamination, store loose rubber gaskets in a cool, dark location away from grease, oil, and ozone producing electric motors, store pipe on a surface which provides even support. Do not store pipe in such a way as to be supported by the bell. When pipe arrives on site, clean pipe and wrap the ends. Store above grade on pallets.
- E. Inspection
1. Promptly remove PVC pipe with any of the following visual defects from the project site:
 - a. Pipe that is out-of-round to prohibit proper joining
 - b. Improperly formed ends
 - c. Fractured, cracked, chipped, dented, or otherwise damaged pipe.
 - d. Pipe that has been damaged during shipment or handling.
- F. Preparation
1. Straight Pipe Runs: Cut pipe smooth, straight, and at right angles to the pipe axis with saws or pipe cutters designed for the material. Remove any burrs and dust from the jointing surfaces. Bevel cut ends in accordance with manufacturer's recommendations.
- G. Installation
1. Prior to making up pipe joints, clean the socket and plain end of the pipe and apply pipe lubrication meeting the requirements of AWWA C111.
 2. Insert the plain end of the pipe into the socket and press the gasket into its proper position within the socket.
 3. Tighten bolts on joint restraint harness to the torque recommended by the manufacturer.
 4. Do not disturb previously completed joints during the joining operation.
 5. Restraint hardware shall be stainless steel.
 6. All pipe less than or equal to 12-inches in diameter shall be manually assembled. No mechanical equipment (i.e.: backhoe) shall be allowed. Pro-Pipe Eagle-Claw or equal is acceptable to assemble pipe.

7. For pipes greater than 12-inches in diameter, Contractor is allowed to use hydraulic jack/bore if granted approval from the City.
8. In the event that installation of the pipe and/or appurtenances are installed in such a manner that voids the manufacturer's warranty, then the Contractor shall be responsible for correcting the pipe and/or appurtenances installation issue. City acceptance of the pipe system will only be granted if the manufacturer's warranty can be guaranteed by the manufacturer in the form of an acceptance letter.

4.8 DUCTILE IRON PIPE

1. General

- A. Ductile iron pipe, joints, fittings, gaskets, and pipe lining and coating.
- B. Standards The most recent AWWA standards shall be followed for manufacture and installation
 1. ANSI/AWWA C104/A21.4 Cement-mortar Lining for Ductile Iron Pipe and Fittings for Water
 2. ANSI/AWWA C105/A21.5 Polyethylene Encasement for Ductile Iron Pipe Systems
 3. ANSI/AWWA C110/A21.10 Ductile Iron and Gray Iron Fittings, 3-in. through 48-in. for Water and
 4. Other Liquids
 5. ANSI/AWWA C111/A21.11 Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings
 6. ANSI/AWWA C115/A21.15 Flanged Ductile Iron Pipe with Ductile Iron or Gray Iron Threaded Flanges
 7. ANSI/AWWA C150/A21.50 Thickness Design of Ductile Iron Pipe
 8. ANSI/AWWA C151/A21.51 Ductile Iron Pipe, Centrifugally Cast for Water
 9. ANSI/AWWA C153/A21.53 Ductile Iron Compact Fittings, 3-in. through 24-in. and 54-in. through 64-in. for Water Service ANSI/AWWA C600 Installation of Ductile Iron Water Mains and their Appurtenances
- C. Submittals
 1. Submit one copy to the City of Folsom the following information: Manufacturer's certificates of compliance with the specified standards, shop drawings that provide a detailed drawing showing alignment of pipes, location of valves, fittings, and appurtenances, type of joints, connections to structures and thrust restrain details. Also provide product data such as description of fittings, gaskets, couplings, grooving of pipe and fittings, pipe linings, and coatings.

2. Products

A. Ductile Iron Pipe

1. Type: Conforming to AWWA C 150 and AWWA C 151 with minimum pressure class 350 for pipe diameter less than or equal to 14"; minimum pressure class 250 for pipe diameter 16" through 20"; minimum pressure class 150 for 24" and larger.

2. Pipe Joints

- H. a. Use push-on type joints on buried pipe unless restrained joints are specifically indicated on the Drawings.

- I. b. Use restrained joints on buried piping on fittings that create a change in pipe size and on fittings that result in a change of direction, whether the change is in horizontal plane or a vertical plane.

- J. c. Use flanged joints on all exposed pipes. Use flanged joints in buried situations only where flanged joints are specifically indicated on the Drawings.

- K. d. Exposed Piping: To the greatest extent possible, use factory-assembled pipe spools with flanges for exposed piping. Field cutting pipe to match field conditions will be allowed in limited quantities as determined by the Construction Manager.

3. Flanged Joints

- a. screw-on type with diameter, thickness, bolt holes, and other characteristics conforming to ANSI B 16.1.
- b. Material: Ductile iron.
- c. All flanges shall be installed squared up to the pipe segment the flange will be mounted to so that the flange is perpendicular to the long axis of the pipe on both horizontal and vertical axes.
- d. Bolt Holes on Flanges:
 1. 2-holed and aligned at both ends of pipe.
 2. Cap Screw or Stud Bolt Holes: Tapped.
- e. Bolts and Nuts: Conform to ANSI/ASME B 16.1.
- f. Aboveground and Exposed Pipe: Corrosion resistant, high strength, low alloy.
- g. Underground, in concrete pipe valve boxes, or underwater: Use Type 304 or Type 316 stainless steel.
- h. Cut and finish bolts to project a maximum of 1/4 inch beyond nut when joints are assembled.

4. Mechanical Joints

- a. Joint Design: In accordance with AWWA C 111/ANSI A 21.11.

5. Restrained Mechanical Joints

- a. Design: Lug-type joint.
 - b. Manufacturers: EBBA Iron, Megalug, or equal
- 6. Single Bolt Restrained Joint
 - a. Design: Single Bolt Type
 - b. Manufacturer, one of the following or equal:
 - 1. Romac Industries, Alpha (4"-12")
 - 2. EBAA Iron, Megalug for greater than 12" diameter
- 7. Push-on Joints
 - a. Design: Gasketed type joint suitable for buried service.
 - b. Conforming to AWWA C 111.
 - c. Manufacturers: One of the following, or equal:
 - 1. Fastite Joint as manufactured by American Cast Iron Pipe Company.
 - 2. Pacific States Cast Iron Pipe Company.
 - 3. Tyton Joint as manufactured by U.S. Pipe.
 - d. Not permitted on fittings or specials, unless otherwise specified.
 - e. Joint Deflection: Provide an allowable deflection up to 5 degrees at specified pressures.
 - f. Make joint assembly and field cut joints per AWWA C600 and manufacturer's recommendations.
- 8. Restrained Push-On Joints
 - a. Design: Gasketed type restrained joint suitable for buried service.
 - b. Manufacturers: One of the following, or equal:
 - 1. American Flow Control, Flex-Ring
 - 2. U.S. Pipe, TR Flex
- B. Gaskets
 - 1. Push-on Joints and Mechanical Joints: Synthetic rubber compound in which the elastomer is Styrene Butadiene Rubber (SBR) and conforming delivery to AWWA C111 unless there are hydrocarbons present. If hydrocarbons are present specify Buna-N.
 - 2. Flanged Joints: SBR unless there are hydrocarbons present. If hydrocarbons are present specify Buna-N.
- C. Pipe Lining

1. Cement Mortar Lining for potable water, recycled water and raw water.
 - a. Cement-mortar Lining: Except otherwise provided herein, interior surfaces of all ductile iron pipe, fittings, and specials shall be cleaned and lined in the shop with a standard thickness cement-mortar lining applied in conformity with AWWA C104, Portland cement mortar. Every precaution shall be taken to prevent damage to the lining. If lining is damaged or found faulty at delivery site, the damaged or unsatisfactory portions shall be repaired or replaced with lining conforming to these Specifications.

D. Pipe Coating

1. See Section 4.8.F – Cathodic Protection

E. Ductile Iron Pipe Appurtenances

1. Dismantling Joints
 - a. Flange Spool: AWWA Class D Steel ring flange. Pipe is ASTM A36 plate.
 - b. End Ring and Body: ASTM A36 steel.
 - c. Gaskets: SBR made from rubber compounded for water and sewer service.
 - d. Bolts and Nuts: Type 304 stainless steel conforming to ASTM A588.
 - e. Pressure: Rated to 150 psi.
 - f. Manufacturers: Romac Industries, Alpha (4"-12") or equal. For pipe diameter larger than 12" use Romac Industries, DJ400 or equal.
2. Lug-type Restrained Flange Adapters
 - a. Use lug type restrained flanged adapters when connecting flanged joints on pipe, fittings, or valves to straight pipe that has been cut to length in the field.
 - b. Material: Ductile iron conforming to ASTM A536.
 - c. Restraint Mechanism: Consists of multiple gripping wedges designed to maximize restraint capability. Use torque limiting actuating screws to insure proper initial set of gripping wedges. Restrained flange adapters using set screws are not acceptable.
 - d. The flange adapter shall be capable of deflection during assembly, or permit lengths of pipe to be field cut, to allow a minimum of 0.6" gap between the end of the pipe and the mating flange without affecting the integrity of the seal.
 - e. Manufacturers: EBAA Iron Inc. Series 2100 Megaflange, or equal.

F. Cathodic Protection

1. Ductile Iron Pipe and Cement Mortar Lined and Coated Steel Pipe

a. Must be designed in accordance with most relevant industry standards such as NACE International SP0169 and SP0286.

b. Ensure pipeline is electrically continuous throughout the alignment.

2. Polyethylene Encasement

a. Design: Encase all underground ductile iron pipe in double wrap 8-mil high density, cross laminated polyethylene film. Must meet all requirements of ANSI/AWWA C105/A21.5 standard for polyethylene encasement. Seal all ends with two layers of 3M Tape.

3. Delivery, Storage and Handling

A. Block piping material for shipment, prevent damage to castings and linings.

B. Carefully handle piping material during loading, unloading, and installation. Do not drop piping material from cars or trucks. Lower piping material by mechanical means. Do not drop or pound pipe to fit grade.

C. Repair damaged cement mortar lining to match quality, thickness, and bonding of original lining in accordance with AWWA C 104. When lining cannot be repaired or repairs are defective, replace defective piping with undamaged piping.

D. Protect gaskets and polyethylene encasement from long term exposure to sunlight.

E. Store piping, fittings and other accessories such that they do not accumulate and hold rainwater, dirt, and debris, with all ends covered and sealed.

F. Pipe shall be covered on both ends prior to placement in the trench, the pipe shall not remain in the trench uncovered overnight.

G. Fabrication of pipe shall be no older than 18 months prior to installation.

4. Installation

A. General

1. Install ductile iron piping in accordance with AWWA C 600.

2. Lay mechanical joint or bell and spigot pipe to manufacturer's recommendation and warranty on space between the spigot and shoulder of the pockets. Pipe will be rejected if outside of these installation requirements.

B. Polyethylene Encasement

1. Wrap ductile iron pipe to be buried with polyethylene encasement in accordance with ASTM A 674 and AWWA C 105.

2. Repair tears and make joints with two layers of 3M tape or equal.

4.9 VALVES

1. General

A. Quality Assurance

Unless specified otherwise, each valve body shall be tested with a water test pressure equal to twice its working pressure rating.

B. Warranty

Supplier warrants equipment (and its component parts) against defects in materials and workmanship under normal use for two years, or the length of the manufacturer's warranty whichever is greater, after the date of Agency's final acceptance and start of beneficial use of the equipment in accordance with the Contract Specifications.

2. Products

A. General

1. Valves 10-inches and smaller shall be gate valves
2. Valves 12-inches and larger shall be butterfly valves
3. Furnish valves, actuators, stem extensions, and other accessories as indicated:
 - a. Unless otherwise indicated, provide valves of same size as upstream pipe size.
 - b. Valves and gates shall be new and of current design.
 - c. Valves of the same type shall be identical and supplied by a single manufacturer.
4. Valves 6-inches and larger shall have actuators with position indicators on above ground applications.
5. Valves and actuators shall have the name of the manufacturer, nominal size, flow direction arrow (where appropriate), design working pressure, and the reference standard cast in raised letters or indelibly marked on an appropriate part of the body.
6. Valves for service in fire protection systems shall be Factory Mutual approved.
7. Valve Ends:
 - a. 3-inches and smaller: Threaded or soldered ends.
 - b. 4-inch thru 12-inch (Where applicable use single bolt type, Alpha End shall be used):
 - 1) Buried: Flanged, ANSI A21.11
 - 2) Buried: Single Bolt Type, Alpha End, American Flow Control or Equal
 - 3) Buried: Push-on restrained joint, Flex Ring, American Flow Control or equal
 - 4) Buried: Restrained Mechanical Joint, EBBA Iron or equal.

- 5) Others: Flanged, ANSI, 125 pounds
- c. Greater than 12-inch:
 - 1) Buried: Flanged, ANSI A21.11
 - 2) Buried: Push-on restrained joint, American Flow Control or equal.
 - 3) Buried: Restrained Mechanical Joint, EBBA Iron or equal.
- 8. Shop Painting:
 - a. Shop paint all ferrous metal surfaces of valves and accessories, both interior and exterior, for corrosion protection. Comply with AWWA C550.
 - b. Materials:
 - 1) Asphalt varnish: TT-U-51.
 - 2) Coal tar: Koppers "Bitumastic Super Tank Solution," Tnemec, or equal.
 - 3) Epoxy: Tnemec "Hi-Build Epoxoline," Carboline, or equal.
 - 4) Rust-inhibitive primer: Tnemec "77 Chem-Prime," Carboline, or equal.
 - 5) Rust-preventive compound: Houghton "Rust Veto 344," "Rust-Oleum R-9," or equal.
 - c. Surfaces to be painted:
 - 1) Unfinished surfaces:
 - a) Interior: Epoxy.
 - b) Exterior to be buried, submerged, or located in manholes: Asphalt varnish or coal tar.
 - c) Other exterior: Rust-inhibitive primer.
 - 2) Polished or machined surfaces: Rust-preventive compound.
 - 3) Operators and accessories: Rust-inhibitive primer.
- 9. Actuators:
 - a. Valve stem to be stainless steel.
 - b. Provide manual actuators for all valves not specified to be power actuated or designed for automatic operation:
 - 1. Buried valve, valves operated through floor boxes: 2-inch Wrench nuts.
 - a) AWWA C504, C508, or C517.
 - b) Provide two operating keys.
 - b. Rotation:

1. Counterclockwise (to the left) to open.
 2. The word "OPEN" and an arrow indicating direction to open cast on each valve body or operator.
- c. Extension stems:
1. Extension stems are required for any valve actuator located below five feet in depth to finish grade. Stem should extend within 18 inches of grade.
 2. Non-rising stems:
 - a) Solid steel shafting with OD not less than OD of valve stem or galvanized steel pipe with ID not less than OD of valve stem.
 - b) Connected to valve by a flexible socket coupling.
 3. Buried valves:
 - a) Stem to extend within 18-inches of grade.
 - b) Provide spaces to center stem in valve box.
 - c) Provide wrench nut.
10. Valve boxes:
- a. Provide for all buried valves, C900 PVC extension sleeve with Christy G5 boxes (Brooks or equal) and cast iron traffic covers.
 - b. Extensions sleeve depth as required for valve, extension sleeve minimum diameter is 8-inches. Box, cover, and base coated shall be dipped in asphalt varnish.
 - c. Provide an appropriate word designating the valve service cast on the cover. Also, provide locking grade rings as necessary for proper installation.
11. Resilient-Seat Gate Valves (3"-10")
1. Features
 - a. Conforms to AWWA C515 (3" thru 10")
 - b. Ductile iron body
 - c. Resilient seat, bronze mounted
 - d. Full port
 - e. Design working pressure: 250 psig
 - f. Coatings and Linings:
 1. Conform to AWWA C550 fusion bonded epoxy.
 2. For potable water applications, epoxy lining shall be NSF 61 approved.

- g. Manufacturers and Products (or equal):
 - 1. American Flow Control, AWWA C515.
 - 2. Mueller 2360 (3" thru 10")
 - 3. M&H Valve; AWWA C509 (3" thru 12")

12. Butterfly Valves

- 1. Comply with AWWA C504
- 2. Butterfly valve stem to be located on curb side if possible
- 3. Materials:
 - a. Valve bodies:
 - 1) ASTM A126, Class B or ASTM A536 Grade 65-45-12 ductile iron.
 - b. Valve shafts:
 - 1) Stainless steel, 18-8, Type 304 or 316.
 - c. Valve discs:
 - 1) ASTM A48, Class 40 cast iron.
 - 2) ASTM A536 Grade 65-45-12 ductile iron.
 - 3) ASTM A436, Type 1 alloy cast iron.
 - 4) Bronze in accordance with AWWA C504.
 - d. Valve Seats:
 - 1) Natural rubber.
 - e. Mating Surface:
 - 1) ASTM A276, 18-8, Stainless steel or bronze.
 - f. Valve Coating: Epoxy coat per AWWA C550 both inside and out.
- 4. Design Requirements:
 - a. Seat Type:
 - 1) Resilient.
 - 2) Comply with AWWA C504.
 - b. Direct buried valves:
 - 1) All valves: Flanged, Class 150A design per AWWA C504. Working pressure rated for 150 psi.
- 5. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:
 - a. Clow Series 4500 or equal

- b. Pratt Groundhog or equal

13. Combination Air-release and Vacuum-relief Valves

1. General

- a. Provide valves with the inlet and orifice sizes indicated. If the orifice sizes are not indicated, propose an orifice size suitable for the proposed operating conditions for each valve as part of the submittal.
- b. Operating pressures: 150 psi minimum. Provide valves with higher pressure ratings where indicated or as necessary to meet test pressure.
- c. Provide valves of the type, and size, and in the location indicated.

2. Combination Air Valves

- a. One and Two Inch:
 - 1) Type: Single body. Inlet/Outlet shall be NPT
 - 2) Manufactured by model: ARI Model D-020, APCO Series 140C, or approved equal.

14. Blow-off Valves

- 1. Blow-Offs shall conform to Standard Drawing WR-05 and WR-06 and shall be a minimum of four-inch diameter.
- 2. All blow-off on distribution main, typically cul-de-sacs, and including low point flushing locations shall be fire hydrants.
- 3. Blow-off on transmission mains shall be four-inch diameter or greater and shall be fire hydrants.
- 4. Stub streets for future extensions and commercial services three inches and larger shall include a four-inch blow-off per Standard Drawing WR-05, except that for commercial services, the only required blow-off (per the service size) will be at the main.

3. Product Delivery

- A. Prepare Valves and Accessories for Shipment According to AWWA C500, Section 31 and:
 - 1. Seal valve ends to prevent entry of foreign matter into valve body.
 - 2. Box, crate, completely enclose, and protect valves and accessories from accumulations of foreign matter.

4. Installation

- A. General Valve Installation:
 - 1. Install valves and accessories in accordance with manufacturer's recommendations.

2. Set valve and valve boxes plumb.
 3. Install valve box directly over valve it serves with top of box flush with finish grade. Provide concrete ring per valve box detail in contract Drawings.
 4. Fill around box with earth and thoroughly tamp on all sides.
- B. Combination Air-Release and Vacuum-Relief Valves:
1. Install vent pipe such that there is a minimum of 12-inches between the vent opening and the finished grade.
- 5. Adjustments**
- A. Check and adjust valves and accessories for smooth operation in accordance with manufacturer's instructions.
- 6. Testing**
- A. Following installation, test each valve as part of the pipeline the valve is attached to demonstrate the intended operation and zero leakage when closed.

4.10 FIRE HYDRANTS

1. General

A. Submittals

Provide one copy to the City of Folsom the following information: Submit manufacturer's literature and illustrations sufficient to verify compliance with the specifications, shop drawings, including dimensions, construction details, materials, assembled weight, installations instructions, maintenance data, parts list, proof of design test reports, etc.

B. Warranty

Supplier warrants equipment (and its component parts) against defects in materials and workmanship under normal use for a minimum of one year after the date of Environmental and Water Resource Department's final acceptance, or manufacturer's warranty whichever is greater, and start of beneficial use of the equipment in accordance with the Contract Specifications.

2. Products

Fire Hydrants

- A. Conform to AWWA C502 – Latest Revision and Drawing WR-08.
- B. Information Required by AWWA C502, Section 2:
1. Affidavit of compliance: Not required.
 2. Catalog and maintenance data: Review before manufacture.
 3. Type of shutoff: Gate Valve.

4. Size of hydrant: 6-inch, flanged.
 5. Inlet connection: 6-inch, flanged.
 6. Harnessing lugs: Not required.
 7. Outlet nozzles: Two 2 1/2-inch hose and one 4 1/2-inch pumper.
 8. Outlet nozzle threads: NFPA #194 for national standard fire hose coupling screw threads.
 9. Direction to open: Counterclockwise.
 10. Stem seals: O-ring.
 11. Outlet nozzle cap chains: Required.
 12. Drain outlet: Required.
- C. Foot piece shall have an inlet size for connecting to pipe of not less than 6 inches and shall be suitable for flanged end pipe.
- D. Hydrants are to be furnished without a drain opening in the base; if manufactured with such an opening, it shall be plugged.
- E. Manufacturer: Jones J-4060, Clow Model 960, or equal.

3. Inspection

- A. Fire Hydrants:
1. Thoroughly inspect.
 2. Thoroughly clean interior.
 3. Open and close hydrant as many times as required to ensure parts are in proper working order, valves are seating properly, and drain valve is operating freely.
 4. Check the packing gland to determine if packing is in-place and gland nut is properly tightened.

4. Installation

- A. Fire Hydrants:
1. Set for required minimum pipe cover over supply line and to keep nozzles 18-inches minimum above the sidewalk or finished ground surface, whichever is higher.
 2. Anchor in place or block adequately to prevent hydrant from blowing off supply connection.
 3. Provide four cubic feet of gravel or crushed stone around hydrant and below top of supply pipe.
 4. Install plumb.

5. Install hydrants with pumper nozzles such that hose nozzles are parallel with, and pumper nozzle is perpendicular to edge of road.
6. Install hydrants with two hose nozzles 90 degrees apart so that line bisecting the 90 degree angle is perpendicular to edge of road.
7. In no case shall a fire hydrant be installed within three feet of a building or any other structure that would limit access.
8. Cover hydrant with burlap bag until tested and placed in service.
9. Per City of Folsom Standard Drawing WR-8 located in Appendix C.

5. Abandoning Existing

- A. All existing fire hydrants located on the mains to be removed and abandoned are to be replaced with new hydrants, 6-inch laterals, and 6-inch gate valves.
 1. All existing hydrants must remain in service at all times during construction.
 2. Only after the new hydrants are in service can the existing hydrants be removed and laterals abandoned.

4.11 FITTINGS AND GASKETS

1. General

- A. Flexible couplings for use in pressure piping.
 - B. Rubber bellows couplings.
- Rubber gaskets for push-on compression type joints.

2. Products

Flexible Couplings (Pressure Piping)

- A. Manufacturers: On of the following or equal:
 1. Unrestrained
 - a. Dresser Industries Style 253, Romac Industries, Inc. Style 501, Smith-Blair, Inc. Series 441, or approved equal.
 2. Restrained
 - a. Ebba Iron Mega Lug Series 3800, Romac Industries 400 RG, Smith Blair Series 470, or approved equal.
- B. Materials
 1. Center Sleeve: Ductile iron, ASTM A536
 2. Follower Flanges: Ductile iron, ASTM A536
 3. Bolt and Hex Nuts

- a. Above Ground: High strength, low alloy steel.
- b. Buried and Underwater: Type 316 stainless steel.
- C. Coating and Lining: Provide product with fusion bonded epoxy.

Flanged Coupling Adapters, 12" and smaller (Pressure Piping)

- A. Manufacturers: One of the following or approved equal:
 - 1. Dresser Industries Style 127, Romac Industries Style FCA501, Smith-Blair Series 912.
 - 2. Provide restrained flanged coupling adapters where indicated on the Plans.
- B. Materials
 - 1. Flanged Body: Ductile iron, ASTM A126 or ASTM A536.
 - 2. Follower Ring: Ductile iron, ASTM A536.
 - 3. Bolts and Hex Nuts
 - a. Above Ground: High strength, low alloy steel.
 - b. Buried and Underwater: Type 316 stainless steel bolts.
- C. Flange Design: In accordance with AWWA Class D with ANSI 150 pound drilling.
- D. Coating and Lining: Provide product with shop-applied primer, which is compatible with finish coating to be applied in the field.

Flexible Couplings (Non Pressurized Piping)

- A. Flexible couplings shall be rubber, full-circle, clamp-on type provided with two stainless-steel band, screw clamps to secure the coupling tightly to entering and exiting pipes. All screw-clamp hardware shall be Type 316 stainless steel. Rubber material shall be suitable for sewage service. Use Fernco Series 1056, Calder, or equal.

Transition Couplings

- A. Application: Use transition couplings with function and design similar to flexible couplings and flanged coupling adapters for connecting piping having different outside diameters.
- B. Install transition-coupling products specifically designed and manufactured for that application.

Rubber Bellow Flexible Couplings

- A. Neoprene bodied, flanged connection, pressure rating shall be 75 psi, minimum
- B. Manufacturer: Red Valve, Metaflex or approved equal

Dismantling Couplings

- A. Steel Bodied, Flange Connection

- B. Manufacturer: Romac DJ400, Smith Blair 975 or approved equal

Joint Gaskets

- A. Gasket: Conform to ASTM F477.
- B. Gasket: A synthetic rubber compound in which the elastomer is neoprene.
 - 1. The compound shall contain no less than 50 percent by volume neoprene and be free from factice, reclaimed rubber and other deleterious substances.
- C. The compound shall meet the following physical requirements when tested in accordance with the specified ASTM standards.
 - 1. Tensile Strength (ASTM D412): 1,500 psi minimum and the ultimate elongation shall be 350 percent minimum.
 - 2. Hardness (ASTM D2240, Type A Durometer): Hardness in the range of 35 to 50 for concrete spigots and 50 to 65 for steel spigots.
 - 3. Compression Set (ASTM D395):
 - a. Not to exceed 20 percent when compressed for 22 hours at 70 degrees
 - b. The test specimens:
 - 1) Circular discs cut from the gaskets.
 - 2) Height: 0.500 (+ 0.005 - 0.025) inches.
 - 3) Diameter: That of the gasket but not to exceed 1.129 + 0.010 inches in diameter.
 - 4. Aging (ASTM D573)
 - a. The test specimen deterioration: Less than 20 percent reduction in tensile strength, 40 percent reduction in ultimate elongation, and 15 points increase in hardness.
 - 5. Effect of Liquids (ASTM D471): The maximum volume change in oil and in water shall be as follows:
 - a. Oil: 100 percent in ASTM oil No. 3.
 - b. Water: 15 percent.
 - c. Circular discs cut from the gasket.
 - d. The test specimens thickness: 0.080 +0.005 inches
 - 6. Ozone Cracking (ASTM D1149)
 - a. Test specimen: A gasket loop mounted to give at least 20 % elongation.
 - b. No cracking visible at two times magnification of the gasket after 100 hours exposure to 1 mg/l ozone at 40 degrees C.

3. Installation

A. Flexible Coupling

1. Install pipe couplings with gap between pipe ends in accordance with the following table.
2. Install flexible coupling with pipe gap located in middle of center sleeve.
3. Install flexible couplings with joint restraint tie rods and harnesses unless specifically shown otherwise on the Drawings.
4. Restraint hardware to be stainless steel.
5. Install tie rods across flexible coupling for joint restraint as indicated:

Center Ring Length	Gap Dimension and Tolerance
4 inch through 6 inch	3/8 inch plus or minus 1/8 inch
7 inch	5/8 inch plus or minus 1/8 inch
10 inch and greater	7/8 inch plus or minus 1/4 inch

B. Flanged Coupling

2. Install flanged coupling adapter with end of plain end pipe in middle of flanged coupling body.

4.12 WATER SERVICES AND APPURTENANCES

1. General

The Work of this section consists of furnishing and installing all materials necessary to provide complete water services, from water main to house connection. Work shall be in accordance with the City of Folsom Design and Construction Standards and as supplemented herein.

2. Products

Water Services

- A. Refer to City of Folsom Water Construction Standard Details for typical water service material and installation requirements.
- B. Water service pipes, water meters and backflow devices shall all be the same size. "Necking" down of piping is not be allowed.
- C. Service type

Two Inches and Smaller

- A. Meters 2-inch and smaller will be installed by the City. 3-inch or larger to be installed by contractor.

- B. Water services shall be only blue, high-density polyethylene (PE) tubing, copper tubing size, Material Code PE 3406, pressure class 200 psi minimum, AWWA designation C901, ASTM designation D3350.
- C. The tubing shall be clearly marked with the following: nominal size, material code, the word "Tubing" and the dimension ratio, AWWA pressure class, AWWA designation C901, manufacturer's name and trademark and seal of testing laboratory.
- D. Brass pipe shall conform to ASTM B-43 standards. A listing of approved pipe include: Hallstead ¾-inch through 2-inch Red Brass, Cambridge-Lee, Federal WW-351, Wolverine (Lead free).
- E. Brass fittings shall conform to ANSI Standard B16.15, B16.24, B2.1, T-94-1 and be a minimum of Class 125 (Lead free).
- F. Corporation stops shall be ball valves, male iron pipe thread quick joint compression type. A corporation stop shall be installed at the water main for all service laterals 2 inches and smaller. Following are approved products, each catalogue number applying to ¾-inch through two inch valves.
 - 1. Ford, James Jones, Mueller, or approved equal
- G. Angle meter stops shall be used for ¾-inch to 2-inch meters only. They shall be quick joint compression type at the service line connection and flanged for 1½-inch and 2-inch at the meter. Following are approved angle meter stops:
 - 1. Ford, Jones, Mueller, or approved equal
- H. Threaded Meter Flanges fittings shall go on the rear of the meter for connection on-site. It is a female IP flange, and shall include a one foot brass pup to penetrate the rear of the meter box.
 - 1. Ford, Jones, or approved equal
- I. Pipe Service Saddles shall be solid brass or double strap brass only for mains up to and including 12-inch diameter, with IP outlet threads. Stainless steel bands may be used for mains larger than 12-inch as specified below. Approved manufacturers and design series are listed below:
 - 1. Ford, James Jones, Mueller, or approved equal
- J. All meters shall be purchased through the Environmental & Water Resources Department Water Meter Division. Call (916) 461-6184 for information.
- K. All domestic meters 3" and larger shall have a bypass. See Water Standard Drawings for details.
- L. Meter idlers shall be installed by the contractor prior to installation of the meter by the City on assemblies 2-inch or less. Meter idlers shall be PVC Schedule 80.

- M. Flange bolts and nuts shall conform to a minimum ASTM #A307. Bolts less than ¾ inches in diameter shall be a minimum Grade B (heavy hex). Bolts ¾ inches and larger in diameter shall be a minimum Grade A (standard hex).
- N. Blocking for Meter Boxes shall be Slump Block - 4"x4"x15½"
- O. All Service Boxes and Lids are to be permanently marked with the appropriate label (i.e., Water, ARV, Blow-Off, CPT, etc.). For banked residential meters, boxes are to have the addresses on tags attached to the corresponding water meter. In commercial projects, meter lids shall be stenciled with the number address it serves. The numbers shall be painted using white enamel paint and 2-inch stenciling. A list of approved box manufacturers include Christy and BES. Part reference numbers are shown below:

Meter Size	Meter Box	Box Size	Lid
1"	B16		B16GP
1-1/2"	B30		B30GP
2"	B36		B36GP
3" Compound	R27P36	48"L x 48"W x 36"H	RAF-R27SA Single Door
4" Compound	R27P36	48"L x 48"W x 36"H	RAF-R27SA Single Door
6" Compound	R33P36	60"L x 48"W x 36"H	RAF-R33SA Single Door
8" Compound	R37P36	84"L x 48"W x 36"H	RAF-R37SA Single Door
3" Turbo Irr	B48		B48-62GP
4" Turbo Irr	B48		B48-62GP
6" Turbo Irr	B52		B52-62GP
8" Turbo Irr	B52		B52-62GP

- P. No meter box extensions shall be used without the approval of the City.
- Q. Meter boxes to be set prior to flushing and disinfection.
- R. Riser stock for curb stops shall be schedule 40 PVC. The riser shall be 4-inch diameter inside meter boxes, and 6-inch diameter for curb stop type valves in valve boxes. Riser stock shall be 8-inch diameter PVC C-900 for all main line valves.
- S. Pressure regulators shall be required when the static pressure of the water system exceeds 70 PSI. The regulator shall be installed on the water service riser at the building. For private residences and businesses, the regulator brand shall be designated by the architect/engineer. For City-funded projects/buildings, following is the list of approved pressure regulators: Watts (¾-inch through 2-inch, UB5-series), Wilkins, or approved equal.

- T. Approved manufacturers for dielectric tape include Polyken #932 Hi-Tack joint wrap tape equivalent flexible dielectric tape.

Three Inches and Larger

- A. Material requirements and installation of water services three inches and larger shall conform to appropriate sections of these specifications addressing PVC-P and DIP and related appurtenances.
- B. Service Manifolds
 - 1. Where a service line is extended a distance greater than 40-feet, a temporary construction jumper shall be installed between the main and the service per Standard Drawing WR-02. The new service line and manifold shall be tested in accordance with these Specifications. Where a service line is less than 40-feet long, the extension shall be cleaned, swabbed with chlorine and flushed in the presence of the Construction Inspector prior to tie-in. The new service line and manifold shall be pressure tested in accordance with these Specifications.
 - 2. Service lines and manifolds 3-inches and larger shall be ductile iron.
 - 3. No water shall be drawn through a service prior to installation of the water meter and testing of the backflow assembly.
- C. Pressure Regulators
 - 1. Pressure regulators shall be required when the static pressure of the water system exceeds 70 PSI. The regulator shall be installed on the water service riser at the building. For private residences and businesses, the regulator brand shall be designated by the architect/engineer. For City-funded projects/buildings, following is the list of approved pressure regulators: Watts or approved equal.
- D. Temporary Blow-offs for Commercial Water Services
 - 1. See Drawing WR-05. Components on the downstream side of the reducer comprise the blow-off assembly and permanent water source for three and four inch water services. The 90 degree elbow is only required where the service line is six inches or larger. Following use of this assembly for loading and testing of six inch and larger services, it is intended the elbow be removed when the service line is extended. The elbow shall also be removed upon the extension of the main for a dead end street. The elbow is intended to facilitate/simplify placement of the thrust block.

3. Location

- A. Final location of meter boxes shall be determined in the field by the Environmental and Water Resources Department. Locations will be determined by minimizing the obstructions to the point of connection with the service. All buildings with an address

shown on the plans are to receive new services. Residential meters are not to be placed in hardscape areas or driveways without approval from the City.

- B. Banked residential meters required for I-Courts.
- C. For banked residential meters, boxes are not to be placed in hardscape areas, but in the landscape area behind the sidewalk.

4. Installation

- A. Water services shall be installed in accordance with the following:
 - 1. Blue polyethylene tubing shall be continuous; no splice shall be allowed in between the water main saddle and the angle meter stop. Curves in HDPE tubing shall be made in a manner that does not crimp or flatten the tubing.
 - 2. Subdivisions for single-family residences and duplexes are one inch in diameter polyethylene (CTS) services encased in a 2-inch PVC sleeve.
 - 3. There shall be a minimum separation of 18 to 24 inches between taps, service saddles and fittings attached to the main.
 - 4. Service saddles shall be wrapped and sealed in 8-mil minimum thickness polyethylene and backfilled with sand. Use vinyl tape to secure and seal the polyethylene wrap.
 - 5. At residential water service locations, the curb shall be stamped with a "W."
 - 6. Stainless steel tubing inserts shall be used in the compression connections of all HDPE service tubing.
 - 7. Where a service line is extended a distance greater than 40 feet, a temporary construction jumper shall be installed between the main and the service per Standard Drawing WR-01. The new service line and manifold shall be tested in accordance with these Specifications. Where a service line is less than 40 feet long, the extension shall be cleaned, swabbed with chlorine and flushed in the presence of the Construction Inspector prior to tie-in. The new service line and manifold shall be pressure tested in accordance with these Specifications.
 - 8. Service lines and manifolds 3 inches and larger shall be ductile iron.
 - 9. No water shall be drawn through a service prior to installation of the water meter and testing of the backflow assembly.

5. Making Service Connections

- A. All services shall be located on the correct lot. The service lines from the water main to the meter box shall be constructed at the time of construction of the main. Prior to making the final service connection from the meter box the service tie-in location, the water main shall be disinfected and pressure tested and shall pass bacteriological

testing. New services shall be connected to existing services using approved flexible connectors.

- B. No water to be used through a domestic or irrigation service until meter is installed and backflow device is certified.

4.13 BACKFLOW ASSEMBLIES, DOMESTIC FIRE

1. General

- A. Backflow Assemblies shall be installed as indicated within the City of Folsom Standard Construction Drawings and Specifications.

2. Products

A. Materials:

1. All Backflow Assemblies shall be lead free.
2. Approved Domestic Assemblies Devices shall be from the most current USC approved list.
3. Approved Fire Assemblies Devices shall be from the most current USC approved list.
4. Appurtenances
 - a. Telemetry Conduit - Telemetry conduit shall be minimum 1-inch diameter Schedule 80 PVC or polyethylene ("Inter-Duct") pipe. Both shall have a nylon pull string.
 - b. Backflow Assembly Support Stands and Saddles - Stands: Placer Waterworks series PW/PS; Saddles: Placer Waterworks series PW/SDL.
 - c. Freeze Protection - Backflow assemblies shall be covered with a freeze protection insulated bag or insulated security cage per these Specifications. Following is a list of approved freeze protection materials/components:
 - i. Laminated fabric conforming to Herculite #10 by Herculite
 - ii. Products (fabric shall be a minimum of 10.6 oz/sq. yd.)
 - iii. Brass Rolled Rim Grommet and spur washer by Astrup.
 - iv. Polyester thread with a minimum strength of 14.2 pounds, Coats American's Star Ultra product line.
 - v. Fiberglass insulation R-19 rated, 6-inch minimum thickness.
 - a. Two-inch minimum width Velcro.
 - b. Nylon zip ties.

B. Temporary Backflow Devices

1. A backflow assembly shall be required for construction and sales trailers or temporary landscape irrigation systems. These backflow devices and those required for loading new water mains shall be certified by a licensed backflow tester and the results provided to the Environmental & Water Resources Department. Water shall only be drawn into the contractor's main through a construction meter. See Standard Detail WR-18 "Temporary Connection for Loading and Testing".

3. Installation

A. General:

1. New Installation of backflow devices shall conform to Standard Drawings WR-09, WR-10, and WR-26. The backflow device shall include the same diameter pipe as the water service.
2. No coatings on the backflow device are allowed.
3. Any requested retrofit installation shall be submitted to the City for approval.
4. Backflows will only be approved if the upstream and downstream pipes are the same size as the backflow assembly.

4.14 REQUIREMENTS FOR TESTING, STERILIZATION AND CONNECTION TO NEW WATER MAINS BACKFLOW ASSEMBLIES, DOMESTIC FIRE

1. General

- A. Construction phases requiring completion prior to testing. Testing of the water system may proceed only after:
 1. Seven day notice is given to City Staff prior to disinfection or shutdown.
 2. Joint utility crossings are completed.
 3. The sewer system has passed the pressure test and TV inspection.
 4. The recycled water system has passed testing.
 5. Street subgrade has passed inspection by the Construction Inspector.
 6. Bases to be lime-treated, cement treated, or localized areas are dug up and new material is placed and compacted shall be pressure tested before and after the disturbance.
 7. An approved backflow device and construction meter shall be installed for loading the new system with potable water.
- B. The contractor is to provide a flushing and disinfection plan for all procedures outlined below.
- C. Contractor to notify any affected customers of water outage caused by contractor shutdowns.

- D. All water appurtenances shall be install prior to performing disinfection. This includes properly functioning combination air vacuum valves and water sampling stations.
- E. Water services will be cut to the proper length in the meter box.
- F. All valves will be exposed and operational.
- G. Water main shutdowns and tie-ins are only to occur Tuesday through Thursday.

2. Products

A. Materials:

- 1. All appropriate equipment to properly flush, pressurize, disinfect and test the water system.
- 2. Refer to Standard Construction Detail WR-18 for requirements regarding temporary connection for loading and testing.

3. On-Site Water System Sterilization Requirements

A. Flushing

- 1. Load and flush the water system at 3 ft/sec to remove debris from all outlets on new system from new or existing blow off. Velocity flushing shall be continuous throughout the duration. Connection to the existing system must be made with an approved and tested RPPA backflow device per WR-18. If pipe is stored without covering the ends, pipes are left with ends exposed in trench overnight, or excessive dirt enters the pipe, then pigging will be required. This pigging will be done at the contractor's expense and no extra contract days will be allowed.

B. Pressure Test

- 1. Contractor shall verify with the Construction Inspector that all system valves are open prior to testing. In pipe installations of 12" or larger, Contractor shall pressure test to every valve.
- 2. The Construction Inspector will be present for the duration of the test.
- 3. Pressure testing shall be conducted for two hours at 150 pounds per square inch, or at one-and-one-half times the operating pressure, whichever is higher, measured at the system high point. The test gauge shall be liquid-filled and of 300 psi maximum capacity.
- 4. No detectable leakage is allowed
- 5. Any repairs or adjustments to the water system to eliminate leaks shall be observed by the Construction Inspector.

C. Chlorine Disinfection & Water Quality Testing

- 1. Disinfection inspections shall begin only after the pressure test has passed.

2. Disinfections will only begin on Mondays or Tuesdays.
3. NSF 60 approved Chlorine shall be drawn through the total system at a rate of 25-50 milligrams per liter (mg/l) so that no point in the system contains less than 25 mg/l or no more than 50 mg/l.
4. City of Folsom Water Quality Division will test chlorine residual immediately following injection process and again 24 hours later.
5. Once the first chlorine test has passed and before the second chlorine test, all of the gate valves in the new water system shall be fully operated to ensure all internal parts of the valve come in contact with the disinfection solution.
6. The disinfection test is considered failed if the chlorine residual is below 10 mg/l after 24 hours and the disinfection procedure must be repeated. If disinfection needs to be repeated the cost is \$200 per attempt.
7. After 2nd test, City of Folsom Water Quality will authorize flushing of chlorinated water from system. The water system shall be flushed until the turbidity is equal to or less than 1 NTU, and less than 1 ppm chlorine residual prior to discharge. The discharge location and neutralization methods shall be documented in the Storm Water Pollution Prevention Plan (SWPPP) and approved by the Construction Inspector.
8. The newly constructed water line will then be filled and pressurized with system water through an approved and tested RPPA backflow device. This water is to remain in the new water line undisturbed until the second bacteriological sample is taken. The Contractor is required to coordinate and pay for the collection and testing of all water samples with a California Department of Public Health certified laboratory. Samples are to be pulled at the same locations that chlorine samples were pulled.
9. Draw 1st bacteria sample (Heterotrophic Plate Count) 16 hours minimum after loading water line with system water.
10. Draw 2nd bacteria sample (Present/Absent Coliform/E-Coli) 24 hours after HPC.
11. HPC: less than 100 Colony Forming Units per mL (CFU/mL)
12. P/A: Not Detected
13. The bacteriological test is considered failed and sterilization must be repeated if lab results indicate excessive HPC (>100) and/or present Coliform/E-Coli.
14. Provide both test results and copies of chain of custody to the Environmental & Water Resources Department, Water Quality for verification.
15. After verification of results by Folsom Water Quality, the valve on the stub will closed and contractor may connect to City's water system.

16. After connection and re-energizing of the main, contractor will flush nearest outlet to connection. The City will collect a precautionary bacteria sample after final connection.
17. The Contractor shall be required to pay for and utilize a California Department of Public Health certified testing laboratory for all water collection, sampling and testing.
18. All samples taken by the Contractor's sample collector must be collected in the presence of the Construction Inspector.
19. Tablet disinfection is not allowed

4. Connection and Tying into Existing Facilities

- A. Connection to existing City water facilities shall only be made upon approval of the Construction Inspector and the Environmental & Water Resources Department. The Contractor shall only tie the new system into the existing system under the following conditions:
 1. The tie-in procedure shall be approved by the Construction Inspector prior to beginning the work.
 2. Tie-ins shall be accomplished within 10 calendar days of passing tests.
 3. Connection of new water mains to the existing City of Folsom water system shall be by hot tap or cut in tee as specified by the plans.
 4. The new water main shall remain isolated from the existing system throughout the entire construction and sterilization process by means of an approved and tested reduced pressure principle assembly (RPPA) backflow device.
 5. Only authorized City of Folsom personnel may operate control valves on existing and newly tied in water systems.
 6. All water pipe stocked onsite shall remain clean and have ends covered until time of installation.
 7. Lateral stubs from hot tap to back of walk may be loaded with 100 ppm NSF 60 approved chlorine solution and disinfected with the slug method.
 8. Alternative disinfection procedures require prior authorization from the City of Folsom Environmental & Water Resources Department, Water Quality Division.
 9. Blow-off valves on hot tapped laterals shall be constructed within 4 feet of back of walk.
 10. City of Folsom Water Quality Division will conduct initial and final disinfections chlorine residual testing.

11. Contractor shall be required to pay for and utilize a California Department of Public Health certified testing laboratory for all collection and testing of bacteriological samples.
12. The tie-in site shall be maintained clean and sanitary
13. All material used in the tie-in shall be clean and swabbed with a 1% to 5% chlorine solution to the satisfaction of the Construction Inspector.
14. Tie-ins shall take place only after the newly constructed water system has passed all required testing procedures, upon the approval of the Construction Inspector and the Environmental & Water Resources Department.
15. An effort shall be made to conduct shut-downs at times when there is least interference with consumer services.
16. Connections shall be made only after diligent preparation, in order that the shutdown duration is minimized.
17. Notification to the Fire Department and affected consumers shall be made by the Contractor 48 hours in advance of the work.
18. Out of service fire hydrants in the City serviced area shall be bagged by the Contractor.
19. After the tie-in has been made, the Contractor shall contact the Environmental & Water Resources Department to flush the segment/system tied-in to the satisfaction of the Construction Inspector and the Environmental & Water Resources Department.
20. In the event that the new water system cannot be tied into the City system within 10 calendar days, the new system shall maintain a minimum chlorine residual of 0.5 ppm or be subject to water quality testing and re-chlorination, subject to the approval of the Environmental & Water Resources Department.

5. Corrosion Protection System Testing, Ductile Iron

- A. At the completion of the pipe installation and prior to curb and gutter construction, the Corrosion Engineer shall conduct a test of the corrosion monitoring system in the presence of the Construction Inspector. A report showing the test results shall be submitted to the Environmental and Water Resources Department for review and approval. The report shall include test station locations as specified on the approved plans, appurtenance tested, test result, and recommendations for future monitoring and maintenance.

6. Continuity Testing

- A. Confirm pipe is continuous by performing continuity test. The continuity shall extend from the meter on the service line to the main to allow for an accurate trace.

- B. The Construction Inspector will test continuity:
 - 1. Upon City acceptance of the street subgrade
 - 2. After paving and raising of iron

7. City Acceptance

- A. Private systems including meters and backflow devices shall connect to the City system upon City acceptance of installation and testing per these specifications. The Contractor shall install meters 3-inch size and larger, subject to City inspection. The City will install all meters two inches in size and smaller.

STANDARD DRAWINGS

- WR-01 Metered Water Service 1" thru 2"
- WR-02 3" or Larger Irrigation Meter Installation
- WR-03 Water Service Manifold for Multiple 1" Meters
- WR-04 Trust Block Bearing Area
- WR-05 4" & 6" End of Line Blow-Off Valve Assembly
- WR-06 4" and 6" Blow-Off Valve Assembly
- WR-07 Water Valve Riser and Box
- WR-08 Fire Hydrant and Valve Installation
- WR-09 Fire Protection Backflow Assembly
- WR-10 2-1/2" & Larger Domestic Backflow Preventer Assembly
- WR-11 1" and 2" Air & Vacuum Release Valve
- WR-12 Locating Wire for Water Mains
- WR-13 Fire Hydrant Protection
- WR-14 Pressure Reducing Station
- WR-15 Water System Pipe Bedding for Mains and Services
- WR-16 Water Sampling Station
- WR-17 Water Service and ARV Saddle
- WR-18 Temporary Connection for Loading and Testing
- WR-19 Exothermic Welds
- WR-20 Typical 3" & 4" Domestic Meter Installation
- WR-21 Typical 6" & 8" Domestic Meter Installation
- WR-22 Water Mains Crossing Below Sanitary Sewer or Storm Drain
- WR-23 Water Service Multi-Connection
- WR-24 1" Thru 2" Non-potable Metered Water Service
- WR-25 3" or Larger Non-potable Metered Water Service
- WR-26 2" & Smaller Domestic Backflow Preventer Assembly
- WR-27 Deep Fill Trench Backfill
- WR-28 Fire and Domestic Service Detail

Section 5: FIRE

5.1 GENERAL

1. Construction Access and Water Supply

All-weather fire apparatus access and approved fire hydrants shall be provided before combustible material or any vertical construction is allowed on site. All-weather fire apparatus access is defined as 6" of compacted aggregate base rock (AB) from May 1 to September 30 and 2" pavement over 6" of AB from October 1 to April 30. Approved fire hydrants shall pass visual inspections, hydrostatic pressure test inspections, and flush inspections.

5.2 ACCESS

1. Premise Identification

Prior to and during construction, an approved address sign shall be provided at each fire and emergency vehicle access road entry into the project.

2. Folsom Fire Code Marking of Fire Apparatus Access Roads

- A. All required fire lanes must be identified with painted and stenciled curbs and fire lane signs to restrict parking in accordance with the California Vehicle Code.
- B. All curbs shall be painted red with the words "No Parking Fire Lane" stenciled in white every 50 feet on the face of the curbs using 4-inch letters.
- C. If curbs are not available, provide 6-inch wide red stripes along the edge of the fire lane with the same stenciling.
- D. Fire lane signs shall state "No Parking – Fire Lane – C.V.C. 22500".
 - i. Fire lane signs shall be located at each entrance on the right-hand side.

3. Emergency Vehicle Access (EVA)

As secondary access/egress points for fire apparatus: An independent third party agency that is technically competent in this field shall conduct inspections during the installation of the EVA turf block system and submit documentation to the Fire Department that certifies the installation is in accordance with the requirements specified by the manufacturer's specifications and the approved design documents.

5.3 INSTALLATION

1. Private Fire Service Mains

Their appurtenances shall be installed and tested per the most current edition of N.F.P.A. 24.

2. Piping

All private fire service mains that can be pressurized by fire department apparatus (downstream of fire department connections) shall be CPVC C900 class 200 or other UL/FM approved equivalent pipe. All underground fire mains that cannot be pressurized by fire department apparatus may be CPVC C900 class 150 or other approved UL/FM approved equivalent pipe.

3. Fire Sprinkler Service Mains

The installation of all private fire service mains shall terminate 6 to 24 inches above finished floor at fire sprinkler system riser locations. These fire sprinkler system riser locations shall provide minimum clearances of 12 inches from any adjacent walls.

4. Depth of Bury

To the top of all private fire service mains: Minimum 36 inches in driveways and minimum 30 inches in landscaped areas.

5. Thrust Block Bearing Areas

Shall be sized in accordance with the City of Folsom's Standard Detail WR-04.

6. Sleeves

Required for private fire service mains at concrete slab penetrations with a minimum clearance of 2 inches around the pipes.

7. Electronic Monitoring

All control valves on private fire service mains (including the valves on the backflow preventers) shall have tamper switches that are monitored by an approved central station. Provide the entire necessary underground conduit.

8. Hydrostatic Test

All private fire service mains shall be pressure tested to 200 psi for 2 hours for an inspection by a Fire Department representative.

9. Flush Inspection

All fire hydrants and fire sprinkler risers shall be flushed during an inspection by a Fire Department representative.

10. Private Fire Hydrants

- A. Provide a minimum 2-foot by 2-foot flat concrete surface around each private fire hydrant located in a landscaped area.
- B. Fire hydrant valves shall be located a minimum of 6 feet away from the fire hydrants. Relocate the positions of the fire mains to accommodate these criteria and show this dimension on the utility plan.
- C. Paint fire hydrants safety yellow.
- D. Color code paint the top 2 inches and the 4½-inch hose connection cap of each fire hydrant light blue, unless a different color is specified by the inspector testing the water supply.

11. Protection From Vehicles

All fire hydrants, fire department connections (FDC), and post indicator valves (PIV) shall be located a minimum of 2 feet back of curbs.

12. Fire Hydrant Markers

Blue two-way reflective markers shall be placed on the roadway/street pavement 12 inches off of street or driveway centerline on the hydrant side.

13. Record-of-Completion Form

The underground contractor shall submit to the Fire Inspector a Record-of-Completion Form in accordance with NFPA 24, after the entire fire underground system has been inspected and tested to meet the minimum site requirements.

Section 6: SANITARY SEWER SYSTEM CONSTRUCTION

6.1 GENERAL

1. Sewer Pipe and Fittings

Sewer pipe and fittings shall be installed in accordance with the requirements of these Standard Construction Specifications and as recommended by the manufacturer. These Specifications as well as the manufacturer's guidelines shall be present at the construction site at all times. Any installation not done in accordance with the manufacturer's guidelines that will void the manufacturer's warranty needs to be corrected prior to City acceptance of the project.

2. Safety

Refer to Article 10 of the General Provisions for safety requirements.

3. Measurement and Payment

Full compensation for mobilization, demobilization, surveying, geotechnical, construction staking, trenching, dewatering, backfilling, pipe and appurtenances installation, testing, etc. as herein specified, shall be included in the price bid per lineal foot for the respective sizes, classes, and types of pipes and conduits listed in the Contract documents, and no additional compensation will be allowed.

4. Connection to Existing Facilities

Connection to existing City waste water facilities, and the procedure thereof, shall be made upon approval of the Construction Inspector after following requirements for construction, bypass pumping and testing conforming to these Specifications.

5. Waste Water System Pipe Material

Unless otherwise specified in the Contract documents, all waste water system mains and services shall be polyvinyl chloride pipe SDR-26 (PVC) for gravity sewer, and ductile iron pipe (DIP) or C900 polyvinyl chloride pipe (PVC) for force main sewer. Existing extra strength VCP (vitrified clay pipe) shall be replaced with PVC and adaptors. When DIP for sewer force mains are required, installation of a cathodic protection (CP) system will also be required. The CP system shall be designed and submitted for approval to the City. The design shall include bond jumpers, test stations, anode bags, etc. in addition, lining requirements shall be required as identified under Section 6.10.2.F.

6. Transitions in Pipe Material

Transitions between existing (only) VCP to DIP or VCP to PVC shall be made with a manufactured "speed-seal" gasketed DIP spigot. The same connection shall be applied to a

pre-cast manhole base inlet. Where PVC or DIP connects to the precast manhole, a flex joint is not required.

7. Sewer Services

All services shall be four inches in diameter for residential and six inches or larger for commercial.

Sewer services shall have a minimum four (4) feet of cover to finish grade at the back of City right-of-way, except that for shallow mains, the required ¼- inch per foot slope governs the depth at the end. Where elevations of the sewer service at the City right-of-way are shown on the approved plans, this governs all the above.

Sewer service connections shall be all bell and spigot SDR-26 PVC or all bell and spigot. ABS pipe shall not be adapted to PVC and shall not be used in the City right-of-way. Calder couplings shall not be used in new construction, except to tie on to older existing, bare spigot end VCP where necessary.

Sewer service connections to the main shall be wye type, not tees. Services shall be run into manholes where possible, with the service flow-line installed at the spring-line of the main. Services shall be installed conforming to drawing SS-07.

8. Approved Equal Product Submittals

To every material listed in these Specifications by product name, the term "or approved equal" applies. Contractors may propose to use materials which are not City-specified and submit documentation to allow review of said material for use as an "approved equal" product. Submittals of the City General Provisions for City-funded projects, the Contractor shall include the following information in the material submittal for development work:

- A. Product - A description and appropriate catalogue information of the product and the related section number of the City specification.
- B. Contact - The name and telephone number of the contact representative for the proposed product.
- C. Reference - A list of a minimum of three agencies who are using the proposed product (include names and telephone numbers).
- D. Performance - Information and reference for three locations with a performance record of three years in operation of the installation.
- E. Address - Address the letter to the City of Folsom Environmental and Water Resources Department, 50 Natoma Street, Folsom, CA 95630, Attn: EWR Department.
- F. City staff may request a sample of the product for review.
- G. Submittal Time - The Contractor shall submit all material for review 35 days prior to development contract award. All submittals shall include documentation verifying

contract award date. Contractors shall allow two to four weeks' review time by the Environmental and Water Resources Department.

Conditionally Approved Material

Materials or products that have met the reference and performance requirements shall be conditionally approved for a minimum trial period of 2 years. Upon completion of the two year period, the product may be approved or the evaluation period may be extended as required by the City. A list of conditionally approved products may be obtained from the Environmental & Water Resources Department.

Material Defects and Failures

Defective material and failures shall be reported immediately. The date of sale, manufacturing dates, lot numbers, and all other identifications shall be provided to the Construction Inspector.

Unapproved Materials

In order to avoid installation of unapproved materials, those materials shall be removed from the site within 24 hours as requested by Construction Inspector.

9. Punch List Process

When the Contractor/Developer is satisfied all project improvements are substantially complete, have inspected the project thoroughly and is aware of no punch list items, a final punch list may be requested of the Construction Inspector.

The Inspector will have 21 calendar days to complete the inspection and issue the final punch list to the Contractor/Developer. Upon the Inspector's receipt of the Developer's request for inspection, the City Sewer Maintenance Division will be informed of the request for inspection, and will have the opportunity of visiting the site and commenting in writing to the Inspector during the first 14 days of the 21.

Note: If, upon beginning the final inspection an excessive number of punch list items are found, the inspection will be terminated and rescheduled.

6.2 CONSTRUCTION STAKING

1. General

- A. Construction staking shall be conducted by a surveyor with a current license in the State of California.
- B. Construction staking will be provided by the Contractor to establish the vertical and horizontal controls necessary to lay out the work.
- C. Construction staking will include line and grade and location of manholes. Easement boundaries will not be staked.
- D. Contractor shall bear the cost of replacement staking if the initial staking is damaged and must be replaced.

2. Layout and Measurement to be Performed by Contractor

- A. The Contractor shall be responsible for laying out the work from the lines and grades provided by the Owner and from the dimensions and elevations provided on the drawings and shall be responsible for all measurements required for the execution of the work.
- B. The Contractor shall furnish stakes, equipment, tools, materials, and all labor as required for layout work.

6.3 CONTROLLED LOW STRENGTH MATERIAL

1. General

- A. Requirements for controlled low strength material (CLSM) as backfill material in specific locations.

2. Definitions

- A. Controlled Low Strength Material (CLSM): A highly flowable, lean concrete mix consisting of a mixture of cement, fly ash, densely graded mineral aggregates, water and admixtures. Characteristics include:
 - 1. Capable of freely flowing to fill excavations and voids without compaction or other additional effort.
 - 2. Used in trenches and for backfill adjacent to structures where clearance is limited, and in other areas specifically identified on the Drawings or specified.
 - 3. Low permeability to prevent migration of adjacent fines into the set mix.
 - 4. Easily excavated after curing with minimum risk of damage to buried utility.

3. Submittals

- A. Submit one copy of the Mix Design to the City of Folsom. Identify name and/or number of the mix design. Provide the proportions and gradations of materials proposed for CLSM.

4. Quality Assurance

- A. Demonstrate that the CLSM mix meets the specified requirements, including compressive strength.
- B. Enlist the services of a testing laboratory to prepare test cylinders and to transport cylinders to the laboratory for testing.
- C. Testing expenses shall be borne by the Contractor.
- D. Test Cylinders

1. Procedure: Make 6-inch diameter by 12-inch high test cylinders in accordance with ASTM C31.
 2. Required Number: Not less than three cylinders for each 200 cubic yards of CLSM placed, with a minimum of three cylinders for each location where CLSM is used.
 3. Test two cylinders at 28 days, third cylinder is spare.
- E. Field Testing: Furnish slump testing equipment and test slump in accordance with ASTM C 143.

5. Materials

CLSM Mix: A mixture of Portland cement, fly ash, aggregate, water, and admixtures that produce a material of controlled density and of low compressive strength capable of filling all spaces between the pipe, the bedding and the trench walls.

- A. Cement: Conforming to ASTM C150, Type II or III with total alkali content not more than 0.8 percent.
- B. Water: Clean, potable water.
- C. Fly Ash
 1. Mix Designs used for Pipe Bedding and Trench Backfill: Class C in conformance with ASTM C 618.
 2. Mix Designs used for Backfill of Excavations: Class F in conformance with ASTM C 618.
- D. Aggregate Materials
 3. Densely graded rock conforming to the following gradation:

Sieve Size	Percentage Passing
1"	100
No. 8	50-100
No. 200	0-5

6. Design Requirements

- A. Water-cement Ratio: Not to exceed 3.5.
- B. Minimum Cement Content: 50 pounds per cubic yard.
- C. Use fly ash to improve flow-ability of the fresh CLSM and to regulate the strength. Do not use more than 300 pounds per cubic yard.
- D. Unit Weight Requirements

1. Density of CLSM when used as backfill of excavations: Between 100 pounds per cubic foot and 130 pounds per cubic foot in the as-placed condition as determined by ASTM D 6023.
- E. Compressive Strength Requirements
 1. Mix Designs used for Pipe Bedding and Trench Backfill: Compressive strength at 28 days between 100 psi and 150 psi as determined in accordance with ASTM D 4832.
- F. Slump: Between 6-inches and 8-inches when tested in accordance with ASTM C143.

7. Placement

- A. Thoroughly settle and consolidate CLSM as the material is placed in excavations. Fill the entire depth of the layer that is being consolidated, into a dense, homogeneous mass, filling all spaces and voids and bringing only a slight excess of water to the exposed surface. Place and consolidate CLSM by means that will not cause segregation of the mix.
- B. Do not place CLSM under the following conditions:
 1. When the air temperature is below 40 degrees Fahrenheit.
 2. When the excavation contains water or when the bottom or walls of the excavation are frozen or contain frozen material.
- C. Prevent flotation of pipes by placing CLSM in two or more lifts, with each lift reaching an initial set before the succeeding lift is placed. Correct any flotation and displacement of pipelines.
- D. Placement of CLSM in Excavations: Limit lift thickness to 10 feet, place subsequent lifts after CLSM has achieved the minimum specified compressive strength.

8. Protection of CLSM

- A. Protect CLSM from equipment, traffic and backfilling operations until the surface has achieved an initial set and has hardened enough to develop a minimum penetration number of 650 when tested in accordance with ASTM C 403.
- B. If the trench backfill is not to be placed over the CLSM within eight hours after CLSM placement, place a 6-inch layer of moist backfill over the CLSM.

6.4 ABANDONMENT OF PIPELINES AND STRUCTURES

1. General

- A. The Work of this Section shall include, but shall not be limited to, the following items:
 1. Demolition and disposal of asphalt pavement, concrete pavement, curbs and gutters, and other pavement features, concrete pavement, concrete driveways, and other property improvements. It also includes abandonment, demolition, salvage and

disposal of existing sewer, as required to complete the work. Salvaged items shall include all manhole frames, covers, and other castings removed for abandoned structures.

2. Protection of Existing Work and Repair of Damage

- A. The Contractor shall take all necessary precautions to prevent damage to existing facilities which are to remain in place. Any damage to remaining street work improvements, building elements to remain, and other existing facilities to remain, as caused by the Contractor's operations, shall be repaired at the Contractor's expense. Damaged items shall be repaired or replaced with new materials as required to restore damaged items or surfaces as closely to their original condition.

3. Concrete & Controlled Low Strength Material

- A. Concrete for pipeline plugs & Controlled low strength material (CLSM) for filling pipeline to be abandoned in place shall be Type E.

4. Abandonment

- A. No existing pipeline facility shall be abandoned until all new facilities serving the same area are in operation and as authorized by the Construction Manager. In the case of water or sewer pipeline that are to be removed due to conflicts with new work, the existing pipelines may be removed after the bypass system has been installed and tested.
- B. Where existing piping is to be abandoned, the Contractor shall cut back the abandoned pipe for a distance of five feet from any connecting structures. All holes at the existing structures shall be repaired. The abandoned pipe shall be filled with CLSM or approved alternate pumpable mix design and capped or plugged with at least a 2 foot depth of concrete at both ends prior to backfill.

5. Exiting Sewer Manholes to be Removed

- A. An existing sewer manhole that is required to be removed shall be removed after flow has been diverted using temporary bypass pumping system. Where indicated on the Plans, existing manholes to be removed shall have the castings, manhole body, and base removed by the Contractor. The Contractor shall dispose of the manhole body, base, castings, and debris in a landfill certified to receive these materials. Disposal shall be at the Contractor's expense.

6. Structure and Piping Rehabilitation

- A. When new piping is installed in existing structures, the Contractor shall accurately position core-drilled openings in the concrete. Openings shall be of sufficient size to permit a final alignment of pipelines and fittings without deflection of any part and to allow adequate space for satisfactory packing where the pipe passes through the wall to ensure water tightness around openings so formed. Before placing the non-shrink grout,

concrete surfaces shall be sandblasted, thoroughly cleaned of sand and any other foreign matter, and shall be coated with epoxy bonding compound.

- B. When new piping is to be connected to existing piping, the existing piping shall be cut square and ends properly prepared for the connection required. Any damage to the lining and coating of the existing piping shall be repaired by the Contractor. Dielectric insulating joints shall be installed at connections between new and existing piping, if required.
- C. Existing reinforcement to remain in place shall be protected, cleaned, and extended into new concrete. Existing reinforcement not to be retained shall be cut off as follows:
 - 1. Where new concrete joins existing concrete at the removal line, reinforcement shall be cut off flush with the concrete surface at the removal line.
 - 2. Where the concrete surface at the removal line is the finished surface, the reinforcement shall be cut back two (2) inches below the finished concrete surface, the ends painted with epoxy paint, and the remaining holes patched with cement mortar grout.

6.5 DEWATERING

1. General

- A. Section Includes: Control of water and dewatering of trench and structure excavations.

2. Performance Requirements

A. General

- 1. Design dewatering systems in accordance with requirements of applicable laws and regulations.
- 2. Groundwater control systems may include single-stage or multiple-stage well point systems, sump pumps within excavations, or combinations of these types of dewatering systems.
- 3. Locate groundwater control and drainage systems so as not to interfere with utilities, construction operations, vehicular traffic, adjacent properties, or adjacent water wells.
- 4. Remove dewatering system when no longer needed.

B. Requirements for Dewatering of Excavations:

- 1. Design dewatering systems of sufficient scope, size, and capacity to accomplish the following results:
- 2. Control the flow of surface water into trench and structure excavations by grading, dikes, or other means.

3. Lower groundwater levels, reduce piezometric pressures, and eliminate infiltration of groundwater into trench and structure excavations, allowing construction to proceed on dry, stable subgrades.
 4. In areas of flowing groundwater filter fabric shall be placed around the entire pipe zone with a 1-foot overlap. Bedding and shading in accordance with on-site geotechnical engineer. In addition, the Contractor shall follow the Geotechnical Engineer's recommendation for collecting and conveying flowing groundwater safely away from the underground roadway and infrastructure.
- C. Provide, operate and maintain dewatering systems of sufficient size and capacity to protect existing structures from hydrostatic uplift when the structure is drained of water.

3. Environmental Requirements

- A. Contractor is responsible for complying with all environmental requirements necessary associated with dewatering. This may include but is not limited to the preparation, submission and implementation of a Water Pollution Control Plan, erosion control plan, obtaining coverage under the State Water Resources Control Board General Permit, obtaining coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity, etc.

4. Submittals

- A. Submit one copy to the City of Folsom of all documentation required for dewatering. This may include but is not limited to the preparation, submission and implementation of a Water Pollution Control Plan, erosion control plan, obtaining coverage under the State Water Resources Control Board General Permit, obtaining coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity, etc.

5. Dewatering and Water Control Equipment

- A. Maintain sufficient standby equipment and materials available at the site to ensure continuous operation, where required.

6. Surface Water & Ground Water Control

- A. Intercept surface water or ground water and divert it away from excavations through use of dikes, ditches, curb walls, pipes, sumps or other means. This requirement extends to temporary works required to protect adjoining properties from surface drainage caused by construction operations.
- B. Operate and maintain surface water and groundwater control systems in accordance with the Erosion and Sediment Control Plan.
- C. Remove all surface water or groundwater control systems upon completion of construction.

6.6 BYPASSING OF FACILITIES

1. General

A. Scope:

1. Includes removal and replacement of existing sewer main pipe. It shall be the Contractor's responsibility to maintain at all times the sewer flows through the Project site and from the adjacent properties.
2. This section specifies the requirements for temporary bypassing and disposal of raw wastewater as necessary to perform the work.

B. Requirements:

1. Contractor shall provide labor, materials, and full-time supervision, to contain, bypass, and dispose of raw wastewater, for sewer system modifications made to complete the work.
2. The work shall not result in surcharges of the existing sanitary sewers. Surcharge shall be defined as the condition where the depth of flow exceeds the crown elevation in any pipe in any existing gravity pipe systems.
3. Contractor shall bypass and dispose of water from pipeline systems including, but not limited to, the following.
 - a. Sanitary sewer mains, laterals, manholes, and cleanouts

2. Submittals

- A. Within 10 days of notice to proceed, submit drawings and complete design data for bypass pumping plan. Show all proposed methods, equipment, and discharge locations for bypassing. Include the following information:
 1. Drawings shall indicate the locations of temporary plugs, taps, pumping systems, suction and discharge piping, and locations of sanitary sewers and manholes to receive discharges of raw or treated wastewater.
 2. Data shall include the locations of off-site disposal areas or facilities, locations and elevations of existing sanitary sewer systems, and the capacities of duty and standby pumps, prime movers, power and standby power, and other equipment.
 3. Design calculations shall prove the adequacy of the bypassing and disposal system(s) and selected equipment. Design calculations shall confirm that the bypassing and pumping operations shall not cause surcharge in any portion of the existing sanitary sewer system. Design calculations shall be signed and sealed by a civil engineer registered in the State of California qualified to perform said analysis.
 4. At least 15 calendar days prior to beginning the work, the Contractor shall submit a plan for bypass pumping around the work area and facilities where wastewater

flows may be interrupted. The plan shall include, at a minimum, the following information:

- a. A site plan showing the size and layout of pumps, valves, and temporary pipelines. Layout shall show how temporary facilities will be protected during use.
 - b. Catalog data on pump controls and audible alarms.
 - c. Catalog data for portable generators when electric pumps are used.
 - d. An emergency response plan to be followed in the event of a failure of the bypass pumping systems.
 - e. Action plan for containment and disposal of any sewer spills.
 - f. The plan shall be approved by the City and the Construction Manager prior to the start of construction of the bypass system.
5. Raw sewage is prohibited from entering any drain inlets, storm drain manholes, or other outlets that flow into a stream, creek, or river.
 6. The Contractor shall submit an odor mitigation plan.
 7. A complete Health and Safety Plan shall be submitted to the Construction Manager. No entry to any of the existing facilities will be permitted until appropriate work crews are certified for confined space entry and the Health and Safety Plan is reviewed. The Health and Safety Plan shall be developed specifically for this project.

6.7 TRENCHING

1. General

- A. Section Includes: Trench excavation and backfilling for pipe and pipeline accessories.

2. Submittals

- A. Submit one copy to the City of Folsom for all proposed fine grading and pipe bedding material, clay material, Native Material, imported backfill material, and other soil materials. Submittal shall include: material sources, gradation, moisture-density curves, permeability tests, etc.

3. Quality Assurance

- A. Obtain representative soil samples as follows:
 1. Two soil samples every 500 feet along the pipeline alignment.
 2. Two soil samples whenever the character of the soil changes.
 3. One soil sample when directed by the Construction Manager.

4. Soil Testing and Compaction Testing

- A. Demonstrate that trenching and compaction procedures are in accordance with specified requirements and that these procedures accomplish the specified performance requirements.
- B. Refer to “Field Quality Control”, below.

5. Materials

- A. Native Material: Soil excavated for the pipe trench and having maximum particle size not exceeding three inches in greatest dimension and that is free of leaves, grass, roots, stumps, and other vegetable matter.
- B. Water for Moisture Conditioning of Fill Material: Use potable water.
- C. Class 2 Aggregate Base

Class 2 Aggregate Base shall conform to the following gradation:

Sieve Size	Percent Passing Sieve by Weight 3/4" Maximum
2"	100
1-1/2"	100
3/4"	90-100
No. 4	35-60
No. 30	10-30
No. 200	2-9

- D. Controlled Low-Strength Material (CLSM)
 - 1. Refer to Section 6.3 For CLSM specifications
- E. Granular Fill: Clean gravel, ¾-inch minus with no material passing the No. 4 sieve.

6. Trench Excavation

- A. Trench Bottom: Excavate and shape trench bottoms to provide uniform subgrade for placement of Bedding Material.
 - 1. Unsuitable Hard Trench Bottom: If bottom of excavation is found to consist of rock or any material that cannot be excavated to provide uniform bearing surface:
 - a. Notify Engineer of the conditions encountered and obtain concurrence that an unsuitable trench bottom condition is present.

- b. Remove such rock or other material to a depth of not less than 3 inches below the original design elevation of the bottom of the trench.
 - c. Place aggregate base course material to restore the trench bottom to the original design elevation. Place material in a single lift and compact to 95 percent of maximum density (Modified Proctor D1557).
 - d. Work outlined above shall be completed by the Contractor without additional compensation or extension of the Contract Time.
2. Unsuitable Soft Trench Bottom: If bottom of excavation is found to consist of soft or unstable material which is incapable of properly supporting pipe:
- a. Notify Engineer of the condition encountered and obtain concurrence that an unsuitable trench bottom condition is present.
 - b. Remove such material to a depth and for the length required, as determined by the Engineer.
 - c. Place aggregate base course material to restore the trench bottom to the original design elevation. Place in lifts not exceeding eight inches in uncompacted thickness and compact to 95 percent of maximum density.
 - d. Work outlined above shall be completed by the Contractor without additional compensation or extension of the Contract Time.
- B. For Manholes, Vaults and Other Pipeline Accessories
- 1. Provide excavations sufficient to leave at least 24 inches clear between their outer surfaces and the face of the excavation or any shoring, which may be used to support the face of the embankment.

7. Bedding & Pipe Zone Material

- A. Bedding and Pipe Zone Material: As shown on SS-15
- B. After the pipe is laid, place bedding and backfill material in lifts:
 - 1. First Lift: Carefully place and compact Bedding Material around the pipe to a level even with the spring line of pipe. Place Bedding Material in a single lift and compact to 95 percent of maximum density.
 - 2. Second and Subsequent Lifts: Place Bedding Material from the spring line of the pipe in loose lifts of approximately eight inches in uncompacted depth and compact to 95 percent of maximum density. Provide compacted Bedding Material over the top of the pipe to a total depth as indicated on the Drawings.
- C. Pipe Displacement
 - 1. Take necessary precautions in placement and compaction of Bedding Material to prevent displacement of piping.

2. In the event there is movement of the pipe, re-excavate re-lay, and backfill the pipe.
- D. Consolidation: Do not use water-settling methods to consolidate Bedding Material.

8. Trench Backfill

- A. Trench Backfill Material: As indicated on SS-15
- B. Backfill voids that may form when removing shoring and bracing.
- C. Do not use water-settling methods to consolidate Trench Backfill Material.
- D. In Roadways, paved areas of Roadway Shoulders, and other AC Pavement Areas
 1. Backfill trench from top of the Initial Backfill to the Aggregate Sub-base with Intermediate Backfill. Place in loose lifts not exceeding eight inches in uncompacted depth and compact to 95 percent of maximum density.
- E. In areas outside of paved roadways, in unpaved areas of Roadway Shoulders or in Open Areas
 1. Intermediate Backfill shall be placed in loose lifts not exceeding 18 inches in uncompacted depth and compact to 90 percent of maximum density.
 2. In Open Areas, replace topsoil with material that was removed and stockpiled prior to trench excavation.
- F. Under Existing Intersecting Pipes or Conduits Larger than 3-inches in Diameter
 1. Backfill to the spring line of the intersecting pipe or conduit with Class 2 Aggregate Base material. Place in loose lifts not exceeding eight inches in compacted depth and compact to 95 percent of maximum density.
 2. Extend Class 2 Aggregate Base Course material two feet on either side of intersecting pipe or conduit to ensure that material remains in place while other backfill is placed.
 3. Backfill remainder of trench in accordance with requirements outlined above.

6.8 POLYVINYL CHLORIDE SEWER PIPE

1. General

Description

- A. The Contractor shall furnish and install all underground polyvinyl chloride (PVC), non-pressure pipe and all appurtenant work, complete and in place, all in accordance with the Contract Documents.

Contractor Submittals

- B. The Contractor shall prepare and submit one copy to the City of Folsom shop drawings and laying diagrams of all pipe, joints, bends, special fittings, and piping appurtenances.

Quality Assurance

- C. The pipe shall be subjected to the specified hydrostatic strength tests, flexure tests, and crushing tests. The crushing tests shall be made on samples taken from the center of full-length sections of pipe.

Gravity Sewer Pipe Size

- D. All sewer mains shall sized according to the City's Sewer Design Standards Section 18.4.

2. Products

General

- A. All PVC pipe shall be continuously and permanently marked with the manufacturer's name, pipe size, dimension ratio or/and pressure rating in psi. All sewer pipe is to be green in color (mains, risers, force mains, etc.). All sewer pipe to be SDR-26.

Pipe

- A. PVC pipe shall have a solid cross section rubber ring gasket. The gasket shall be securely attached to the pipe to prevent displacement of the gasket when installed in the field. All rubber-ring gaskets shall be in accordance with ASTM F477. Lubricant used for field assembly of gasketed PVC pipe shall have no detrimental effect on the gasket, joint, fitting, or pipe and shall be as recommended by the manufacturer. Provide rubber waterstops at the entry of all PVC pipe into manhole bases.
- B. Polyvinyl-chloride pipe (PVC) shall conform to the requirements of ASTM D 3034, Class SDR 26. Material for PVC pipe shall conform to the requirements of ASTM D 1784, cell Class 12454-B or 12454-C, as defined therein.

Fittings

- A. All fittings for PVC pipe shall conform to the requirements of ASTM D 2241. The ring groove and gasket ring shall be compatible with PVC pipe ends. Flanged fittings shall be compatible with cast-iron or ductile-iron pipe fittings.
- B. The strength class of the fittings shall be not less than the strength class of any adjoining pipe.

3. Execution

General

- A. All laying, jointing, and testing for defects and for leakage shall be performed in the presence of the Engineer and shall be subject to inspection before acceptance. All material found during the progress of the work to have defects will be rejected, and the Contractor shall promptly remove such defective materials from the site of the work.
- B. Installation shall conform to the requirements of ASTM D 2321 and to the supplementary requirements or modifications specified herein. Wherever the provisions of this Section and the requirements of ASTM D 2321 are in conflict, the more stringent provision shall apply.

4. Laying Pipe

- A. Sewer Pipe brought to the jobsite shall not be older than 18 months from the date of installation. Pipe shall be stored on an elevated platform a minimum of 12 inches above finished grade. Pipe ends shall be covered as soon as pipe has been delivered to the jobsite to minimize the amount of debris that could enter the pipe. Any pipe that has sun damage, gouges deeper than 1/8 of an inch, etc. shall not be suitable for installation and shall be returned to the manufacturer. The pipe and accessories shall be inspected for defects prior to lowering into the trench. Any defective, damaged, or unsound pipe shall be repaired or replaced. All foreign matter or dirt shall be removed from the interior of the pipe before lowering into position in the trench. Pipe shall be kept clean during and after laying. All openings in the pipeline shall be closed with watertight, expandable-type sewer plugs or PVC test plugs at the end of each day's operation or whenever the pipe openings are left unattended.
- B. Proper implements, tools, and facilities, as recommended by the pipe manufacturer's standard printed installation instructions, shall be provided and used by the Contractor for safe and efficient execution of the work. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.
- C. Cutting and machining of the pipe shall be accomplished in accordance with the pipe manufacturer's standard procedures for this operation. Pipe shall not be cut with a cold-chisel, standard-iron pipe cutter, nor any other method that may fracture the pipe or produce ragged, uneven edges.
- D. The pipe shall be installed in accordance with the requirements of ASTM D 2321 and as indicated in the Contract Documents. Over assembly (over-stabbing) of jamming the spigot into the neck of bell shall not be allowed. Over assembly (over-stabbing) loses flexibility of the joint. Do not assemble beyond the reference mark. Proper assembly calls for insertion of the spigot end into the bell so that it is in contact with the gasket. Keep the pipe lengths in proper alignment. Brace the bell while the spigot end is pushed under the gasket, so that previously completed joints will not be further inserted. Push the spigot into the bell until the assembly mark on the pipe barrel is flush with the end of the bell. Stabbing is not recommended and should be avoided.

If undue resistance to insertion of the spigot end is encountered or the reference mark does not reach the flush position disassemble the joint and check the position of the gasket.
- E. All pipe less than or equal to 12-inches in diameter shall be manually assembled. No mechanical equipment (i.e.: backhoe) shall be allowed. Pro-Pipe Eagle-Claw or equal is acceptable to assemble pipe.
- F. For pipes greater than 12-inches in diameter, Contractor is allowed to use hydraulic jack/bore if granted approval from the City.

- G. Remove any pipe bedding material necessary around each pipe bell (bell holes) in order to ensure line and grade of sewer pipe is maintained.
- H. In the event that installation of the sewer pipe and/or appurtenances is installed in such a manner that voids the manufacturer's warranty, then the Contractor shall be responsible for correcting the sewer pipe and/or appurtenances installation issue. City acceptance of the sewer system will only be granted if the manufacturer's warranty can be guaranteed by the manufacturer in the form of an acceptance letter.
- I. Where the grade or alignment of the pipe is obstructed by existing utility structures, such as conduits, ducts, pipes, branch connections to main sewers, or main drains, the obstruction shall be permanently supported, relocated, removed, or reconstructed by the Contractor in cooperation with owners of such utility structures.

5. Handling

- A. Handling of the PVC pipe shall be done with care to ensure that the pipe is not damaged in any manner during storage, transit, loading, unloading, and installation.
- B. Pipe shall be inspected both prior to and after installation in the ditch, and all defective lengths shall be rejected and immediately removed from the working area.

6. Field Jointing

- A. Each pipe-compression-type joint shall be joined with a lock-in rubber ring and a ring groove that is designed to resist displacement during pipe insertion.
- B. The ring and the ring seat inside the bell shall be wiped clean before the gasket is inserted. At this time, a thin film of lubricant shall be applied to the exposed surface of the ring and to the outside of the clean pipe end. Lubricant other than that furnished with the pipe shall not be used. The end of the pipe shall then be forced into the ring to complete the joint.
- C. The pipe shall not be deflected either vertically or horizontally in excess of the printed recommendations of the manufacturer of the coupling.
- D. When pipe laying is not in progress, the open ends of the pipe shall be closed to prevent trench water from entering pipe. Adequate backfill shall be deposited on pipe to prevent floating of pipe. Any pipe which has floated shall be removed from the trench, cleaned, and re-laid in an acceptable manner. No pipe shall be laid when, in the opinion of the Engineer, the trench conditions or weather are unsuitable for such work.

7. Installation of Bends, Tees, and Reducers

- A. Cast-iron and PVC fittings shall be installed utilizing standard installation procedures. Fittings shall be lowered into trench by means of rope, cable, chain, or other acceptable means without damage to the fittings. Cable, rope, or other devices used for lowering fittings into trenches shall be attached around exterior of fittings for handling. Under no circumstances shall the cable, rope, or other device be attached through the fitting's

interior for handling. Fittings shall be carefully connected to pipe or other facility, and joint shall be checked to ensure a sound and proper joint.

6.9 POLYVINYL CHLORIDE (PVC) PRESSURE PIPE

1. General

Section Includes

A. Polyvinyl chloride (PVC) pipe for pressurized service applications.

Submittals

B. The Contractor shall prepare and submit one copy to the City of Folsom information on materials, pipe dimensions and gaskets, thrust restraint devices catalog data, materials of construction, coatings and dimensions.

2. Materials

POLYVINYL CHLORIDE (PVC) PIPE – Pressure CLASS TYPE

A. Pressure

1. 4-inch diameter to 16-inch diameter in nominal size: Conform to AWWA C900, Pressure Class 235 and DR of 18 unless otherwise indicated.
2. Greater than 16-inches in diameter: Refer to Ductile Iron Specification 6.10
3. Pipe Materials: Manufactured from Class 12454A or 12454B virgin compounds as defined in ASTM D1784.
4. Outside Diameter of Pipe: Conform to outside diameter of cast iron pipe to allow connection directly into cast or ductile iron fittings without adapters.
5. Joint Design: Gasketed push-on.
6. Gaskets: Elastomeric with solid cross section, meeting the requirements of ASTM F477.
7. Pipe Lengths: Standard laying length of 20 feet. Shorter pipe lengths may be used in curved alignments to meet manufacturer's joint deflection limitations.
8. Color: Green
9. Markings: "Caution: Sanitary Sewage Force Main". Stamp on opposite sides of pipe every three feet.
10. 10 Gauge Tracer wire shall be installed on any sanitary sewer force main. In the event of dual force mains, tracer wire shall be attached to both force mains.

RESTRAINED JOINT DEVICES

A. Pressure Class Pipe

1. 4-inch diameter to 16-inch diameter in nominal size:
 1. Integral Pipe Restraints: Restraint devices shall utilize machined grooves on the pipe spigot ends and the coupling/pipe bell. When assembled, splines are inserted through entry holes in the coupling/pipe bell, resulting in a continuous circumferential restrained joint, including flexible elastomeric gaskets to providing a hydraulic pressure seal. The pipe restraint system shall contain no metal components.
 - a. Manufacturers:
 - i. NAPCO, C900/RJ Certa-Lok.
 - ii. NAPCO, C900/RJIB Certa-Lok.
 - iii. Or approved equal.
 2. Restrained Joints on straight pipe, larger than 16-inches in nominal diameter, Refer to Section 6.10 Ductile Iron Pipe.
 3. Restrained Joints on Pipe Fittings and Valves
 - a. Use concrete thrust block as outlined on Standard Construction Drawing WR-04 at location indicated on the drawings as the primary method of restrain for PVC C-900 pressure pipe size 4-inch to 16-inch in diameter.
 - b. Restrained Joints on Pipe, Larger than 16-inches in nominal diameter, refer to Section 6.10 Ductile Iron Pipe.

3. Product Delivery, Storage and Handling

A. Handling

1. Use wide fabric choker slings, do not drop pipe or fittings, do not use hooks.
2. Use extra care when handling and installing PVC pipe during cold weather due to reduced impact resistance.

B. Storage

1. Protect piping from exposure to sunlight, store and use lubricants in a manner that will avoid contamination.
2. Store loose rubber gaskets in a cool, dark location away from grease, oil, and ozone producing electric motors. Store pipe on a surface which provides even support for the pipe barrel. Do not store pipe in such a way as to be supported by the bell.

4. Inspection

- A. Promptly remove PVC pipe with any of the following visual defects from the project site:
 1. Pipe that is sufficiently out-of-round to prohibit proper joining.

2. Improperly formed ends.
3. Fractured, cracked, chipped, dented or otherwise damaged pipe.
4. Pipe that has been damaged during shipment or handling.

5. Preparation

- A. Straight Pipe Runs: Cut pipe smooth, straight, and at right angles to the pipe axis with saws or pipe cutters designed specifically for the material. Remove any burrs and dust from the jointing surfaces. Bevel cut ends in accordance with manufacturer's recommendations.

6. Installation (Water standards more in depth Items E-H)

- A. Prior to making up pipe joints, clean the socket and plain end of the pipe and apply pipe lubrication meeting the requirements of AWWA C111.
- B. Insert the plain end of the pipe into the socket and press the gasket into its proper position within the socket.
- C. Tighten bolts on joint restraint harness to the torque recommended by the manufacturer.
- D. Do not disturb previously completed joints during the joining operation.
- E. Restraint hardware shall be stainless steel.
- F. All pipe less than or equal to 12-inches in diameter shall be manually assembled. No mechanical equipment (i.e. backhoe) shall be allowed. Pro-Pipe Eagle-Claw or equal is acceptable to assemble pipe.
- G. For pipes greater than 12-inches in diameter, Contractor is allowed to use hydraulic jack/bore if granted approval from the City.
- H. If installation of the pipe and/or appurtenances are installed in such a manner that voids the manufacturer's warranty, then the Contractor shall be responsible for correcting the pipe and/or appurtenances installation issue. City acceptance of the pipe system will only be granted if the manufacturer's warranty can be guaranteed by the manufacturer in the form of an acceptance letter.

6.10 DUCTILE IRON PIPE

1. General

- A. Ductile iron pipe, joints, fittings, gaskets, and pipe lining and coating.
- B. Standards: The most recent AWWA standards shall be followed for manufacture and installation
 - a. ANSI/AWWA C104/A21.4 Cement-mortar Lining for Ductile Iron Pipe and Fittings for Water

- b. ANSI/AWWA C105/A21.5 Polyethylene Encasement for Ductile Iron Pipe Systems
 - c. ANSI/AWWA C110/A21.10 Ductile Iron and Gray Iron Fittings, 3-in. through 48-in. for Water and Other Liquids
 - d. ANSI/AWWA C111/A21.11 Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings
 - e. ANSI/AWWA C115/A21.15 Flanged Ductile Iron Pipe with Ductile Iron or Gray Iron Threaded Flanges
 - f. ANSI/AWWA C150/A21.50 Thickness Design of Ductile Iron Pipe
 - g. ANSI/AWWA C151/A21.51 Ductile Iron Pipe, Centrifugally Cast for Water
 - h. ANSI/AWWA C153/A21.53 Ductile Iron Compact Fittings, 3-inch through 24-inch and 54-inch through 64-inch for Water Service ANSI/AWWA C600 Installation of Ductile Iron Water Mains and their Appurtenances
- B. Submit one copy to the City of Folsom the following information: Manufacturer's certificates of compliance with the specified standards, shop drawings that provide a detailed drawing showing alignment of pipes, location of valves, fittings, and appurtenances, type of joints, connections to structures and thrust restrain details. Also provide product data such as description of fittings, gaskets, couplings, grooving of pipe and fittings, pipe linings, and coatings

2. Products

A. Ductile Iron Pipe

1. Type: Conforming to AWWA C 150 and AWWA C 151 with minimum pressure class 350 for pipe diameter less than and equal to 14inches; minimum pressure class 250 for 16-inch through 20-inch diameter; minimum pressure class 150 for 24-inch diameter and larger.
2. Pipe Joints
 - a. Use push-on type joints on buried pipe unless restrained joints are specifically indicated on the Drawings.
 - b. Use restrained joints on buried piping on fittings that create a change in pipe size and on fittings that result in a change of direction, whether the change is in horizontal plane or a vertical plane.
 - c. Use flanged joints on all exposed pipes. Use flanged joints in buried situations only where flanged joints are specifically indicated on the Drawings.
 - d. Exposed Piping: To the greatest extent possible, use factory-assembled pipe spools with flanges for exposed piping. Field cutting pipe to match field

conditions will be allowed in limited quantities as determined by the Construction Manager.

3. Flanged Joints
 - a. Screw-on type with diameter, thickness, bolt holes, and other characteristics conforming to ANSI B 16.1.
 - b. Material: Ductile iron.
 - c. After installation of flanges, machine flange face to make perpendicular to axis of the pipe.
 - d. Bolt Holes on Flanges:
 - e. 2-holed and aligned at both ends of pipe.
 - f. Cap Screw or Stud Bolt Holes: Tapped.
 - g. Bolts and Nuts: Conform to ANSI/ASME B 16.1.
 - 1) Aboveground and Exposed Pipe: Corrosion resistant, high strength, low alloy.
 - 2) Underground, in concrete pipe valve boxes, or underwater: Use Type 304 or Type 316 stainless steel.
 - 3) Cut and finish bolts to project a maximum of 1/4 inch beyond nut when joints are assembled.
4. Mechanical Joints
 - a. Joint Design: In accordance with AWWA C 111/ANSI A 21.11.
5. Restrained Mechanical Joints
 - a. Design: Lug-type joint.
 - b. Manufacturers: EBBA Iron, Megalug or equal
6. Single Bolt Restrained Joint
 - a. Design: Single Bolt Type
 - b. Manufacturer: One of the following or equal:
 - 1) Romac Industries, Alpha (4-inch through 12-inch)
 - 2) EBBA Iron, Megalug for greater than 12-inch diameter
7. Push-on Joints
 - a. Design: Gasketed type joint suitable for buried service.
 - b. Conforming to AWWA C 111.
 - c. Manufacturers: One of the following, or equal:

- 1) Fastite Joint as manufactured by American Cast Iron Pipe Company.
 - 2) Pacific States Cast Iron Pipe Company.
 - 3) Tyton Joint as manufactured by U.S. Pipe.
 - d. Not permitted on fittings or specials, unless otherwise specified.
 - e. Joint Deflection: Provide an allowable deflection up to five degrees at specified pressures.
 - f. Make joint assembly and field cut joints per AWWA C600 and manufacturer's recommendations.
8. Restrained Push-On Joints
- a. Design: Gasketed type restrained join suitable for buried service.
 - b. Manufacturers: One of the following, or equal:
 - 1) American Flow Control, Flex Ring
 - 2) U.S. Pipe, TR Flex
- B. Gaskets
1. Push-on Joints and Mechanical Joints: Synthetic rubber compound in which the elastomer is Styrene Butadiene Rubber (SBR) and conforming delivery to AWWA C111 unless there are hydrocarbons present. If hydrocarbons are present, specify Buna-N.
 2. Flanged Joints: SBR unless there are hydrocarbons present. If hydrocarbons are present, specify Buna-N.
- C. Pipe Lining
1. Ceramic Epoxy Lining
 - a. Material: An amine cured novolac epoxy containing at least 20% by volume of ceramic quartz pigment.
 - b. Nominal dry film thickness: 40 mils.
 - c. Protecto 401 or equal.
- D. Pipe Coating
1. See Section 6.10.2.F – Cathodic Protection
- E. Ductile Iron Pipe Appurtenances
1. Dismantling Joints
 - a. Flange Spool: AWWA Class D Steel ring flange. Pipe is ASTM A36 plate.
 - b. End Ring and Body: ASTM A36 steel.

- c. Gaskets: SBR made from rubber compounded for water and sewer service.
- d. Bolts and Nuts: Type 304 stainless steel conforming to ASTM A588.
- e. Pressure: Rated to 150 psi.
- f. Manufacturers: Romac Industries Inc., Romac Industries, Alpha (4" -12") or equal. For pipe diameter larger than 12" use Romac Industries, DJ400 or equal.

2. Lug-type Restrained Flange Adapters

- a. Use lug type restrained flanged adapters when connecting flanged joints on pipe, fittings, or valves to straight pipe that has been cut to length in the field.
- b. Material: Ductile iron conforming to ASTM A536.
- c. Restraint Mechanism: Consists of multiple gripping wedges designed to maximize restraint capability. Use torque limiting actuating screws to insure proper initial set of gripping wedges. Restrained flange adapters using set screws are not acceptable.
- d. The flange adapter shall be capable of deflection during assembly, or permit lengths of pipe to be field cut, to allow a minimum of 0.6-inch gap between the end of the pipe and the mating flange without affecting the integrity of the seal.
- e. Manufacturers: EBAA Iron Inc. Series 2100 Megaflange, or equal.

F. Cathodic Protection

- 1. When DIP for sewer force mains are required, installation of a cathodic protection (CP) system will also be required.
 - a. Must be designed in accordance with the most relevant industry standards such as NACE International SP0169 and SP0286.
 - b. Ensure Pipeline is electrically continuous throughout the alignment.

2. Polyethylene Encasement

- a. All Design: Encase all underground ductile iron pipe in double wrap 8-mil high density, cross laminated polyethylene film. Must meet all requirements of ANSI/AWWA C105/A21.5 standard for polyethylene encasement. Seal all ends with two layers of 3M Tape.

3. Delivery, Storage, and Handling

- A. Block piping material for shipment, prevent damage to castings and linings.
- B. Carefully handle piping material during loading, unloading, and installation. Do not drop piping material from cars or trucks. Lower piping material by mechanical means. Do not drop or pound pipe to fit grade.

- C. Repair damaged cement mortar lining to match quality, thickness, and bonding of original lining in accordance with AWWA C 104. When lining cannot be repaired or repairs are defective, replace defective piping with undamaged piping.
- D. Protect gaskets and polyethylene encasement from long term exposure to sunlight.
- E. Store fittings and other accessories such that they do not accumulate and hold rainwater, dirt, and debris.
- F. Pipe shall be covered on both ends prior to placement in the trench, the pipe shall not remain in the trench uncovered overnight.
- G. Fabrication of pipe shall be no older than 18 months prior to installation.

4. Installation

General

- A. Install ductile iron piping in accordance with AWWA C 600.
- B. Lay mechanical joint or bell and spigot pipe to manufacturer's recommendation and warranty on space between the spigot and shoulder of the pockets. Pipe will be rejected if outside of these installation requirements.

Polyethylene Encasement

- A. Wrap ductile iron pipe to be buried with polyethylene encasement in accordance with ASTM A 674 and AWWA C 105.
- B. Repair tears and make joints with two layers of 3M tape.

6.11 SANITARY SEWER MANHOLE, FRAME AND COVER

1. General

- A. The Contractor shall furnish and install all prefabricated manholes, and other structures, complete with grade rings, frames, covers, pipe connections, preformed joint sealant, liners, and cast-in-place bases, and any other necessary appurtenances, in accordance with the requirements of the Contract Documents.
- B. The Contractor shall furnish one copy of complete shop drawings to the City of Folsom for all precast manhole sections, drainage inlets, manhole frames and covers, precast concrete bases, and appurtenances.
- C. After installation, the Contractor shall demonstrate that all manholes and other precast concrete structures have been properly installed, level, with tight joints, at the correct elevations and orientations, and that the backfilling has been carried out in accordance with the Contract Documents.
- D. Only concentric SSMH shall be allowed. Written approval from the City shall be obtained for the use of Eccentric SSMH.

2. Products

MANHOLE FRAMES AND COVERS

- A. Manhole lids and castings for 48-inch diameter barrels shall be 24-inch diameter. 24-inch diameter manhole frames and covers shall be fiber reinforced polymer, GMI composite manhole cover and frame set or approved equal. Manhole lids and castings for 60-inch barrels shall be 36-inch diameter cast iron frame and cover. 36-inch manhole lids shall have at least one pick hole to lift the SSMH lid.

PRECAST CONCRETE MATERIALS

- A. Precast Concrete Sections: Manholes, and other precast concrete structures, shall be constructed of precast concrete sections and shall conform to ASTM C478. Precast concrete sections shall be manufactured by a process that will produce a dense, homogeneous concrete of first quality. The sections shall be steel reinforced and have a minimum wall thickness of four (4) inches. Cement used in manufacturing the sections shall be Type V, Portland cement, as specified in ASTM C150. Precast concrete sections, cones, and grade rings shall be joined using preformed joint sealant only. All manholes shall be pre-cast SSMH bases. Prior approval from the City shall be required for the use of cast-in-place concrete bases. All pre-cast and/or formed channels shall be constructed with inverts to match the adjoining pipes.
 - 1. Manhole Manufacturers, or Approved Equal:
 - A. Jensen Precast, Sacramento, California
 - B. Cook Concrete Products, Redding, California
 - 2. Joint-Seal Material, or Approved Equal:
 - A. Joints for barrel sections shall be tongue & Groove. All barrel joints shall be sealed with Ram-Nek joint sealant, Sika Swellstop, or approved equal.
 - B. Connection of pipe to manhole shall be cast-in flow and outflow SDR-26 bell or coupling only. Between bell or coupling, there shall be a cast in water stop gasket that conforms to ASTM C-923. See SS-01 and SS-02 for further clarification.
- B. Concrete Sealant: Refer to City of Folsom Sewer Standard Detail SS-01 and SS-02 for requirements regarding interior linings and exterior coatings.

DESIGN LOADS

- A. Vertical Loads: Design all precast manhole rings and accessories to support an AASHTO H-20 truck loading, in addition to soil weight above sloping ring sections and the dead load of all material supported above.
- B. Lateral Loads: Lateral loads shall be as dictated by the following formula or the geotechnical report requirements, whichever are more stringent.
 - Operating: $95 \times H$ (psf) triangular equivalent fluid pressure for dead load plus a live load

surcharge from an H-20 truck, including impact.

Seismic: $23 \times H^2$ (psf) uniform pressure distribution.

Where H = depth below finished grade.

3. Workmanship

- A. Manholes or special structures shall be sound watertight structures, constructed as shown on the Plans. The type of manhole and its location is to be as shown on the Plans. The manhole shall be constructed to the rim elevations shown on the Plans. In paved areas, the Contractor shall set the manhole rim after backfill and site settlement to match the proposed finish pavement elevation based on pavement restoration and pavement overlay requirements, if applicable.
- B. Connections to manufactured, precast items shall be made by casting sections of pipe into the items, using nonshrink grout, and/or using an approved resilient connector.
- C. All precast concrete structures shall be installed in strict conformance with the manufacturer's written instructions, on a foundation, of clean, undisturbed soil or native soil compaction to at least 95% maximum dry density and 6-inch of 3/4-inch crushed rock. After installation of concrete manholes and concrete manhole risers on junction structures, the Contractor shall apply concrete waterproofing sealant to the outside of manhole barrels and manhole risers. The Contractor shall allow sufficient time for sealant to cure, prior to backfill, in accordance with the manufacturer's written instructions.
- D. Existing and new manhole frames and covers shall not be set to final grade until the pavement has been completed, unless otherwise approved by the Construction Manager. Special care shall be taken to protect the SSMH and the temporary SSMH lids prior to being raised to grade. Once the SSMH has been CCTV'd and air tested a water tight temporary lid shall be installed. The temporary lid shall serve to keep the SSMH and the sewer system free from construction loads, debris, unauthorized entry, and inflow and infiltration.
- E. CONNECTION TO EXISTING MANHOLES: Contractor shall core drill openings to existing manholes where new pipes are to connect. The new pipe shall be inserted into the core-drilled opening with a water-stop conforming to Section 02701.3.01.J fitted around the pipe exterior. The annular space between the pipe outside diameter and the cored opening shall be packed with non-shrink grout. After connection the Contractor shall re-channel the inside of the existing manhole base to provide a smooth flow channel to the new exit pipe. The Contractor shall plug any holes remaining from abandoned lines with non-shrink grout.

6.12 VALVES

1. General

Quality Assurance

- A. Unless specified otherwise, each valve body shall be tested with a water test pressure equal to twice its working pressure rating.

Warranty

- A. Supplier warrants equipment (and its component parts) against defects in materials and workmanship under normal use for a minimum of one year after the date of Agency's final acceptance, or manufacturer's warranty whichever is greater, and start of beneficial use of the equipment in accordance with the Contract Specifications.

2. Products

- A. Furnish valves, actuators, stem extensions, and other accessories as indicated.
 - 1. Unless otherwise indicated, provide valves of same size as upstream pipe size.
 - 2. Valves and gates shall be new and of current design.
 - 3. Valves of the same type shall be identical and supplied by a single manufacturer.
- B. Valves 6-inches and larger shall have actuators with position indicators on above ground applications.
- C. Valves and actuators shall have the name of the manufacturer, nominal size, flow direction arrow (where appropriate), design working pressure, and the reference standard cast in raised letters or indelibly marked on an appropriate part of the body.
- D. Valve Ends:
 - 1. 3-inches and smaller: Threaded or soldered ends.
 - 2. 4-inch through 12-inch(Where applicable Single Bolt Alpha End shall be used):
 - a. Buried: Flanged, ANSI A21.11.
 - b. Buried: Single Bolt, Alpha End, American Flow Control or Equal.
 - c. Buried: Push-On Restrained Joint, Flex Ring, American Flow Control or Equal.
 - d. Buried: Mechanical Joint Restraint, EBBA Iron or Equal.
 - e. Others: Flanged, ANSI, 125 pounds
 - 3. Greater than 12-inch
 - a. Buried: Flanged, ANSI A21.11.
 - b. Buried: Mechanical Joint Restraint, EBBA Iron or Equal.

c. Push-On Restrained Joint, American Flow Control or Equal.

E. Shop Painting:

1. Shop paint all ferrous metal surfaces of valves and accessories, both interior and exterior, for corrosion protection, comply with AWWA C550
2. Materials:
 - a. Asphalt varnish: TT-U-51.
 - b. Coal tar: Koppers "Bitumastic Super Tank Solution," Tnemec, or equal.
 - c. Epoxy: Tnemec "Hi-Build Epoxoline," Carboline, or equal.
 - d. Rust-inhibitive primer: Tnemec "77 Chem-Prime," Carboline, or equal.
 - e. Rust-preventive compound: Houghton "Rust Veto 344," "Rust-Oleum R-9," or equal.
3. Surfaces to be painted:
 - a. Unfinished surfaces:
 - 1) Interior: Epoxy.
 - 2) Exterior to be buried, submerged, or located in manholes: Asphalt varnish or coal tar.
 - 3) Other exterior: Rust-inhibitive primer.
 - b. Polished or machined surfaces: Rust-preventive compound.
 - c. Operators and accessories: Rust-inhibitive primer.

F. Actuators:

1. Valve Stem to be Stainless Steel
2. Provide manual actuators for all valves not specified to be power actuated or designed for automatic operation:
 - a. Buried valve, valves operated through floor boxes: 2-inch Wrench nuts.
 - 1) AWWA C504, C508, or C517.
 - 2) Provide two operating keys.
3. Rotation:
 - a. Counterclockwise (to the left) to open.
 - b. The word "OPEN" and an arrow indicating direction to open cast on each valve body or operator.
4. Extension stems:

- a. Extension stems are required for any valve actuator located below 5 feet in depth from finish grade. Stem should extend within eighteen inches of grade.
 - b. Non-rising stems:
 - 1) Solid steel shafting with OD not less than OD of valve stem or galvanized steel pipe with ID not less than OD of valve stem.
 - 2) Connected to valve by a flexible socket coupling.
 - c. Buried valves:
 - 1) Stem to extend within eighteen inches of grade.
 - 2) Provide spaces to center stem in valve box.
 - 3) Provide wrench nut.
- G. Valve boxes:
- 1. Provide for all buried valves, ADS extension sleeve with Christy G5 boxes (Brooks or equal) and cast iron traffic covers.
 - 2. Extensions sleeve depth as required for valve, extension sleeve minimum diameter is 8-inches. Box, cover, and base coated shall be dipped in asphalt varnish.
 - 3. Provide an appropriate word designating the valve service cast on the cover. Also, provide locking grade rings as necessary for proper installation.

Gate Valves

A. Resilient-Seated Gate Valve:

- 1. Features:
 - a. Conforms to AWWA C515
 - b. Ductile Iron Body
 - c. Resilient seat, bronze mounted
 - d. Full Port
 - e. Design working water pressure: 250 psig
 - f. Coatings and Linings
 - 1. Conform to AWWA C550 fusion bonded epoxy
- 2. Manufacturers and Products:
 - a. American Flow Control
 - b. Mueller 2360 (2-inch to 12-inch)
 - c. M & H Valve: AWWA C509 (2-inch to 12-inch)
 - d. or Equal

Combination Air-Release and Vacuum-Relief Valves

A. General

1. Provide valves with the inlet and orifice sizes indicated. If the orifice sizes are not indicated, propose an orifice size suitable for the proposed operating conditions for each valve as part of the submittal.
2. Operating pressures: 150 psi minimum. Provide valves with higher pressure ratings where indicated or as necessary to meet test pressure.
3. Provide valves of the type, and size, and in the location indicated.

B. Combination Air Valves

1. One and Two Inch:
 - a. Type: Single body. Inlet/Outlet shall be NPT
 - b. Manufactured by model: ARI Model D-020, APCO Series 140C, or approved equal.

Eccentric Plug Valves

A. General

1. Plug valve manufacturer has unit responsibility for valve and actuator compatibility. Responsibility of the manufacturer extends to the proper selection, assembly, factory testing, and furnishing of the specified products.
2. Plug Valves shall be non-lubricated, eccentric plug-type valve suitable for drip-tight, bi-directional shutoff at the specified valve design pressure and must comply with ANSI/AWWA C517.

B. Valve Design

1. Port Design: Rectangular shaped with a full pipe cross-sectional area
2. Plug Design:
 - a. Geometry: Eccentrically shaped with a cylindrical seating surface that is offset from the center of the plug shaft.
 - b. Facing:
 - I. Encapsulate entire plug with resilient material.
 - II. Bond between Resilient Facing and Metal Plug: Capable of withstanding 75-pound pull in accordance with ASTM D 429, Method B.
3. Valve Seats: Welded-in overlay of not less than 90 percent pure nickel to form a raised area at least 1/8-inch thick for contact with the plug facing. Machine seat after welding to provide a smooth surface.
4. Shaft Bearing and Bottom Bearing:

- a. Replaceable bearings in the upper and lower shaft trunnions.
 - b. Design: Sleeve-type, permanently lubricated.
5. Shaft Seal: Chevron type packing seal, held in place with an adjustable gland follower. Valves using O-ring type shaft seals are not acceptable.
- C. Valve Body Pressure Ratings
- 1. Valves 12-inches in nominal size and smaller: 175 psi.
 - 2. Valves 14-inches through 36-inches in nominal size: 150 psi.
 - 3. Valves 42-inches through 54-inches in nominal size: 125 psi.
- D. End Connections
- 1. Valves 3 inches and Smaller: Threaded ends.
 - 2. Valves Larger than 3-inches:
 - a. Exposed Piping Systems: Flanged end connections with flange dimensions, facing and drilling conforming to ANSI B16.1, Class 125.
 - b. Buried Piping Systems: Mechanical joint end connections conforming to ANSI A21.11/AWWA C606.
- E. Materials
- 1. Body: Cast iron, ASTM A126, Class B.
 - 2. Plug: Cast iron, ASTM A126, Class B, or cast iron ASTM A436 (Ni-resist), or ductile iron, ASTM A536.
 - 3. Plug Facing: Neoprene or Buna-N.
 - 4. Body Seats:
 - a. Valves less than 3-inches in nominal size: Cast iron, ASTM A126, Class B.
 - b. Valves 3-inches in nominal size and larger: Stainless steel, ASTM A276, Type 304 or nickel.
 - 5. Stem Packing: Buna-N or PTFE.
 - 6. Plug Bearings: Type 316 stainless steel.
 - 7. Bolts, studs, nuts and washers: Zinc plated in exposed installations, type 316 stainless steel in buried installations.

Wafer Check Valves

- A. General
- 1. Acceptable products include Milliken Series 700 or approved equal.

2. Disc, disc arm, shaft, keyways, lever and spring: Capable of closing within 0.05 seconds of pump stoppage and fluid moving at velocity of 8 ft./sec.
3. Spring tension shall be adjustable. The valve design must permit mounting levers and springs on either side of the valve body. Valves must have a clear opening equal to or greater than the connecting piping, with no raised seating surface.
4. Seats must be replaceable, threaded onto the body or fitted with an O-ring seal and locked in place with stainless steel screws or pins. Shafts must be externally replaceable, provided with stuffing box and packing or O-ring seals at each end.

B. Materials

1. Materials of construction shall be as follows:
 - a. Body, Cover: Cast iron, ASTM A126, Class B
 - b. Disc: Cast iron, ASTM A126, Class B
 - c. Seat Rings: Bronze, AWWA C508
 - d. Hinge Shafts and Hinge Pins: Stainless steel, ASTM 276, Type 304
 - e. Shaft Bushings: Bronze, AWWA C508

3. Product Delivery

- A. Prepare Valves and Accessories for Shipment According to AWWA C500, Section 31 and:
1. Seal valve ends to prevent entry of foreign matter into valve body.
 2. Box, crate, completely enclose, and protect valves and accessories from accumulations of foreign matter.

4. Installation

- A. General Valve Installation:
1. Install valves and accessories in accordance with manufacturer's recommendations.
 2. Set valve and valve boxes plumb.
 3. Install valve box directly over valve it serves with top of box flush with finish grade. Provide concrete ring per valve box detail in contract Drawings.
 4. Fill around box with earth and thoroughly tamp on all sides.
- B. Combination Air-Release and Vacuum-Relief Valves:
1. Install vent pipe such that there is a minimum of 12-inches between the vent opening and the finished grade.

5. Adjustments

- A. Check and adjust valves and accessories for smooth operation in accordance with manufacturer's instructions

6. Testing

- A. Following installation, test each valve as part of the pipeline the valve is attached to demonstrate the intended operation and zero leakage when closed.

6.13 FITTINGS AND GASKETS

1. General

- A. Flexible couplings for use in pressure piping as well as non-pressure (Gravity) piping.
- B. Rubber bellows couplings
- C. Rubber gaskets for push-on compression type joints

2. Products

FLEXIBLE COUPLINGS (Pressure Piping)

- A. Manufacturers: One of the following or equal:
 - 1. Unrestrained
 - a. Dresser Industries Style 253, Romac Industries, Inc. Style 501, Smith-Blair, Inc. Series 441, or approved equal.
 - 2. Restrained
 - a. Ebba Iron Mega Lug Series 3800, Romac Industries Inc. 400 RG, Smith Blair Inc. Series 470 or approved equal.
- B. Materials:
 - 1. Center Sleeve: Ductile iron, ASTM A536
 - 2. Follower Flanges: Ductile iron, ASTM A536
 - 3. Bolt and Hex Nuts
 - a. Above Ground: High strength, low alloy steel.
 - b. Buried and Underwater: Type 316 stainless steel.
- C. Coating and Lining: Provide product with fusion bonded epoxy.

FLANGED COUPLING ADAPTERS, 12-INCH AND SMALLER (PRESSURE PIPING)

- A. Manufacturers: One of the following or equal:
 - 1. Dresser Industries Style 127, Romac Industries, Inc. Style FCA501, Smith-Blair Inc. Series 912, or approved equal.
 - 2. Provide restrained flanged couplings adapters where indicated on the Plans.
- B. Materials
 - 1. Flanged Body: Ductile iron, ASTM A126 or ASTM A536.

2. Follower Ring: Ductile iron, ASTM A536.
3. Bolts and Hex Nuts.
 - a. Aboveground: High strength, low alloy steel.
 - b. Buried and Underwater: Type 316 stainless steel bolts.
- C. Flange Design: In accordance with AWWA Class D with ANSI 150 pound drilling.
- D. Coating and Lining: Provide product with shop-applied primer, which is compatible with finish coating to be applied in the field.

FLEXIBLE COUPLINGS (NON-PRESSURIZED PIPING)

- A. Flexible couplings shall be rubber, full-circle, clamp-on type provided with two stainless-steel band, screw clamps to secure the coupling tightly to entering and exiting pipes. All screw-clamp hardware shall be Type 316 stainless steel. Rubber material shall be suitable for sewage service. Use Fernco Series 1056, Calder, or equal.

TRANSITION COUPLINGS

- A. Application: Use transition couplings with function and design similar to flexible couplings and flanged coupling adapters for connecting piping having different outside diameters.
- B. Install transition-coupling products specifically designed and manufactured for that application.

RUBBER BELLOW FLEXIBLE COUPLINGS

- A. Neoprene bodied, flanged connection, pressure rating shall be 75 psi, minimum.
- B. Manufacturer: Red Valve, Metaflex or approved equal.

DISMANTLING COUPLING

- A. Steel Bodied, Flange Connection.
- B. Manufacturer: Romac DJ400, Smith Blair 975 or approved equal.

JOINT GASKETS

- A. Gasket: Conform to ASTM F477.
- B. Gasket: A synthetic rubber compound in which the elastomer is neoprene.
 1. The compound shall contain no less than 50 percent by volume neoprene and be free from factice, reclaimed rubber and other deleterious substances.
- C. The compound shall meet the following physical requirements when tested in accordance with the specified ASTM standards.

1. Tensile Strength (ASTM D412): 1500 psi minimum and the ultimate elongation shall be 350 percent minimum.
2. Hardness (ASTM D2240, Type A Durometer): Hardness in the range of 35 to 50 for concrete spigots and 50 to 65 for steel spigots.
3. Compression Set (ASTM D395):
 - a. Not to exceed 20 percent when compressed for 22 hours at 70 degrees C.
 - b. The test specimens
 - 1) Circular discs cut from the gaskets.
 - 2) Height: 0.500 (+ 0.005 - 0.025) inches.
 - 3) Diameter: That of the gasket but not to exceed 1.129 + 0.010 inches in diameter.
4. Aging (ASTM D573)
 - a. The test specimen deterioration: Less than 20 percent reduction in tensile strength, 40 percent reduction in ultimate elongation, and 15 points increase in hardness.
5. Effect of Liquids (ASTM D471): The maximum volume change in oil and in water shall be as follows:
 - a. Oil: 100 percent in ASTM oil No. 3.
 - b. Water: 15 percent.
 - c. Circular discs cut from the gasket.
 - d. The test specimen's thickness: 0.080 +0.005 inches.
6. Ozone Cracking (ASTM D1149)
 - a. Test specimen: A gasket loop mounted to give at least 20% elongation.
 - b. No cracking visible at two times magnification of the gasket after 100 hours exposure to 1 mg/l ozone at 40 degrees C.

3. Installation

A. Flexible Coupling

1. Install pipe couplings with gap between pipe ends in accordance with the following table.
2. Install flexible coupling with pipe gap located in middle of center sleeve.
3. Install flexible couplings with joint restraint tie rods and harnesses unless specifically shown otherwise on the Drawings.

4. Install tie rods across flexible coupling for joint restraint as indicated

Center Ring Length	Gap Dimension and Tolerance
4 inch through 6 inch	3/8 inch plus or minus 1/8 inch
7 inch	5/8 inch plus or minus 1/8 inch
10 inch and greater	7/8 inch plus or minus 1/4 inch

B. Flanged Coupling

1. Install flanged coupling adapter with end of plain end pipe in middle of flanged coupling body.

6.14 SANITARY SEWER SYSTEM TESTING

1. General

- A. The Contractor shall perform all pipeline flushing and testing, complete, for sanitary sewerage system acceptance and shall be responsible for obtaining, conveying, and disposing of water used in the testing operations.
- B. Use potable water for pressure testing pipelines. Obtain water from the City of Folsom in accordance with City requirements. Contractor must obtain the meter from the City of Folsom and provide a backflow prevention device acceptable to the City of Folsom.
- C. Obtain approval from the City of Folsom and other regulatory agencies to dispose of water in existing sanitary sewers. Contractor is required to pay all costs to convey or transport water to the point of disposal.
- D. All testing operations shall be performed in the presence of the Construction Manager.

2. Contractor Submittals

- A. Submit one copy of the testing schedule for air test, mandrel, and vacuum tests, including proposed plans for test water conveyance, control, and disposal in writing for approval a minimum of one week before testing is to start to the City of Folsom.

3. Materials Requirements

- A. The Contractor shall furnish pumps, compressors, piping, hosing, valves, test gages, test plugs, joint test apparatus, water, power, stop watch, and personnel required for conducting the test. The Contractor shall also furnish a valved connection for City to attach a gage.

4. Execution

- A. All pipelines shall be cleaned by balling, flushing, and/or other approved methods prior to testing. Debris shall be removed from the downstream manhole until all pipelines are clean.
- B. Contractor shall be responsible for the disposal of water released. The Contractor may use the City's sanitary sewer system for disposal of testing water pending approval of the

quantity and timing of the release after all debris in the pipe and the flushing water have been removed.

5. Testing of Gravity Piping

- A. GENERAL: All gravity sewer pipes and service laterals shall be tested for exfiltration and or infiltration and deflection, as specified. All manholes shall be tested for leakage, as specified. Manholes shall be tested prior to backfill new placement, whereas all pipe shall be tested after backfill and compaction prior to testing. All leakage tests shall be completed and approved prior to placing of permanent resurfacing. When leakage or infiltration exceeds the amount allowed by the Contract Documents, the Contractor at its expense, shall locate the leaks, submit a repair procedure(s) for the City of Folsom's review, and make the necessary repairs or replacements in accordance with the Contract Documents to reduce the leakage or infiltration to the specified limits. Any individually detectable leaks shall be repaired, regardless of the results of the tests. Pipe joint leakage repair solely with cement grout will not be permitted.
- B. LEAKAGE TESTS: The Contractor shall, in the presence and under the direction of the Construction Manager, test the watertightness of all main sewer lines. The test will be made before pavement restoration.

The Contractor may test using either the Water Exfiltration Test or the Air Test as described below.

1. When Tested:

- a. In areas to be left unpaved, the pressure test shall be made after the backfill is satisfactorily compacted.
- b. In areas to be paved, the pressure test shall be made after the "sub-base" material has been satisfactorily compacted.

The test, as noted in item a or b above, is considered the "official test." However, preliminary testing is strongly recommended and may be conducted by the Contractor at any time prior to the "official test."

C. Air Test Requirements

1. Air shall be slowly fed into the plugged pipe until the internal air pressure reaches 4.0 pounds per square (psi) inch greater than the average back pressure of any groundwater that may submerge the pipe.
2. At least two minutes shall be allowed for temperature stabilization before proceeding further. Air may be added during the temperature stabilization period to keep air pressure no less than 3.5 psi and no greater than 4.0 psi.
3. The rate of air loss shall then be determined by measuring the time interval required for the internal pressure to decrease from 3.5 to 2.5 pounds per square inch greater than the average back pressure of any groundwater that may submerge the pipe.

4. The minimum test time (minutes: seconds) considered acceptable for a 1 PSI pressure drop is indicated on the Air Test Table:

Pipe Diameter, (inches)	Test Time, (seconds/ft x feet)	Minimum Test Time (minutes: seconds)
4	0.379	3:46
6	0.853	5:40
8	1.517	7:33
10	2.370	9:26
12	3.413	11:20
15	5.333	14:10
18	7.679	17:00
21	10.471	19:50
24	13.676	22:40
27	17.309	25:30
30	21.369	28:20
33	25.857	31:10

5. Each section of sewer main and service lateral shall be tested between successive manholes by plugging and bracing all openings in the sewer lines. If any leaks are found, the air pressure shall be released, the leaks eliminated, and the test procedure started over again.

D. Water Exfiltration Test Requirements

1. After pipe installation and cleaning, the section of pipeline to be tested shall be prepared for testing by plugging the upper side of the downstream manhole and all openings in the upstream manhole except the downstream opening. Where manholes are widely spaced, sections may be tested by blocking upstream end of pipe.
2. A section of pipe prepared as above shall be tested by filling with water to an elevation five feet above the top pipe at the upstream end of the test section, or five feet above the existing groundwater elevation, whichever is greater. The water shall be introduced into the test section at least 24 hours in advance of the test

period to allow the pipe and joint material to become saturated. The level shall not be allowed to fall more than one foot below the initial elevation.

3. The pressure shall be maintained for not less than two hours. Leakage shall not exceed 50 gallons per inch of diameter per mile of pipe for 24 hours.

E. Leakage Test Acceptance

1. Where the actual leakage exceeds the allowable, the Contractor shall determine the cause and correct any visible leaks in the pipeline, manholes, and special structures.

F. Mandrel Test of Sewers

1. The Contractor shall pull a mandrel through each segment of installed flexible pipe to test the amount of pipe deflection incurred during installation.
 - a. A test shall be conducted on the pipe after the trench has been backfilled and compacted to at least four feet above the top of the pipe.
 - b. Tests for final acceptance shall be conducted on all pipe at least eight days after all other utility work has been completed and the trench has been backfilled and compacted to the level of the ground surface in areas to be left unpaved or to the top of the sub base material in areas to be paved.
 2. Mandrels shall be full circle, solid or rigid odd-numbered leg (nine-leg minimum) steel cylinders with pulling rings at each end and be approved by the Construction Manager. The circular cross section of each mandrel shall have a diameter that shall allow only as much initial deflection which would result in an ultimate deflection of five percent. The Contractor shall justify, by calculation, the use of a mandrel smaller than 96-2/3 percent of the pipe base diameter.
 3. The mandrels shall be pulled by hand through the sewer without the aid of mechanical pulling devices. Deficiencies or obstructions found by the mandrel shall be corrected by the Contractor at its expense and rechecked as directed by the Construction Manager.
 4. The mandrel shall be fitted with pulling rings at each end, be stamped or engraved on some segment other than a runner indicating the pipe material specification, nominal size, and mandrel OD (i.e., PVC, D3034-8"-10.92"); and be furnished in a suitable carrying case labeled with the same data as stamped or engraved on the mandrel.
- G. If Inflow/Infiltration (I/I) is found in the sanitary sewer system after an air test has been performed and prior to the sanitary sewer system being connected to any sewer service, the Contractor shall be required to fix all I/I issues. After all I/I issues have been repaired, the Contractor shall perform another air test and CCTV test.

6. Testing of Pressure Sewer Pipe

A. General

1. Prior to pressure testing, clean pipeline of debris, construction materials, dirt and other foreign material within the piping system.
 - a. Pipelines 24-inches in diameter and smaller: Flush at a minimum rate of 2.5 feet per second.
 - b. Pipelines 30-inch and larger: Clean by mechanical means using brooms, wet rags, or compressed air.
2. Do not test pipelines until thrust restraint devices have been installed. Where concrete thrust blocks used, do not begin pressure test until concrete has attained an age of at least seven days.

B. Filling Piping Systems with Water

1. Place temporary bulkheads in the pipe or close new valves, and then slowly fill the piping system with water. Fill pipeline with water at a rate which will not cause surges or exceed the rate at which the air can be released through the air valves at a reasonable velocity.
2. Purge air within the pipeline during the filling operation. Check proper operation of air release valves and air vents during the filling operation to confirm proper operation and venting of air from the pipeline.

C. Pressure Testing Exposed Pipe

1. Pressure test exposed piping with flanged, screwed or welded joints as follows:
 - a. Fill section of piping to be tested with water and raise the system pressure to the test pressure specified in the Piping Schedule. Visually inspect exposed pipe joints, joints at fittings, valves, hydrants, and other piping appurtenances for leaks. Correct leakage as necessary to eliminate the leakage.
 - b. Duration of Pressure Test: Two hours.
 - c. Leakage Allowances: Zero leakage allowance and zero pressure loss between the start of the test and the end of the test.
 - d. Correct any visible leakage by tightening flanges and screwed joints, replacing gaskets or removing defective materials.
 - e. Repeat test until no leakage is observed.

D. Pressure Testing Buried Piping

1. Fill section of piping under test with water and raise the system pressure to the test pressure specified in the Piping Schedule. Visually inspect exposed pipe joints, joints at fittings, valves, hydrants, and other piping appurtenances for leaks. Correct leakage as necessary to eliminate the leakage.

2. Duration of Pressure Test: Two hours.
3. Test pressure: As indicated in the Pipe Schedule.
4. Leakage Measurement: After visually checking for leaks and making corrective adjustments, maintain test pressure by introducing water, if necessary, during the test period. Using a calibrated test reservoir, accurately measure the volume of water introduced into the pipeline to maintain the test pressure.
 - a. The pressure test is successful when the makeup water added during the test is equal to or less than the allowable leakage.
 - b. Allowable leakage is determined as follows:
 - 1) Ductile-Iron Pipe and PVC C900/C905 Pipe

$$L = \frac{SD(P)^{1/2}}{148,000}$$

L = Allowable leakage in gallons per hour.

S = Length of the test section in feet.

D = Nominal diameter of the piping in inches.

P = Test pressure in pounds per square inch gauge.

- 2) Steel Pipe (AWWA C200), Concrete Bar Wrapped Cylinder Pipe (AWWA C303)

- a) Gasketed Joints:

L = 2.5 gallons/inch diameter/mile/24 hours.

L = Allowable makeup water in gallons

- b) Welded Joints: No leakage allowable

- c) Where pipe consists of a combination of welded and gasketed joints, adjust the formula above by the ratio of the two joint types.

- 3) PVC Schedule Pipe and Copper Pipe: No leakage allowable

7. Testing of Manholes

- A. Vacuum Testing: All Project manholes shall be vacuum tested. Vacuum test of all manholes shall be done after the SSMH has been backfilled to subgrade. Vacuum test procedures and requirements shall be as follows:

1. After completion of the manhole barrels but prior to backfilling and grade ring installation, all openings in the manholes are sealed with plugs and a rubber ring "donut" type plug inserted inside the opening of the cone.
2. A small vacuum pump is attached to a hose connected to the plug and 4 psi of vacuum applied.
3. The vacuum is permitted to stabilize at 3.5 psi for 1 minute; then the test is begun.
4. The manhole must maintain vacuum such that no greater than 0.5 psi of vacuum is lost during the specified test period.
5. The specified test period is as follows:

Manhole depth, ft	Test period, min.
0-5	4.5
5-10	5.5
10-15	6.0
Greater than 15	6.5

6. Manholes that fail the test shall be patched as required and retested.
7. A vacuum regulator shall be provided on the vacuum pump such that no greater than 10 psi can be applied to the manhole during the test. All manholes that do not meet the leakage test, or are unsatisfactory from visual inspection, shall be repaired to the satisfaction of the Construction Manager.

8. Cleaning

- A. After the sewers have satisfactorily passed the tests and all structures are complete and before TV inspection, the Contractor, in the presence of the Construction Manager, shall clean each section of the sewer in the following manner after placing a screen in the downstream manhole to catch debris.
- B. Hydraulic Cleaning: All hydraulic cleaning equipment shall be truck mounted. Water jet cleaning equipment shall include a water tank, auxiliary engine, pumps, and hydraulically driven hose reel.
- C. Cleaning shall remove all grit, sludge, rocks, debris, roots, grease accumulations, and obstructions from the sewer. Sewer cleaning method shall be water jetting.
- D. Debris Removal: During cleaning operations, the Contractor shall provide a means of catching and removing the dislodged debris conveyed downstream with the sewer flow. The method chosen shall not allow the transport of debris to downstream sewer reaches.
- E. All debris removed from the sewer may be stored until the day's end, whereupon the Contractor shall be responsible for its proper disposal off site.

- F. Recleaning: If television inspection indicates that the sewer is not adequately cleaned, the Contractor shall remove all equipment or materials from the sewer and reclean the sewer at no additional expense to the Owner.
- G. Water used for cleaning the lines may be discharged to the existing sewer system after screening and removal of solids

9. Inspection of Main Sewers

- A. Television inspection of sewers shall be conducted by the Contractor, and the cost for these inspections shall be included in the bid. Inspection must be completed in the presence of the Inspector and City Representative. Contractor shall provide at least one week notice of television inspection. A DVD of television inspection shall be provided to the City.
- B. The following criteria must be met to pass inspection without requiring remediation:
 - 1. Maximum depth of chip for ends of pipe $\leq 1/4$ -inch.
 - 2. Pipelines 12-inches in diameter or less: Allowable vertical deflection from grade line at a joint $\leq 3/4$ -inch; for larger pipelines, ≤ 1 inch.
 - 3. After cleaning and hydro-flushing any sewer line, the standing water shall not exceed $3/4$ -inch as measured by a target attached to the CCTV equipment.
 - 4. The target size attached to the CCTV camera shall be as follows:
 - a. $1/2$ -inch socket for pipes ≤ 6 -inches in diameter
 - b. 1-inch socket for pipes ≥ 8 -inches and ≤ 12 -inches in diameter
 - c. 1-1/4-inch socket for pipes >12 -inches in diameter

When Tested

- A. The television inspection shall be made after final air or leakage testing, cleaning, and after the "subbase" or "base" material portion of the paving is satisfactorily compacted but before pavement is installed.
- B. In the outfall manhole for the portion of the sewer system to be tested, an 1/8-inch mesh screen shall be installed in the existing discharge pipe to keep debris from the existing system.

Second Sewer Lateral T.V. Inspection

- A. A second sewer lateral TV inspection will occur when the plumber connects the house plumbing to the sewer lateral, in the presence of a City of Folsom Building Inspector.

Delivery of CCTV Videos

- A. All T.V. Inspections shall be recorded onto a c.d. or dvd and given to the City's of Folsom Waste Water Department.

- B. The video shall also include the subdivision name, proper labeling of all upstream and downstream manholes, lengths, dimensions, etc.

CCTV Re-inspection

- A. Any portion of the sewer found not to conform with these Specifications shall be corrected by the Contractor. Sewers so corrected shall be re-televised by the Contractor at the expense of the Contractor.
- B. Any sewer that has been tested and passed, but has allowed debris or sediment to enter the system, shall be cleaned and shall perform another CCTV inspection.

STANDARD DRAWINGS

SS-01	Pre-Cast Standard 48" Pre-Cast Sewer Manhole
SS-02	Pre-Cast Standard 60" Sewer Manhole
SS-03	Cast-In-Place Concrete Manhole Base
SS-04	Inside Drop Connection
SS-05	Inside Drop Connection Manhole Attachments
SS-06	Sewer manhole Frame and Cover
SS-07	Lined Sewer Manhole
SS-08	Sewer Service Lateral
SS-09	Flushing Branch
SS-10	Cleanout to Grade
SS-11	Cleanout to Grade (Less than 4 Foot Depth)
SS-12	Cleanout to Grade (Main Deeper than Lateral)
SS-13	Cleanout to Grade (With Backflow Preventer)
SS-14	Combination Air Release Valve for Sewer Force Mains
SS-15	Sewer System Pipe Bedding for Mains and Services
SS-16	Sanitary Sewer and Water Main Crossing
SS-17	Utility Crossing
SS-18	Water Main and Other Wet Utility Crossings
SS-19	Utility Stream Crossing
SS-20	Sanitary Sewer and Storm Drain Crossing

Section 7: STORM WATER DRAINAGE

7.1 TRENCH BEDDING AND BACKFILL

1. Measurement and Payment

Full compensation for trench bedding and backfill as herein specified, including all equipment, labor, and materials required, shall be included in the price bid per lineal foot for the respective sizes, grades, and types of pipes and conduits listed in the Proposal, and no additional compensation will be allowed therefore.

2. Trench Bedding and Backfill

Unless otherwise indicated on the drawings and in the Special Provisions, the pipe shall be placed on a firm, prepared bed of imported materials. All loose material shall be removed from the new trench bottom before placing the bedding material. Bedding shall extend at least 3-inches below the pipe barrel for pipe diameters 10-inches and smaller and 4-inches below for larger diameters. Compaction of initial backfill around and over the pipe shall be accomplished by hand tamping. Jetting or use of mechanical means, which could subject the pipe to possible damage, shall not be allowed. Other requirements shall be as follows:

The pipe shall be bedded uniformly throughout its length. The bearing shall be achieved by shaping the bedding or by lightly "bouncing" the pipe to set it into the bedding. The Contractor shall then place backfill material to the spring line of the pipe, thoroughly compacting it by shovel slicing if gravel or by light tamping if sand, to provide proper support under the pipe haunches. Care shall be used not to disturb or displace the pipe.

When the trench bottom or walls consists of dredge tailings or cobbles containing void spaces or of any other material which, in the opinion of the Engineer, might allow migration of sand bedding material into the trench walls or bottom, the bedding material used shall be crushed rock or gravel graduated so that 100% will pass the ¾-inch sieve and not more than 15% will pass the No. 8 sieve.

Where solid rock is encountered and blasting is required near the pipe bottom, the rock shall be removed to a minimum depth of 12-inches below the bottom of the pipe, and the trench backfilled with materials conforming to Section 9.2.4.H of these specifications and compacted to a minimum relative compaction of 90%.

Pipe shall not bear on bells or joints. The trench shall be excavated at the pipe joints as necessary to provide at least 1½-inches of bedding material below the bell. No wedging or blocking of the pipe will be permitted.

Initial backfill shall be the material placed from the top of the bedding to a depth of 12-inches above the top of the pipe and pipe bell. Initial backfill shall be placed only with approval of the Engineer.

Pipe bedding and initial backfill for drainage pipes shall be as specified herein and as shown on Standard Drawing SD-04. If trench conditions vary from that shown on the plans, the required type of bedding and initial backfill shall be as directed by the Engineer in accordance with the provisions of Section 9.2.4.C of these Specifications.

Unless otherwise noted on the plans, minimum requirements for bedding and initial backfill for rigid sewer pipe shall be Type II, with an unlimited trench width allowable, subject to the limitations of Section SS11-03 of these Specifications.

A. Bedding and Initial Backfill Materials: RCP, CSP

Bedding and initial backfill materials for Reinforced Concrete Pipe, Corrugated Steel Pipe, drainage pipes shall be crushed rock, gravel, or coarse sand of which 100% shall pass the $\frac{3}{4}$ -inch sieve. The sand shall have a minimum sand equivalent of 50, as determined by Test Method No. Calif. 217.

For pipes less than 24-inches in diameter, bedding and initial backfill material, as specified herein, shall be placed to an elevation of 6-inches above the top of the pipe barrel.

For pipes 24-inches or larger in diameter, bedding and initial backfill material, as specified herein, shall be placed to the spring line of the pipe. Initial backfill material above the spring line of the pipe shall be either the herein specified initial backfill materials, or selected job excavated materials, finely divided and free from debris, organic matter, or pieces larger than 1-inch in diameter. The initial backfill material shall be placed to an elevation 6-inches above the top of the pipe barrel.

For a distance of 3 feet from the open end of a pipe not protected by a headwall or inlet structure, the bedding and initial backfill shall consist of native select, finely divided materials.

Compaction of the bedding and initial backfill material shall be accomplished by shovel slicing, tamping, or other means as directed by the Engineer, to assure that all voids under the pipe haunches and around the pipe are filled. Shaping of the bedding material will not be required. Extra care shall be used in placing and compacting bedding and initial backfill so as not to displace the pipe.

H. Bedding and Initial Backfill Materials: CPEP, PVC

Bedding and initial backfill materials for, Corrugated Polyethylene Pipe, and Polyvinyl Chloride Pipe shall be crushed rock, 100% of which shall pass the $\frac{3}{4}$ -inch sieve. The specified bedding and initial backfill material shall be placed to an elevation of 6-inches above the top of the pipe barrel. The initial backfill material shall be brought up uniformly on each side of the pipe to prevent distortion or displacement of the pipe,

and shall be consolidated by rodding or shovel slicing to assure all voids under the pipe haunches are filled.

For a distance of 3 feet from the open end of a pipe not protected by a headwall or inlet structure, the bedding and initial backfill shall consist of native select, finely divided materials.

3. Intermediate Backfill

Intermediate backfill is that trench backfill above the initial backfill and to a point 2 feet below the top of the trench, or 3 feet below the top of the trench in areas of horticulture and may be of job-excavated material. Intermediate backfill in existing paved areas shall conform to Standard Drawing RD-17.

Intermediate trench backfill over all underground services including storm drain lines, shall not contain any rocks or lumps larger than 3-inches in greatest dimension and shall be placed in a manner which will achieve 90% relative compaction based on the following tests and which is acceptable to the Engineer:

ASTM D1557 laboratory test for maximum dry density at optimum moisture

ASTM D2922 field test for in-place wet density by nuclear methods.

ASTM D3017 field test for in-place moisture content by nuclear methods.

In areas of rounded cobble, the initial bedding and backfill shall be increased to a depth of 12-inches above the crown of the pipe and the cobble material may be used in the intermediate backfill provided that the above compaction can be achieved without the presence of voids in the intermediated backfill.

Compaction of the intermediate backfill shall be achieved by use of mechanical compaction equipment as specified herein. Jetting shall not be allowed as a method of achieving backfill compaction.

Mechanical compaction with pneumatic, vibratory, or other powered equipment acceptable to the Engineer shall not be allowed until the initial backfill is extended to a depth of 12-inches over top of the pipe bell. Intermediate backfill, at or near optimum moisture content, shall be placed in uniform horizontal layers not exceeding 8-inches in loose depth, and compacted to a relative density of 90%. The thickness of the loose layer may be increased only when in-place density tests, satisfactory to the Engineer and conducted at the Contractor's expense, demonstrate that the specified density can be consistently achieved.

Mechanical compaction equipment or methods that produce horizontal or vertical earth pressures which may cause excessive displacement or may damage the pipeline shall not be used.

The Engineer may designate the use of "Imported Select Backfill" in lieu of job-excavated material. If imported select backfill is required, the material and methods of payment shall conform to Section 9.4.1 of these Specifications unless specified otherwise on the plans or in the Special Provisions.

4. Top Backfill

Unless otherwise approved by the Engineer, the top 2 feet of backfill shall be placed and compacted to a minimum relative density of 90%. Top backfill in existing paved areas shall conform to Standard Drawing RD-17. Jetting of top backfill will not be allowed.

If the excavation is through an area used for horticulture, lawns or other cultivated areas, the top 3 feet of backfill shall be designated top backfill with the final 12-inches of backfill consisting of original topsoil, which shall have been removed and stockpiled separately. The topsoil shall be placed over 2 feet of fill that has been compacted to a relative density of 90%. The topsoil shall be compacted by wheel rolling or other suitable means, and the trench then refilled with topsoil as necessary to bring the backfill level even with the level of the surrounding ground.

5. Other Backfill Requirements

The Contractor shall make any accommodations necessary for the Engineer to test backfill compaction at any point throughout the entire depth of intermediate backfill. Such provisions as may be made by the Contractor to accommodate testing shall be a normal part of the work and no additional compensation will be allowed therefore up to a maximum of three tests per 1,000 feet of pipe except that not less than one test shall be required for each pipe reach between manholes.

Where cribbing is used in the trench, the fill shall be carried to a height sufficient to prevent the surrounding ground from cracking or caving into the trench before the cribbing is removed. Backfill around manholes and the pit excavated for boring operations shall be made in the same manner as above specified for trenches. However, whenever the excavated space between the outer wall of the manhole and the undisturbed earth is 12-inches or less, the backfill shall be sand, well compacted.

In highway rights-of-way or traveled areas where cover over the top of the pipe is 24-inches or less, imported select material for all sizes of pipe shall be placed level across the trench to a point 12-inches above the top of the pipe. Backfill above the initial backfill shall consist of aggregate material conforming to Section 2.2.5 or 2.2.6 of these Specifications as applicable.

If, at any time during a period of two year from the date of final acceptance of the project, there is any settlement of the trenches requiring repairs to be made, the Engineer may notify the Contractor to immediately make such repairs at the Contractor's expense (see Articles 5.29 and 6.24 of the General Provisions).

6. Ground Water Removal

Refer to Section 9.2.4G of these Standard Specifications.

7.2 BORING AND JACKING

1. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing by boring and jacking the respective sizes and types of pipe as indicated on the plans and in the Proposal. Where specified or permitted, the pipe shall be placed in a conductor. The unit price bid per lineal foot of bored and jacked pipe shall include the conductor pipe, if specified or if permitted, the pipe to be placed in the conductor, all excavation, backfill, and all other tools, material, labor, and equipment to complete the installation in accordance with the plans and specifications.

2. General

All conductor pipe, pipe to be conducted and fittings shall conform to the applicable portions of these specifications.

The equipment, method and sequence of operation and conductor pipe grades shall be approved by the Engineer before proceeding with the work.

Excavation for the boring operation shall be the minimum necessary to satisfactorily complete the work. Bracing and shoring shall be adequate to protect workmen and any adjacent structure or roadbed. Special backfill requirements may be specified for pipe installed in the area excavated for the boring operation.

Boring and receiving pits shall not be located within the tree protection zone (TPZ) of a protected tree and no boring shall occur within or below the TPZ without a tree permit.

Unless expressly specified otherwise, the Contractor may elect to either jack reinforced concrete pipe directly or place it in a conductor in conformance with these specifications.

3. Direct Jacking of Reinforced Concrete Pipe

Only pipe using double-rubber gasket, fiberglass reinforced epoxy collar, or approved equal type joints may be jacked directly. The pipe must be designed to safely bear all loads imposed by jacking in addition to the design D-loads. Guide rails shall be accurately set to line and grade to insure installation within tolerances allowed. Maximum length of direct jacking shall be 100 feet. The diameter of the hole shall not be more than 0.1 foot greater than the outside diameter of the reinforced concrete pipe.

4. Installation of Conductor

The conductor shall closely follow the boring operation. The bored hole shall not be more than 0.1 foot larger in diameter than the outside diameter of the conductor. Guide rails shall be accurately set to line and grade to insure installation of the conductor within allowable

limits. Conductor diameter shall be sufficient to allow adjustment of line and grade of the conducted pipe to meet allowable tolerances and to allow sand to be placed between the conductor and the conducted pipe. Minimum conductor diameter shall be 6-inches larger than the outside diameter of the conducted pipe joints.

5. Placing Pipe In Conductor

Conducted pipe with joints not larger than the pipe barrel shall be slid into place on two redwood skids, which have been securely fastened to the invert of the conductor or strapped, to the barrel of the pipe, at locations hereinbefore specified.

Pipe sections shall be joined outside the conductor and then slid into place. The space between the conducted pipe and conductor shall be completely filled with clean, dry sand blown into place. The method of placing sand shall be subject to the Engineer's approval. Necessary adjustments in grade shall be made by adjusting the height of the skids.

6. Backfill of Voids

Whenever, in the opinion of the Engineer, the nature of the soil indicates the likelihood of ground loss which would result in a greater space between the outer surface of the conductor or direct jacked pipe than herein allowed, the Contractor shall take immediate steps to prevent such occurrences by installing a jacking head extending at least 18-inches from the leading edge of the conductor. The jacking head shall cover the upper two-thirds of the conductor and project not more than ½-inch beyond the conductor's outer surface. Excavation shall not be made in advance of this jacking head.

Voids greater than allowable shall be filled with sand, soil cement, or grout as directed by the Engineer. Where voids are suspected, the Engineer may direct the Contractor to drill the conductor, to pressure inject grout to refusal, and then to repair the drilled hole. Grouting pressure shall not exceed 50 psi at the nozzle.

7. Tolerances

Extreme care shall be exercised by the Contractor to maintain line and grade during jacking operations. Maximum deviation from stated line and grade of conductor pipe shall be such that line and grade of the conducted pipe can be adjusted a sufficient amount within the conductor pipe to achieve the line and grade shown on the plans. This adjustment shall be made to all pipes deviating from line and grade and not merely to the sections of pipe nearest the end of the conductor.

Directly jacked reinforced concrete pipe will be allowed a maximum deviation of 0.25 foot per 100 feet from intended line and grade unless more stringent tolerances are shown on the plans or directed by the Engineer.

8. Dry Boring Under Curb, Gutter and Sidewalk

Portions of drainage lines which pass beneath curbs and gutters, sidewalks, and other obstructions may be placed by boring. If under the curb, gutter and sidewalk, the bore shall begin at the lip of the gutter and continue to slightly past the property line.

9. Wet Boring of Small Diameter Pipelines

Where expressly specified in the contract documents, 6-inch and smaller pipelines may be installed by wet boring. Pipe material shall be ductile iron as specified in Section 4.4 of these Specifications, with push-on joints. PVC Pressure Class 200 (DR-14) pipe conforming to the requirements of AWWA C900 may be used in lieu of iron pipe. The pipe joint for PVC pipe shall be as specified in Section 8.5.4.C of these Specifications.

If the diameter of the bored hole is more than 0.1 foot greater than the outside diameter of the pipe to be installed, the void shall be backfilled with sand, soil cement, or grout as directed by the Engineer. The limitation on grade deviation as specified in Section 7.4 of these Specifications shall apply.

7.3 CONDUCTOR PIPES

1. Measurement and Payment

Pipe used as a conductor of another conduit under a highway, railroad, or other location, shall be either welded steel pipe, or reinforced concrete pipe, as specified herein. Payment for conductor pipe shall be as specified in Section 7.2.1 of these Specifications.

2. Reinforced Concrete Pipe

Reinforced concrete pipe shall conform to the requirements of Section 7.5.3 of these Specifications except for joints. The pipe must be designed to safely bear all loads imposed by jacking in addition to the design D-loads. Only pipe using double-rubber gasket, fiberglass reinforced epoxy collar, or approved equal type joints may be used.

3. Welded Steel Pipe

Welded steel pipe shall be manufactured of ASTM: Designation A 570 steel. All joints shall be butt-welded. Welded steel conductor shall have a minimum wall thickness of ¼-inch for sizes up to and including 2-inches in diameter and 5/16-inch for sizes 27-inches to 36-inches in diameter.

7.4 PIPE INSTALLATION

1. Measurement and Payment

Measurement of pipe shall be the total distance along the centerline of the pipe as installed from center to center of manholes and shall include the straight run of all wyes and tees where used.

The price per lineal foot of pipe includes the furnishing of all materials for construction of the pipe, fittings and connections and all labor, materials, and equipment necessary to excavate the trench, remove all obstructions, remove and replace all utilities where necessary, bed, place and joint the pipe, backfill the trench, restore the surfaces, test the pipe lines, connect to existing manholes or pipes, furnish pre-construction photographs when applicable, and do all other work necessary to produce a complete and finished job in accordance with the drawings and specifications. The unit price bid shall be the average price for lines of all depths and bedding types of a given size.

2. Pipe Laying

Drainage pipes less than 36-inches in diameter, allowable deviation in profile shall be 0.05 foot. For drainage pipes greater than 36-inches in diameter, allowable deviation in profile shall be 0.10 foot; allowable deviation in slope shall be 0.15 foot in any 10 feet length of pipeline.

Pipe laying shall proceed upgrade with the bell ends of bell and spigot pipe placed upstream. Each section of pipe shall be laid to line and grade as herein specified and in such a manner as to form a watertight, concentric joint with the adjoining pipe. The interior of the pipe shall be cleared of all dirt and debris and excess joint sealing material as the work progresses. Pipe shall not be laid when the condition of the trench or the weather is unsuitable. If pipe with elliptical or quadrant reinforcement is used, care shall be taken to properly orient the axis.

Where plain end vitrified clay pipe with the compression coupling is installed, the Contractor shall tighten the compression bands as pipe laying proceeds. The first length of pipe laid on any run, except where a connection is made to an existing line, shall be anchored securely to prevent movement when each succeeding length is pushed home. After each compression band is torqued, the Contractor shall replace and tamp any bedding material that may have been displaced under the pipe and particularly under the coupler before proceeding with the initial backfill.

All joint surfaces shall be cleaned before joints are made.

The Contractor shall expose the end of existing pipe to be extended, for verification of alignment and elevation, by the Engineer, prior to trenching for any pipe which may be affected. All cost of such excavation and backfill shall be included in the price paid for various items of work. Trench excavation, bedding and backfill shall conform to Section 7.1.2 of these specifications.

3. Existing Utilities

All utility, service, or other conflicting lines which are not in direct physical conflict with the facility under construction, are to be avoided by the Contractor, and no additional compensation will be made therefore. However, the Contractor for his convenience may arrange with the owner of the utility to temporarily disconnect house service lines or other

facilities along the line of work, and the cost of disconnecting and restoring such utilities shall be borne by the Contractor.

Utility or other lines which are in direct physical conflict with the structural section of the facility being constructed or appurtenant structures thereto, and which cannot be avoided by rerouting the facility being constructed, or for which relocation is not provided for in the plans and specifications, will be relocated by the owner of the utility prior to or during construction of the project. If these relocations have not been accomplished at the time the contract is awarded, the Contractor shall schedule his work and cooperate with the owner of the utility for the relocation of the conflicting utility so as to cause a minimum of interference with the Contractor's operations.

Should it become necessary to reroute the facility being constructed to avoid an existing utility or other obstruction and such rerouting is ordered by the Engineer, compensation for the installation of such rerouted line shall be made at the unit price bid for the installation of said facility and no additional compensation will be made except as provided for in Article 9 of the General Provisions.

4. Sequence

On all drainage projects, excepting new subdivision improvements, no more than 3,000 lineal feet of pipe shall be installed before starting manhole construction, installation of service sewers on sewer projects, placement of first lift of pavement, and cleanup with this sequence being maintained throughout the construction period unless otherwise directed by the Engineer. The work set forth above at any given location is to be completed within 15 working days after starting construction at that location. No longer than 30 calendar days shall elapse from the time the trench is backfilled until placement of final paving, unless delayed by weather.

5. Internal Inspection

Upon completion of construction and prior to final inspection, the Contractor shall clean the entire new pipeline of all dirt and debris. Any dirt or debris in previously existing pipes or ditches in the area, which in the opinion of the Engineer resulted from the new installation, shall also be removed by the Contractor. Pipes up to and including 24-inch diameter shall be cleaned by the controlled balling method, except where cover over the top of the pipe at the upstream manhole is 3 feet or less, alternate means of cleaning may be used if approved by the Engineer in writing. Pipes over 24-inch diameter shall be cleaned as approved by the Engineer. Temporary plugs shall be installed and maintained during cleaning operations at points of connection to existing facilities to prevent water, dirt, and debris from entering the existing facility. Water from the drainage system operations shall be routed through a suitable trap to collect any dirt and debris prior to discharging into any downstream facility. The Contractor shall notify the Engineer immediately after completion of the pipe cleaning operations. Cleaning of drainage pipes by the controlled balling method will not be required. As soon as possible after the completion of the pipe cleaning, and prior to placement of

pavement, the Engineer may make a visual internal inspection of the new pipeline either manually or with television equipment.

7.5 PIPE OPTIONS

1. Measurement and Payment

The unit price bid for pipe will be paid only for the horizontal length of pipe placed except as noted herein. In locations where precast manholes or saddle type manholes are to be constructed, measurement for payment shall be made from center of manhole.

Measurement for payment shall include those portions of the pipeline included in special pipe fittings, except where such fittings are listed separately in the Proposal.

The unit price bid for pipe per lineal foot shall include the furnishing of all materials, tools, labor, and equipment necessary to excavate the trench, connect to existing facilities, bed, place, and joint the pipe and fittings, backfill the trench, control dust, and perform all other work necessary to produce a complete installation in accordance with the plans and specifications. The unit price bid shall be the average price for the respective size of pipe at all depths and for all types of surface conditions.

2. Alternates

Following are the alternates for drain pipe. On Proposal items where pipe options are shown, the Contractor shall bid only one of the alternates specified.

A. Within Public Right-of-Way/Easements (City Owned and Maintained)

1. Reinforced Concrete Pipe (RCP) conforming to the specification of ASTM Designation: C76, latest revision.
2. Polyvinyl Chloride (PVC) pipe shall conform to one of the following specifications: ASTM Designation D-3034 for diameters 12-inches through 15-inches and ASTM Designation F2241 for diameters 18-inches through 27-inches.
3. Corrugated Polyethylene Pipe (CPEP) conforming to the specifications of ASTM Designation D3350.
4. Corrugated Steel Pipe (CSP). Corrugated Aluminum Pipe (CAP), Ribbed Steel Pipe, and Non-Reinforced Concrete Pipe (CP) shall not be permitted to be used for any public owned and maintained drainage pipe.

I. Private Property (Not City Owned and Maintained)

1. Any pipe material that will provide a storm drain system with a minimal leakage rate and maximum durability may be used for storm drain pipe which will not be operated and maintained by the City.

3. Reinforced Concrete Pipe (RCP)

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes and classes of reinforced concrete pipe as indicated on the plans and in the Proposal.

J. Specification

Reinforced concrete pipe shall conform to the specifications of ASTM Designation: C76, latest revision.

K. Joints for Reinforced Concrete Pipe

Joints for concrete pipe shall be tongue and groove, bell and spigot, or other approved type, and shall be of such a design that when properly laid, they shall have a smooth and uniform interior surface. Each joint shall be sealed to prevent leakage. Sealing materials shall consist of either cement mortar, rubber gasketed joints, or resilient materials conforming to Section 65-1.06 of the State Specifications. Joints sealed with cement mortar or resilient materials shall be sealed both inside and outside.

If cement mortar is used in sealing the joint, the sealed joint shall be protected and cured in a manner approved by the Engineer. If the sealing material will not adhere to the pipe, or if a portion of the outside of the joint is inaccessible, the Contractor shall use a "diaper" or other method approved by the Engineer to properly seal the joint.

Immediately prior to making a cement mortar joint, the tongue and inside of the groove shall be thoroughly wetted with clean water.

L. Curved Alignment

Curved alignment shall be accomplished by one of the methods described herein. The method to be used shall be as shown on the plans or as approved by the Engineer in writing.

1. Joint Deflection - Maximum permissible deflection for cement mortar or resilient material joints shall be one-half of the bell or groove depth, providing that both the inside and outside of the joint gaps are properly filled with jointing material.

Maximum permissible joint deflection for gasketed joints shall be as recommended by the pipe manufacturer and shall be approved by the Engineer. The Contractor shall submit a copy of the pipe manufacturer's recommendations for approval prior to ordering any pipe. Any gasket jointed pipe ordered prior to the Engineer's approval of the joint deflection recommendations shall be at the Contractor's own risk.

Pipe sections of less than standard length to reduce angular deflection of joints will be allowed only with the Engineer's approval.

2. Beveled Pipe - Sections of pipe with one or both ends beveled may be used for curved alignment. Beveled pipe shall have a maximum deflection of 5 degrees from a plane perpendicular to the pipe axis unless otherwise shown on the plan or approved by the Engineer.

4. Polyvinyl Chloride Pipe (PVC)

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the sizes, thickness and series of polyvinyl chloride pipe, as indicated on the plans and in the Proposal. When fittings are indicated in the Proposal, the Contractor shall bid a unit price per each for the specified fittings. The fittings shall be manufactured and installed as set forth on the plans, in these specifications, and in the Special Provisions. If no item appears in the Proposal for polyvinyl chloride pipe fittings, the cost of furnishing and installing the fittings shall be included in the price bid per lineal foot for the pipe, said measurement to include the centerline length of the fittings installed.

M. Specification

Polyvinyl chloride pipe for drainage shall conform to one of the following specifications:

Diameter	Specifications
8-inches thru 15-inches	ASTM Designation: D3034, SDR35
18-inches thru 27-inches	ASTM Designation: F2241, SDR51

N. Joints and Connection to Structures

Joints shall consist of either an elastomeric gasket coupling or an integral bell and spigot with an elastomeric gasket. The joints shall have seal ring grooves or other approved means for positively holding the gaskets in place. The pipe shall have a stop indicated on the barrel or other approved means to accurately position the pipe end in the joint.

Connections to manholes, drop inlets or other concrete structures shall be made by utilizing manhole adapters or elastomeric seal rings embedded in the concrete.

O. End Sections

PVC pipe shall not be placed in any situation where it will be exposed to the sun's rays and/or possible vandalism. Channel and ditch outfall structures shall use alternative pipe materials, described in these Standard Specifications. Alternative pipe materials shall be placed immediately upstream of the outfall structure to a distance of not less than 300 feet, terminating in a manhole or junction structure.

P. Bedding and Backfill

Bedding and backfill shall conform to Section 7.1.2 of these Specifications.

Q. Deflection Testing

Maximum allowable deflection (reduction in vertical inside diameter) of the installed pipe shall be 5%. On pipes 21-inches in diameter and smaller the Engineer may require the Contractor to furnish a properly sized "Go, No-Go" mandrel, sewer ball, deflectometer, or other approved device and check the pipe for maximum allowable deflection. For pipes larger than 21-inches in diameter, deflection may be determined by other means. At any location where the deflection is determined to be excessive, the Engineer may require the Contractor to remove, re-bed, and if required, replace the pipe.

5. Corrugated High-Density Polyethylene Pipe (HDPE), Drainage

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the sizes of corrugated high-density polyethylene (HDPE) pipe as indicated on the plans and Proposal. When fittings are indicated in the Proposal, the Contractor shall bid a unit price per each for the specified fittings. The fittings shall be manufactured and installed as set forth on the plans, in these specifications and in the special provisions. If no item appears in the Proposal for corrugated high-density polyethylene pipe fittings, the cost of furnishing and installing the fittings shall be included in the price bid per lineal foot for the pipe, said measurement to include the centerline length of the fittings installed.

R. Specification

Type S corrugated polyethylene pipe shall be manufactured from high-density polyethylene (HDPE) virgin compounds and shall conform to AASHTO Designation: M294, unless otherwise specified. The pipe wall shall be of either solid or hollow rib exterior construction with a smooth inner liner.

1. Dimensions

The dimensions given for the pipe are nominal inside diameters from which the average inside diameter shall not vary more than the following:

<u>Pipe Diameter Maximum</u>
12-inch through 18¼-inch
21-inch through 24¾-inch
Over 24½-inch

2. Materials

The HDPE compounds shall conform to the following cell classifications as provided in ASTM Designation: D3350:

<u>Property</u>	<u>Cell Classification</u>
Density	3
Melt Index	2 (a), 3 or 4
Flexural Modulus	4, 5 or 6
Tensile Strength	4, 5 or 6
Environmental Stress Crack Resistance	1, 2 or 3
Hydrostatic Design Basis	0, 1, 2, 3 or 4
Ultraviolet-Stabilizer	C (b)

- a. The Melt Index for cell classification 2 material used to manufacture pipe shall not be greater than 0.6. Rotationally molded couplings and end fittings may be produced from material compounds having a melt index cell classification of 1.
- c. HDPE resin shall contain not less than 2% ($\pm 1/2\%$) carbon black ultraviolet stabilizer.

3. Pipe Thickness, Stiffness and Unit Weight

Wall thickness of Type S corrugated polyethylene pipe shall be the thickness of the inner liner measured between corrugation valleys. The wall thickness of the polyethylene pipe, measured as specified above, shall equal or exceed the minimum wall thickness values in Table 1.

The pipe stiffness shall be determined in accordance with ASTM Designation: D2412 at 5% deflection. Average pipe stiffness shall be determined for each manufactured run from three test specimens. Test specimen length shall be one pipe diameter or a maximum of 36-inches whichever is less. The average pipe stiffness shall equal or exceed the minimum pipe stiffness value for each size of HDPE pipe listed in Table 1.

The pipe unit weight for corrugated HDPE shall be computed as the average weight per foot of length determined from three test specimens, taken from each manufactured run. Each test specimen for pipes 24-inches in diameter and less shall be a minimum length of two pipe diameters. Test specimens for pipes larger than 24-inches in diameter shall be one diameter or a maximum of 36-inches, whichever is less. The weight of pipe specimens shall be determined with any suitable weighing device accurate to 0.10 pounds. The pipe unit weight for each size of polyethylene pipe shall equal or exceed the minimum unit weight value for each size of plastic pipe listed in Table 1.

TABLE 1
HDPE PIPE

Nominal Diameter (inches)	Minimum Wall Thickness (inches)	Minimum Pipe Stiffness (PSI)	Minimum Unit Weight (lbs. per lineal foot)
12	0.035	45	2.7
15	0.035	42	4.0
18	0.050	40	6.0
21	0.050	38	*
24	0.050	34	10.2
27	0.050	31	*
30	0.050	28	15.0
33	0.050	25	*
36	0.050	22	18.1

Note: The asterisk (*) indicates that those pipe sizes either are not available from manufacturers or have not been approved for use.

S. Joints and Connection To Structures

Polyethylene pipe joints shall conform to either standard or positive joint requirements in Section 61-1.02 of the State Specifications. Joints shall consist of a corrugated coupling with close-cell neoprene sponge gasket or heat-shrink polyethylene sleeve. Minimum length of split coupling or heat-shrink sleeve shall be 12-inches or 2/3 diameter, whichever is greater.

Connections to manholes, drop inlets or other concrete structures shall be made by concrete packing a 24-inch long stub into the structure per Section 7.6.1.G of these

Specifications, flush with the inner wall and connecting the stub with a split or heat-shrink coupling.

T. End Sections

Polyethylene pipe shall not be placed in any situation where it will be exposed to the sun's rays and/or possible vandalism. Channel and ditch outfall structures shall use alternative pipe materials, described in these Standard Specifications. Alternative pipe materials shall be placed immediately upstream of the outfall structure to a distance of not less than 300 feet, terminating in a manhole or junction structure.

U. Bedding and Backfill

Bedding and backfill shall conform to Section 7.1.2 of these Specifications.

V. Certificates

In accordance with Section 6-1.07 of the State Specifications, a Certificate of Compliance shall be submitted to the Engineer for the polyethylene pipe furnished. Said certificate shall certify that the plastic pipe complies with the requirements of the specifications, and shall include the resin material cell classification, unit weight of pipe, average pipe stiffness and the date of manufacture.

HDPE pipe supplied shall also be approved for use by the California State Department of Transportation (CALTRANS). A letter of approval from CALTRANS for the proposed HDPE pipe shall be on file in the office of the Director of Public Works. Contractor shall submit said letter of approval for the proposed HDPE pipe from CALTRANS prior to the delivery of HDPE pipe to the construction site, if none is on file in the Director of Public Works' office.

W. Deflection Testing

Maximum allowable deflection (reduction in vertical inside diameter) of the installed pipe shall be 5%. The Engineer may require the Contractor to furnish a properly sized "Go, No-Go" mandrel, sewer ball, deflectometer, or other approved device to check the maximum allowable deflection of pipes 21-inches in diameter and smaller. Deflection testing for pipe diameters larger than 21-inches may be determined by other means approved by the Engineer. At any location where the pipe deflection is determined to be excessive by the Engineer, the Contractor shall remove, re-bed and if required, replace the pipe.

6. Driveway Culverts

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing each of the respective sizes of driveway culvert as indicated on the plans and as directed by the Engineer. The Contractor may elect to use reinforced concrete pipe, non-reinforced concrete pipe.

X. Specification

The minimum nominal thickness of 10-inch and larger corrugated steel pipe shall be 0.064-inch. The minimum nominal thickness for corrugated aluminum pipe shall be 0.060-inch for 10-inch corrugated aluminum pipe and 0.075-inch for 12-inch and larger sizes of corrugated aluminum pipe.

Y. Joints

The pipe and joints shall conform to the requirements as indicated elsewhere in these specifications for the type of pipe used.

Z. Bedding and Backfill

Bedding and backfill shall be of native material, free from refuse and individual particles over 2-inches maximum dimension. Compaction of backfill shall be by tamping, wetting, or both, as directed by the Engineer.

AA. End Finish

The exposed ends of corrugated aluminum pipe with 0.060 and 0.075-inch thickness shall be reinforced with an aluminum band a minimum of 6-inches wide.

7. Flared End Sections

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per each for furnishing and placing each of the respective sizes of steel flared end sections and concrete flared end sections as indicated on the plans and in the Proposal.

BB. Specification

Materials, method of placing, and payment shall conform to Section 70 of the State Specifications.

8. Pipe Fittings and Miscellaneous Pipe Facilities

A. Measurement and Payment

Unless otherwise set forth in the Special Provisions, the cost of furnishing and placing all pipe fittings shall be included in the contract unit price bid per lineal foot of the respective type, size, and classification of pipe. The payment for fittings shall be

included in the length of pipe and no fittings shall be measured separately unless herein specified.

CC. Jointing

All pipe fitting and jointing, including the maximum deflection of joints in curved alignment, shall be in accordance with accepted best practice. Care shall be used to prevent chipping, cracking, or deformation of either end of the pipe during installation. Adjacent pipes at each joint are to be concentric. Maximum allowable eccentricity is 1% of pipe I.D. or $\frac{3}{16}$ -inch, whichever is greater. Greater eccentricity shall be corrected.

7.6 STRUCTURES

1. Precast Concrete Manholes

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price each for constructing the various sizes and types of precast concrete manholes as indicated on the plans and in the Proposal. The contract unit price paid for precast reinforced concrete manholes shall include excavation, precast concrete items, pipe and fittings for stubs and stoppers and as detailed on the Standard Drawings, flat top covers, cast iron frames and covers (hold down bolts where specified), concrete and steel reinforcement, backfill, restoration of street surfaces, and all other labor, equipment and material necessary for completion of the structure in accordance with the drawings and specifications. The unit price bid shall be the average price for manholes of all depths and types indicated on the plans and in the Proposal.

DD. Dimensions

Precast manholes shall consist of cylindrical sections, all with joints and base construction as detailed on Standard Drawings SD-28 or SD-29 for drainage manholes.

EE. Specification

Precast manhole barrels, risers, cones, flat tops, and grade rings shall conform to ASTM Designation: C478 with the additional requirement that the cement used shall be Type II. Manhole sections shall be manufactured without provision for steps.

Flat slab tops shall be constructed of Class A concrete with Type II cement and shall conform to Standard Drawing SD-28.

Manhole bases may be precast or cast-in-place. If precast, they shall be placed on a minimum of 4-inches of crushed rock of $\frac{3}{4}$ -inch maximum size. Elevation differentials of inlets and outlets shall conform to the plans.

Mortar used in finishing the manhole and method of placing shall conform to Section 51 of the State Specifications. An 'Ordinary Surface Finish' as specified in said Section 51 will be required.

FF. Cones

Standard concentric cones conforming to ASTM Designation: C478 shall be used on all manholes shown on the plans unless otherwise specified. Where depth is insufficient for cones, flat slab tops shall be used. Eccentric cones shall be used where specified on the plans. An 18-inch high cone, as shown on Standard Drawing SD-28 may be used for standard 48-inch sanitary sewer manholes where the depth is less than 6 feet. If the depth is less than 3 feet, a flat slab top, as shown on Standard Drawing SD-28 shall be used. Lifting holes in precast cones and grade rings shall be plugged with dry-packed mortar.

GG. Joints

Joints in precast manhole shafts shall be made by buttering the joint space previously laid with mortar, or shall be made with performed plastic sealing compound conforming to Federal specifications SS-S-0021A and installed as recommended by the manufacturer. All joint surfaces shall be thoroughly cleaned prior to placing the sealing compound or buttering with mortar. Both the inside and outside of mortared joints shall be plastered with mortar and the inside brushed to a smooth finish with a wet brush. Special precautions shall be taken to see that the entire joint space is filled with mortar and is watertight.

HH. Frames And Covers

Manhole frames and covers shall be of the type and size shown on the plans and shall conform to Standard Drawing SD-25, or SD-27 unless otherwise stated on the plans or in the Special Provisions. Drainage grate manhole covers shall conform to Standard Drawing SD-26. Frames and covers shall be set flush with the finish grade unless otherwise herein specified or otherwise stated on the plans or in the Special Provisions. In unimproved areas, manholes shall be installed between 6 and 12-inches above finished grade located within a 10-foot diameter level pad (2% max slope) to allow tripod access for maintenance purposes. A minimum of a 6-inch collar of concrete placed around the frame. The concrete shall be 8-inches thick and placed from 1-inch beneath the top of the casting to a point 9-inches below the top of the casting. The joint between the manhole frame and the cone or grade ring shall also be made by buttering the joint space with mortar, or the joint shall be made using an epoxy adhesive. The adhesive shall be as described in Section 95-2.05 of the State Specifications for Pavement Marker Epoxy Adhesive, Standard Set (Spec. 8040-51B-09).

II. Connections

Pipe connections to manholes shall be made such that the pipe is flush with the inside face of the manhole. These connections shall be finished so that entrances are smooth. Unless the manhole is cast around the pipe, connections shall be packed with Class "A" Portland cement concrete, aggregate gradation of fine aggregate, No. 16 sieve size, per State Specifications, Section 90-3, as directed by the Engineer.

All connections to manholes not cast as part of the base shall be by machine coring with the annular space between the pipe and the manhole wall sealed with an expansive grout approved by the Engineer. The minimum spacing between pipes entering manhole and the minimum annular space between the pipe and manhole wall shall be in accordance with Section 7.7 of the Specifications. Pipe connections shall not be made into the cone section of the manhole.

JJ. Cast Portion

The Contractor may, at his option, cast the lower portion of drainage manholes in place. The cast-in-place portion shall not be placed higher than 6-inches above the outside tops of the main incoming and outgoing pipes. Concrete used for construction shall conform to Section 2.4.1.C of these Specifications. Slump shall not exceed 2-inches as determined by the slump cone method of ASTM Designation: C143, or an equivalent slump as determined by Test Method No. California 533. Minimum and maximum wall thickness for the cast-in-place sections shall conform to the following table:

Manhole Diameter	Minimum Wall Thickness	Maximum Wall Thickness
48"	5"	7"
60"	6"	8"
72"	7"	9"

Inside diameters of cast-in-place portions shall equal the diameter of the manhole specified. Standard precast manhole riser sections and/or cones shall be placed above the cast-in-place section to bring the manhole rim up to finished grade.

Maximum and minimum wall thickness for the cast-in-place portion of manholes shall be strictly adhered to. Concrete on the cast portion may be placed neat against undisturbed earth provided wall thickness requirements are met; otherwise, outside forms shall be required.

2. Saddle Manholes

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price each for constructing the various types of saddle manholes as indicated on the plans and in the Proposal. The contract unit price paid for saddle manholes shall include excavation, concrete, precast items, flat top covers, cast iron frames and cover (bolt-on type where specified), concrete reinforcing backfill, restoration of street surfaces, and all other labor; equipment and material necessary for completion of the structure in accordance with the drawings and the specifications. The unit price bid shall be the average price for manholes of all depths as indicated in the plans and in the Proposal.

KK. Specification

Saddle manholes shall be constructed in accordance with Standard Drawing SD-29. Risers, cones, grade rings, flat tops, eccentric cones, and other features of the manholes, shall be constructed in accordance with Section 6.12 of these Specifications.

Manhole frame and cover, Standard Drawing SD-27, shall be used unless otherwise specified on the plans or in the special provisions.

Portland cement concrete and reinforcing steel shall conform to Section 2.4.1.C and Section 2.2.14 of these Specifications.

3. Drop Connections Existing Manholes

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a unit price per each for constructing inside and outside drop connections at existing manholes. The cost of both inside and outside drop connections to all existing manholes shall be paid for at the unit price bid, and shall include excavation, pipe and fittings, concrete, connections to existing pipes or structures, backfill, restoration of surfaces, and all other labor and equipment necessary for completion of the drop connection in accordance with the plans and specifications. The cost of inside and outside drop connections constructed with new manholes shall be included in the unit price for precast reinforced concrete manholes as specified in these Specifications.

LL. Specification

Outside drop connections shall be constructed only at manholes where the plans specifically indicate their construction.

4. Adjust Manholes to Grade

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per each for adjusting manholes and flusher branches to grade or elevation as indicated on the plans and as

directed by the Engineer. Adjustment may be made by utilization of precast grade rings or by a cast-in-place ring, in accordance with Section 7.6.1.C of these Specifications.

MM. Specifications

Method and payment for adjusting manholes shall conform to Section 15-2.05A of the State Specifications, except that raising devices are not allowed and the unit price bid shall include all necessary excavation, backfill, sealing, and concrete and that the unit price shall be the average of all depths and limits of adjustment required.

NN. Manholes Within Traffic Lanes

Adjusting manholes to grade within marked traffic lanes shall be completed, including placing paving material around and to the level of the ring and cover, by the end of the same day on which work is started. If permanent pavement backfill cannot be completed by the end of the work day, the Contractor shall place temporary paving material to the level of the cover.

5. Drop Inlet

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per each for constructing the respective types of drop inlets as indicated in the plans and the Proposal. The price bid per drop inlet shall include all excavation and backfill, concrete, steel, grate, frame, and connections to place the complete unit as set forth on the plans and specifications. The unit price bid shall be the average price for drop inlets of all depths for the type indicated in the Proposal. Cost of removal and replacement of the required amount of any existing curb and gutter to obtain the standard depression, as shown on Standard Drawings SD-05 through SD-12, shall be included in the unit price bid per each drop inlet.

OO. Specification

Drop inlet types shall conform to the Standard Drawings.

Concrete for inlets shall be Class "B" and conform to Section 2.4.1.C of these Specifications. Reinforcing steel shall conform to Section 2.2.14 of these Specifications. The concrete box portion of the drop inlet shall be cast to the proper grade in a maximum of two placements of concrete. Use of grout to adjust the drop inlet frame to the proper grade will not be permitted without specific approval of the Engineer.

Reinforcing bar supports or other approved means shall be used to hold the frame at proper grade during final placement of concrete. Broken pieces of concrete, or other debris, shall not be used for this purpose.

Concrete construction, including formwork, shall conform to Section 51 of the State Specifications. The interior of the drop inlet shall have an Ordinary Surface Finish; exposed top surfaces shall have a Class I Surface Finish. Grate and frame assemblies shall conform to Section 7.6.8 of these Specifications.

6. Area Drains

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a unit price per each for construction of area drains. The unit price bid shall include full compensation all excavation, backfill, concrete, frame, grate, connecting elbow and all other work necessary to complete the installation.

PP. Specification

Area drains shall conform to Standard Drawing SD-13.

7. Metal Downrain Assemblies

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per each for downrain assemblies complete in place at locations shown on the plans. The unit price bid per each downrain assemblies shall include but not be limited to all pipe, joints, inlets, reducers, slip joints, anchor assemblies, excavation and backfill.

QQ. Specification

The requirements for downrain shall conform to Section 69 of the State Specifications and State Standard Plate D87A, except as to payment.

8. Grate Assemblies

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per each for the respective type grate assemblies complete in place.

RR. Specification

Type of grates and frames shall conform to the Standard Drawings. The material and method of placing shall conform to the requirements of Section 70-1.02E of the State Specifications, except for payment which shall be as stated herein.

9. Inlet and Outlet Structures

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price each for construction of inlet structures with trash racks and outlet structures with access control racks. The price bid each for construction of inlet and outlet structures with racks shall include full compensation for all materials, labor, equipment, excavation, and backfill necessary to place the unit, complete, as shown on the plans and in the Specifications. The unit price bid shall be the average for all sizes of the type of rack shown on the plans.

SS. Specification

Inlet structures with trash racks and outlet structures with access control racks, shall conform to Standard Drawings SD-15 through SD-20. Concrete for inlet and outlet structures shall be Class "B" and shall conform to Section 2.4.1.C of these Specifications. Reinforcing steel shall conform to Section 2.2.14 of these Specifications.

10. Castings

A. Measurement and Payment

The cost of furnishing and placing manhole frames and covers, flushing branch frames and covers, drop inlet frames, gutter drain frames and hoods shall be included in the contract unit price bid for manholes, drop inlets, gutter drains and/or other items of work.

TT. Materials

Castings for manhole frames and covers, drop inlet frames, gutter drain frames, open-back hoods, flushing branch frames and covers, or other purposes, shall be tough grey iron, free from cracks, holes, swells, and cold sheets, and be of workmanlike finish. A "Certificate of Compliance" signed by an authorized agent of the manufacturer or supplier shall be required and be delivered to the City of Folsom Department of Public Works as specified herein. Each certificate so furnished shall be accompanied by a copy of test results stating that the material has been sampled, tested, and inspected in accordance with the provisions of the latest issue of ASTM A-48, Gray Iron Castings. Test bars shall be cast and tested for the first lot of casting and every four months thereafter. If production is interrupted for any period longer than four months, test bars shall be cast and tested from the initial lot after production is resumed and every four months thereafter. The first lot is defined as the first castings produced after January 1st of each year. The tension tests specified shall be performed and the results certified by an independent testing laboratory located in the United States of America. The cast iron shall meet the requirements of ASTM Designation: A 48, Class 25. The seating faces of manhole covers and frames shall be machined as shown on the drawings to assure a tight fit and prevent rocking. The name of the manufacturer shall be cast on the manhole cover and on the frame. In addition, the day, month and year of manufacture shall be cast on the frame and cover adjacent to the name of the

manufacturer. 24-inch diameter manhole frames and covers shall conform to Standard Drawing SD-25 unless otherwise specified on the plans or in the Special Provisions. 36-inch diameter manhole frames and covers should conform to Standard Drawing SD-27.

When required by the Engineer, proof-load tests shall be performed on manhole frames and covers in accordance with paragraph 4.7.1 and paragraph 3.11.1 of Federal Specifications RR-F-621C (August 10, 1977) or the latest issue.

When locking type covers are specified, they shall be standard covers drilled and tapped on 120 degrees centers and bolted to the frame with $\frac{7}{16}$ "x $1\frac{1}{4}$ " brass hex head cap screws.

Exposed edges of castings shall be chamfered or rounded, and all exposed surfaces shall be smooth unless otherwise shown.

Manhole frames and covers shall be clearly marked with the country of origin as specified in the Trade and Tariff Act of 1984.

At the Contractor's option, drop inlet frames and open back hoods may be fabricated from steel plate and structural shapes in lieu of cast iron. If the Contractor elects to use fabricated steel drop inlet frames or open back hoods he shall submit drawings of these items to the Engineer for approval prior to fabrication. This submittal requirement does not apply to the drop inlet frame shown on Standard Drawing SD-07.

11. Channel Lining

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per square foot of surface area for placing the various thickness of channel lining as indicated on the plans and in the Proposal. The price bid per square foot of surface area for channel lining shall include full compensation for all labor, materials, and equipment necessary to place the channel lining and ramp paving, as shown on the plans and as specified herein. The vertical legs of cutoff walls shall not be considered surface area, and no separate payment will be made therefore, except, if Alternate A of Standard Drawing SD-22 is selected; the surface area for payment shall be considered the same as for Alternate B.

UU. Materials

Materials for poured-in-place concrete lining shall be Class "B" concrete and shall conform to the 1-inch maximum aggregate gradation as set forth in Section 90 of the State Specifications. Slump for concrete channel lining shall not exceed 4-inches as determined by the slump cone method of ASTM Designation: C 143 or an equivalent slump as determined by Test Method No. Calif. 533. The Engineer may require lesser

slumps if the concrete begins to develop surface cracks. Air blown mortar shall conform to Section 2.4.8 of these specifications. Air blown mortar may be used for side lining only.

When specified on the plans or in the special provisions, grouted cobbles conforming to Section 8.4 of these Specifications shall be used for side and/or bottom lining. Reinforcing and expansion and contraction joints will not be required in grouted cobble lining.

VV. Placement and Thickness

The thickness of the bottom lining in channels shall not be less than 4-inches of poured-in-place concrete. The thickness of the side lining in channels shall not be less than 3-inches of poured-in-place concrete or air-blown mortar.

Lining shall be placed as shown on the plans and Standard Drawing SD-22, and as directed by the Engineer.

The appearance of the lining shall be neat and uniform conforming to the lines shown on the plans or as directed by the Engineer. A 2"x4" header board placed along the top of the lining or other method approved by the Engineer shall be used as a control while placing the lining.

The surfaces of those areas to be lined shall be evenly graded to the lines and grade and sections as indicated on the plans. The surfaces shall be moistened thoroughly to prevent moisture from being drawn from the freshly placed lining. All surfaces on which lining is to be placed shall be free from water, mud and debris, and shall be firm enough to prevent contamination of the fresh lining by earth or other foreign material. Prior to placing any lining, the Contractor shall secure the Engineer's approval of the excavated channel.

Grade control points shall be placed in accordance with 2.1.2.B of these Specifications.

WW. Reinforcement

The channel lining shall be reinforced with 6"x6"x10 gauge welded wire fabric conforming to ASTM Designation: A 185. The welded wire fabric reinforcement shall be embedded in the concrete so that it will be a minimum of 1-inch clear from either face of the concrete unless otherwise noted. Furnishing and placing welded wire fabric shall be included in the price bid for channel lining and no additional compensation will be allowed.

XX. Construction Joints

Construction joints shall be square, and shall be edged with a ¼-inch radius edging tool. The edge shall be thoroughly wetted before the next section of lining is placed. Construction joints shall be constructed whenever the operation is halted for a period exceeding 30 minutes. Welded wire fabric reinforcing shall extend through the construction joint.

YY. Expansion Joints

Transverse expansion joints shall be constructed at intervals of not more than 50 feet and shall be filled with pre-molded expansion joint filler material. The material shall have a minimum thickness of ¾-inch and shall conform to ASTM Designation: D 1751. Expansion joints shall be edged with a ¼-inch radius edging tool.

ZZ. Contraction Joints

Transverse contraction joints shall be constructed at intervals of 10 feet and shall be scored by troweling a groove ⅝-inch in depth and ¼-inch in width. All joints shall be true to a uniform line and neat in appearance.

AAA. Weep Holes

On channels with side lining extending more than 18-inches vertically above the channel toe, weep holes shall be constructed at intervals of 10 feet midway between contraction joints on each side of the channel. The holes shall be backed by a minimum of one cubic foot of aggregate material tied in a burlap bag. The aggregate shall extend at least 6-inches above and below and to each side of the weep hole, and at least 10-inches into the side slope. The side and back of the burlap sack shall be protected from being coated by mortar or concrete during the placing operation by a suitable means approved by the Engineer. On the day following the placing of the material each weep hole shall be rodded to assure that it has not been blocked. All weepholes shall be 2-inches in diameter and made of galvanized steel pipe, schedule 40 or greater, polyvinyl chloride (PVC) pipe, schedule 40 or greater, acryl nitrile butadiene-styrene (ABS) pipe, schedule 40 or greater, or other material approved by the Engineer. The pipe shall be cut to fit the channel slope and shall be placed at an elevation of 1 foot above the toe of slope.

BBB. Cutoff Walls

Cutoff walls shall be constructed around the perimeter at each end of the channel lining and at all locations where the new lining meets structures or existing lining, and in other locations as shown on the plans. The cutoff walls shall be a minimum of 6-inches thick and 18-inches in depth measured from the surface of the lining. The welded wire fabric shall be bent down into the cutoff walls.

CCC. Finishing

Poured-in-place concrete channel lining shall be spread and tamped until it is thoroughly compacted and mortar flushes to the surface. After striking off to grade, the concrete shall be hand floated with wooden floats not less than 4-inches in width and not less than 30-inches in length. The entire surface shall then be broomed with a fine texture hair push-broom to produce a uniform surface. Brooming shall be done when the surface is sufficiently set to prevent deep scarring, and shall be accomplished by drawing the broom parallel to the expansion and contraction joints.

Air blown mortar channel lining shall be placed as early as practicable to prevent damage to the lining subgrade material. The fresh poured concrete surface shall be checked with a minimum 10-foot length straightedge, and all low spots or depressions shall be filled to finish grade. The finished concrete surface shall be smooth and uniformly constructed to the design finish grade. The air blown mortar lining shall have a finish equivalent to a broomed concrete surface.

DDD. Curing

Channel lining shall be sprayed uniformly with a white pigmented or clear curing compound. The material, method, and rate of application shall conform to Section 90-7.01B of the State Specifications.

12. PIPE CONNECTIONS TO STRUCTURES

A. Measurement and Payment

The cost for constructing connections to existing manholes or structures shall be included in the cost per lineal foot of the size and type of pipe to be connected and no additional compensation will be allowed therefore.

EEE. Method

All connections to manholes not cast as part of the base shall be by machine coring with the annular space between the pipe and the manhole wall sealed with an expansive grout approved by the Engineer. The "cut-out" area shall not exceed an area greater than the outside connecting pipe diameter plus 2-inches. Damage to an area greater than the outside connecting pipe diameter plus 2-inches shall be repaired to the satisfaction of the Engineer and may require the replacement of the damaged manhole barrel section.

The minimum spacing between pipes connecting into manholes or structures shall be 10-inches outside pipe diameter to outside pipe diameter or 6-inches outside annular cutout edge to outside annular cutout edge, whichever is greater.

Surfaces in contact with the annular concrete seal around the connection pipe shall be thoroughly moistened and then scrubbed with Portland cement paste. The concrete seal shall be toweled smooth and flush with the interior surface of the manhole or structure.

All sewer pipes shall be connected to structures and manholes by means of a flexible joint within one pipe diameter or 2 feet of the structure, whichever is greater, unless otherwise shown on the drawings or herein specified.

Channelizing of the flow through sanitary sewer manholes shall conform to the details shown on the standard drawing for new manholes.

The Contractor shall notify the Engineer one working day in advance before a connection is made to an existing structure or manhole. Contractor shall schedule work so that interruption of flow is held to a minimum.

STANDARD DRAWINGS

SD-01	No Dumping Public Notice
SD-02	Corrugated Steel Pipe Drainage Inlet Type 1
SD-03	Pipe Connections
SD-04	Storm Drain Pipe Bedding
SD-05	Drop Inlet Frame and Grate for Type A, B, & C
SD-06	Drop Inlet – Type A
SD-07	Drop Inlet – Type B
SD-08	Drop Inlet – Type C
SD-09	Drop Inlet Frame and Grate for Type D and E
SD-10	Drop Inlet – Type D
SD-11	Drop Inlet – Type E
SD-12	Drop Inlet – Type F
SD-13	Area Drain
SD-14	Drainage Swale
SD-15	Pipe Outfall Access Control Rack 18” and Larger
SD-16	Pipe Inlet and Trash Rack 30” and Smaller
SD-17	Pipe Inlet Structure 33” and Larger
SD-18	Pipe Inlet and Trash Rack 33” and Larger
SD-19	Outfall Structure Pipe Less than 18 Inches
SD-20	Outfall Structure Pipe 18” and Larger
SD-21	Erosion Control Ditch Discharge
SD-22	Lined Channel Section
SD-23	Typical Ramp and Transition
SD-24	Grate Manhole Cover
SD-25	Standard 24” Manhole Frame and Cover
SD-26	Drainage Grate Manhole Cover
SD-27	Standard 36” Manhole Frame and Cover
SD-28	Standard Precast Manhole
SD-29	Saddle Manhole
SD-30	Drain Inlet – Type GOL (1 of 4)
SD-31	Drain Inlet – Type GOL (2 of 4)
SD-32	Drain Inlet – Type GOL (3 of 4)
SD-33	Drain Inlet – Type GOL (4 of 4)
SD-34	Storm Drain Outfall Energy Dissipater Type 1
SD-35	Storm Drain Outfall Energy Dissipater Type 2
SD-36	Storm Drain Outfall Energy Dissipater Type 3
SD-37	Storm Drain Outfall Energy Dissipater Type 4
SD-38	High Rate Storm Drain Interceptor

Section 8: STORM WATER QUALITY

8.1 DEWATERING

1. Measurement and Payment

No separate payment will be made to the Contractor for dewatering or temporary drainage facilities unless specifically indicated in the Special Provisions and the Proposal. Such dewatering and temporary drainage facilities shall include but not be limited to provisions for removal and disposal of surface and sub-surface waters either natural or man-made regardless of whether industrial, agricultural or domestic in origin, or storm runoff. The cost of all materials, labor and equipment required for the dewatering or temporary drainage facility shall be included in the price bid for other items of work

8.2 RESEEDING

1. Measurement And Payment

Under this item of the proposal the Contractor shall bid a lump sum price for reseeding the unlined side slopes on the newly constructed channel and all other areas within the easement disturbed by construction. If there is no payment item in the proposal for reseeding, and reseeding is called for on the plans or in the Special Provisions, the cost of reseeding shall be included in other items of work.

2. Installation

The following seed mix shall be used for reseeding unless otherwise specified on the plans or in the Special Provisions:

- 25% Annual Ryegrass, Lolium Multiflorum
- 15% Lana Woolypod Vetch
- 20% Meadow Barley, Hordeum Brachyantherum
- 10% Anderson Blue Wild Rye, Elymus Glaucus 'Anderson'
- 6% Native California Brome, Bromus Carinatus
- 6% Needle Grass, Stipa Pulchra
- 6% Nodding Needle Grass, Stipa Cornua
- 6% California Medic Grass, Melica California
- 6% Deer Grass, Muhlenbergia Rigens

All seed shall be labeled in accordance with the California Food and Agricultural Code and shall be delivered to the site in sealed bags with the vendor's certificate attached. Seed treated with mercury compounds shall not be used.

If the ground surface to be reseeded is hard, the Engineer may require the Contractor to break up the surface by discing, harrowing, or other means approved by the Engineer prior to seeding.

The Contractor shall apply seed at the rate of 50 pounds per acre, or as otherwise specified in the Special Provisions.

Hydroseeding shall be used in lieu of raking in the seeds.

8.3 EROSION CONTROL APRONS

1. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price each for constructing pipe or ditch erosion aprons in those locations shown on the plans. The contract unit price paid for pipe or ditch erosion control aprons shall be full compensation for all labor, materials, excavation, backfill and equipment necessary to place the aprons, complete, in accordance with the specifications and drawings. The unit price bid shall be the average price for all pipe or ditch erosion control aprons of the sizes and types indicated on the plans and in the proposal.

2. Material and Placement

The materials for constructing erosion control aprons shall conform to Section 2.4 of these Specifications. Details of placement shall conform to Standard Drawings SD-20 through SD-21.

When specified on the plans or in the Special Provisions, erosion control aprons shall be constructed of grouted cobbles conforming to Section 8.4 of these Specifications. No reinforcing will be required in grouted cobble aprons.

8.4 GROUTED COBBLES

1. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per square foot of surface area for grouted cobble (erosion control) in place as shown on the plans and in the Proposal. The vertical legs of cutoff walls shall not be considered as surface area for purposes of payment, but shall be included in the unit price bid for grouted cobbles. Payment will be based on the number of square feet of surface area of cobbles grouted in place. No separate payment will be made for the concrete grout material. The contract unit price paid for grouted cobbles (erosion control) shall include cobbles and grout, and all labor, equipment, and other materials necessary for completion of the lining in accordance with the plans, Special Provisions, and these Specifications.

2. Materials and Placement

Cobbles shall conform to the following specifications:

All retained on the 1½-inch sieve; not more than 40% passing the 4-inch sieve; and 10-inch maximum size.

Grout shall consist of Class "B" Portland Cement concrete conforming to the provisions of Section 2.4 of these Specifications. Aggregate shall conform to State Specifications Section 90-3.03.

The cobbles shall be placed in a neat, uniform manner to a thickness of approximately 12-inches. Minimum penetration of the grout into the interstices of the cobbles shall be 4-inches measured from the outer surface of the cobble protection. The grout shall be used before it reaches a temperature of 90 degrees F. The water content of the grout shall be such as to permit gravity flow of the grout into the interstices with limited spading and brooming. The amount of water used may be designated by the Engineer. Aggregate size will be limited to that necessary to obtain the required penetration as stated above, and as directed by the Engineer.

The surfaces of the cobbles to be grouted shall be cleaned of adhering dirt and clay and then moistened. The grout shall be placed in a continuous operation for any day's run at any location. Grout shall be brought to the place of final deposit by use of chutes, tubes, or buckets, or may be placed by means of pneumatic equipment or other mechanical methods. In no case shall grout be permitted to flow on the slope protection a distance in excess of 10 feet.

Immediately after depositing, the grout shall be spaded and rodded into place with suitable spades, trowels, or other approved means until the minimum penetration is obtained.

After the grout has been placed, the rocks shall be thoroughly brushed so that their top surfaces are exposed. The outer rocks shall project $\frac{1}{3}$ to $\frac{1}{4}$ their diameter above the grout surface. After completion of any 10-foot strip, no workman or load shall be permitted on the surface for a period of at least 24 hours and longer if so ordered by the Engineer. Grouted cobbles shall be cured as provided in State Specifications Section 90-7.

Section 9: GRADING

9.1 CLEARING AND GRUBBING

Unless otherwise specified in the Special Provisions or shown on the plans, clearing and grubbing shall conform to Section 15 and 16 of the State Specifications and shall include, but not be limited to, all the work set forth herein.

1. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a lump sum price for clearing and grubbing. If no item for clearing and grubbing is included in the Proposal, it shall be understood that such work will be done as herein specified, and that the cost for such work will be included in the prices bid for other items of work, and that no additional compensation for clearing and grubbing shall be made.

2. Debris

All objectionable materials such as weeds, grass, roots, stumps, trash, broken concrete, and other debris shall be removed from the right-of-way or easement area and disposed of by the contractor.

3. Signs

The protection and maintenance of existing signs and the removal, protection, storage, and resetting of City of Folsom traffic signs that are affected by the work shall be the responsibility of the Contractor, as directed by the Engineer, or as specified in the Special Provisions. Attention is directed to Article 10 of the General Provision regarding detailed requirements for the maintenance of existing traffic control signs.

4. Mailboxes

Removal and resetting of all mailboxes and newspaper tubes which are affected by the construction is the responsibility of the contractor. All mailboxes shall be maintained in an upright position adjacent to the construction area between the time the mailbox is removed and reset in its final location. Mailboxes shall be reset on 4"x4" Douglas fir or redwood posts S4S, unless otherwise noted on plans. They shall be set a minimum of 2 feet in concrete. Mailboxes, which can be salvaged intact, including ornamental or iron supports, shall be salvaged and reset. The bottom of mailboxes shall be set at a height of 3 feet, 6-inches above the back of curb or edge of shoulder. The face of the box shall be set 1 foot behind the back of sidewalk or right-of-way line.

5. Underground

All abandoned pipes conduits and other abandoned structures which conflict with the structural sections of the roadway or underground installation are to be removed and disposed of. All other abandoned pipes indicated on the plans or directed by the Engineer are to be plugged in accordance with Section 9.1.14 of these Specifications.

6. Survey Monuments

Survey monuments and markers shown on the plans or encountered along the line of the work must be preserved. The Contractor shall notify the Engineer of monuments encountered, and shall not remove or damage said monument until the monument can be cross referenced and tied out by the survey party. The Contractor shall allow a minimum of one working day for such referencing to be accomplished. When notified by the Engineer that the ties have been completed, the monument or marker can then be removed. The Contractor is not responsible for the replacement of any monument or marker, the removal of which is necessitated by the work to be performed and which has been referenced and tied as set forth herein. If, through negligence or carelessness on the part of the Contractor, notification is not made as provided above or markers are removed which are not in direct conflict with the construction, the Contractor shall be responsible for the cost of referencing, resurvey, and replacement of the monument or marker. Such sums for the replacement shall be deducted from the final contract payment.

7. Drainage Facilities

The Contractor shall be responsible for maintaining all existing drainage and irrigation facilities and to re-establish the drainage and irrigation ditches and facilities to their original location and condition as soon as possible after completion of the work in the area, to the complete satisfaction of the Engineer, except when such realignment or modification of the existing facilities are set forth on the plans and in other items of work.

8. Sprinklers and Lights

Sprinkler system pipes, heads, hose bibs, and yard lighting systems which interfere with the clearing and grubbing or excavation for roadway or drainage projects within roadway rights-of-way or drainage easements for channels shall be cut and capped at the right-of-way line or easement line unless otherwise set forth on the plans and in the Special Provisions. On projects for underground construction of sewer or water facilities and on drainage projects in public utility easements or other easements, all sprinkler system pipes, heads, hose bibs and all yard lighting shall be replaced and reconstructed to their original location and condition, unless otherwise set forth in the Special Provisions.

9. Trees and Shrubbery

On underground construction of all sewer and water facilities and on construction of underground and open channel drainage facilities when construction is to be performed in

the vicinity of trees, shrubbery, and lawns, the work shall be carried out in such a manner, which will cause minimum damage to public and private property. Those trees, which are to be removed and disposed of, shall be so designated on the plans. Prior to the clearing and grubbing operation on a particular property, the Engineer will designate to the Contractor those trees and shrubbery that may be removed. Trees and shrubbery, which are not to be removed, shall be protected from injury or damage by the Contractor's operations. Trees and shrubs which are to be removed and not specifically designated for disposal, shall be preserved by removing a ball of natural material with the roots wrapped in burlap and kept moist until the work has progressed enough for the replanting of the tree or shrub. The replanting shall be performed in a careful and professional manner. If trees are protected by species or location, a City issued tree permit shall be required. Lawns which are disrupted during the course of construction shall be re-graded to match the existing lawn but not reseeded unless specifically stated otherwise on the plans or in the Special Provisions.

Work in the vicinity of trees shall conform to Article 12 of the General Provisions.

On roadway construction projects the Contractor shall remove all trees, shrubbery, and lawns within the existing rights-of-way, which interfere with the excavation, embankments slopes, ditches, or structures, unless specifically indicated on the plans, or directed by the Engineer to be saved. Tree branches, which extend over the roadway, shall be trimmed to provide a minimum clearance of 14'-6" above the shoulder point of the roadbed unless specifically permitted otherwise in writing by the Engineer. A tree trimmer certified by the International Society of Arborists shall remove the tree branches or shrubbery branches to be removed. If cuts are proposed to be 2" in diameter and greater, then a City issued tree permit shall be required.

10. Fencing

The Contractor shall be responsible for the placing, maintenance, and removal of any temporary fencing that may be necessary along the line of work to confine or protect livestock or pets that may be confined in areas through which the work is to proceed. All existing fences that intersect a fenced channel easement line or a right-of-way line at an angle shall be cut and a new end post equal to or better than the existing shall be set at the right-of-way line and the existing fence attached thereto. Any fences removed for the Contractor's convenience during construction shall be replaced in accordance with Section 2.9.6 of these Specifications.

11. Concrete

Where a portion of a concrete structure, slab, or curb is to be removed, the concrete shall be cut with a concrete saw so that the edge of the remaining concrete shall form a neat, straight line. Where concrete slabs, curbs, ornamental walls, brickwork, or similar items are encountered in the course of the construction of underground facilities, except drainage facilities within road rights-of-way, the structure or facility shall be reconstructed to match the existing portion of the facility. On roadway projects and drainage construction in

highway rights-of-way, the facility shall be removed to the right-of-way line and the end of the facility shall be reconstructed to provide a neat and workmanlike appearance.

12. Disposal and Salvage

All materials removed as provided herein shall become the property of the Contractor and shall be disposed of off the rights-of-way or easement unless otherwise set forth on the plans or in the Special Provisions. Existing public or private improvements which are designated on the plans or in the Special Provisions to be salvaged shall be carefully removed and stockpiled in the right-of-way or easement for later removal by City forces or the adjacent property owner, as specified.

13. Erosion and Silt Control and Stormwater Pollution Prevention

During construction, provision shall be made to prevent erosion and siltation of the downstream drainage system, both from winter runoff or from any dry season flow passing through the construction site. Such provision may include silt basins, silt fences, or other physical means. If the Contractor's methods fail to prevent erosion and siltation, or he fails to provide a protection against erosion and siltation, he shall clean the downstream drainage system to the satisfaction of the Engineer, and he shall be responsible for any damage or penalties, which might result. The Contractor is also required to comply with all provisions of Stormwater Pollution Prevention Plan (SWPPP) as shown on the plans and indicated in the special provisions.

14. Abandonment of Pipes and Manholes

Where the plans call for abandonment and plugging of a pipeline, the exposed end of the pipe shall be plugged with a minimum of 12-inches of concrete. Manholes to be abandoned shall be removed to a minimum of 3 feet below the ground or street surface. The manhole shall then be filled with sand, crushed rock or gravel, compacted by wetting, tamping or shovel slicing. The base of such manholes shall be broken up and partially removed to allow drainage.

9.2 EXCAVATION

1. Unsuitable Material Excavation

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per cubic yard for excavation of unsuitable material. Unsuitable material, by definition, shall be that material determined by the Engineer to be unsuitable in its natural location and condition for roadway, channel, or structural foundation. Unsuitable material shall be that material below a plane, said plane being 2 feet below subgrade of roadway, channel or foundation of structure as determined by the structural section, flow line or foundation or 2 feet below original ground, whichever is lower.

FFF.Approximate Quantity

The quantity shown for this item shall be considered as approximate and is indicated for bid comparison only, and no guarantee is made or implied that the quantities as shown will not be reduced or increased or deleted as may be required by the Engineer.

G.G.G. Embankment and Disposal

The Contractor shall use extra care in excavating unsuitable material so as not to aggravate the condition. If, in the opinion of the Engineer, the Contractor's methods for excavating are increasing the amount of unsuitable material required to be excavated, the Engineer will require the Contractor to take the necessary steps to correct the condition. Unsuitable material excavation, which in the opinion of the Engineer, cannot be worked into roadway embankment, or other embankments, shall be disposed of as set forth under Section 9.5 of these Specifications. Unsuitable materials, which in the opinion of the Engineer can be used in embankments, shall be placed and compacted in the embankment as set forth in Section 2.1.1.F of these Specifications. No additional compensation will be allowed for the placing of unsuitable material in embankments as required herein.

H.H.H. Backfill

Backfill of areas excavated as unsuitable materials shall be placed and compacted to a minimum relative compaction of 95% within 30-inches of finished grade on roadways and structural foundations. Below 30-inches of finished grade on roadways and below subgrade in channels, compaction shall be not less than 90%. Suitable backfill material shall be one of the following:

1. Pit run materials as specified in Section 2.2.1 of these Specifications.
2. Roadway excavation, structural excavation, or channel excavation material approved by the Engineer.
3. Imported borrow as specified in Section 9.3 of these Specifications.
4. Cobbles as specified in Section 2.2.2 of these Specifications.
5. Any combination of "1", "2", "3", and "4".

The selection of the proper backfill shall be at the discretion of the Engineer. Backfill, when made with select material excavated from site, will be paid for at the same contract unit price paid for roadway excavation or channel excavation, whichever applies, and the pay quantity will be the same as that computed for unsuitable material excavation as specified herein. Imported borrow, pit run materials, and cobbles, and the placing of such materials shall be paid for as set forth in these Specifications.

2. Rock Excavation

A. Measurement and Payment

This item of work shall consist of removing rock, boulder outcroppings, and rock masses if encountered during excavation/trenching operations. Payment for this item shall be at the unit price indicated in the proposal per cubic yard for rock excavation. The quantity shown for this item shall be considered as approximate and is indicated for bid comparison only, and no guarantee is made or implied that the quantities as shown will not be reduced or increased or deleted as may be required by the Engineer and shall include all labor, tools, equipment, and for all incidental work necessary to complete this item.

Material that qualifies for payment under this item of the proposal shall be that material that cannot be effectively removed by "mechanical" means. "Mechanical" is hereby defined as within the advertised production rate of a Caterpillar D-8 series crawler tractor, Caterpillar 235 series excavator, or approved equivalent.

The cost for removing rock, boulder outcroppings, and rock masses that **can** be removed by "mechanical" means shall be included with the associated items of the proposal and no additional payment shall be made.

If the use of explosives for rock disintegration is approved by the Engineer, the Contractor shall employ a qualified licensed seismic firm experienced in such work and/or an explosive firm that specializes in explosives for disintegration of subsurface rock with documented experience.

The Contractor shall conform to all applicable codes for the explosive disintegration of rock removal. The Contractor shall obtain all required permits from authorities having jurisdiction before explosives are brought to the site or drilling is started.

The Contractor shall conform to NFPA 495 code for the manufacture, transportation, storage and use of explosive materials, and Section 19-2.03 of the State Specifications, State of California.

The Contractor shall submit to the Engineer for approval of the proposed method of blasting, delay pattern, explosive types, type of blasting mat/cover and rock recovery method. The proposed method of blasting shall be that recommended by the explosives firms.

The Contractor shall personally verify site conditions of rock removal and note irregularities affecting work of this item.

The Contractor by beginning this work item means acceptance of existing conditions.

The Contractor shall remove rock in trenches by excavating 12-inches below invert elevation of pipe and 24-inches wider than pipe diameter.

The Contractor shall coordinate the removal and disposal of excavated material from site with Engineer's permission and coordination.

When rock is uncovered that cannot be removed by mechanical means, the Contractor shall notify the Engineer for a determination of method of rock removal.

The Contractor shall advise Owners of adjacent buildings or structures in writing at least one week prior to blasting. Describe blasting and seismic operations.

3. Structure Excavation and Backfill

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per cubic yard for structure excavation. Structure excavation shall conform to Section 19-3 of the State Specifications, except as herein modified. The contract unit price per cubic yard for structure excavation shall include full compensation for all necessary excavation, structure backfill, and pervious backfill within the limits set forth on the plans, Standard Drawings, and in the Special Provisions. Structure and pervious backfill shall conform to Section 19-3.06 of the State Specifications. Full compensation for trench excavation as herein specified, including all equipment, labor, materials, dewatering, special traffic considerations and safety measures required, shall be included in the price bid per lineal foot of the respective sizes, grades, and types of pipes and conduits listed in the Proposal, and no additional compensation will be allowed therefore.

1. Final Quantity

The quantity of structural excavation shown on the plans and in the proposal shall be the final quantity for which payment will be made as provided in Section 9-1.015 of the State Specifications.

III. Jetting

Jetting of structure backfill will not be allowed except when specifically set forth in the Special Provisions.

JJJ. Existing Structures

When removing an existing structure, which is to be replaced with a new structure, no payment will be made under this item for the area occupied by the existing structure.

KKK. Pipes and Miscellaneous Structures

Payment for and method of excavation and backfill for all pipes, manholes, inlets and miscellaneous facilities shall be as set forth elsewhere in these Specifications.

LLL. Unsuitable Materials

Unsuitable materials encountered at the grade elevation of the structural excavation which are directed by the Engineer to be removed and backfilled shall conform to Section 9.2.1 of these Specifications.

4. Trench Excavation

A. Measurement and Payment

Trench excavation shall include the removal of all materials or obstructions of any nature, and the control of water necessary to construct the work as shown. Unless otherwise indicated on the drawings or permitted by the Engineer, excavation shall be by open cut.

MMM. Exploratory Holes

An encroachment permit must be obtained from the City Department of Public Works prior to any exploratory drilling or excavation within highway rights-of-way, or other public easements. The exploratory holes shall be backfilled with sand or native excavated materials, which shall be jetted or mechanically compacted to prevent subsequent settlement, prior to nightfall of the same day that the exploratory drilling or excavation takes place.

NNN. Trench Width

Minimum trench width shall be the outside diameter of the pipe plus 12-inches. Maximum trench widths at the top of the pipe shall be as shown on the plans for the designated type bedding. For drainage pipe, if no maximum is shown, the Contractor shall conduct the Contractor's operation to limit top trench widths to pipe outside diameter plus 16-inches for pipe 33-inches or smaller, and pipe outside diameter plus 24-inches for pipe 36-inches and larger, except with the specific approval of the Engineer. If trench widths at the top of the pipe, as shown on the plans or as specified herein, are exceeded by any amount, for any reason, the Contractor shall provide stronger pipe or improved bedding and backfill conditions, as approved by the Engineer to meet the changed load requirements. If the trench width is exceeded for any reason within the Contractor's control, the stronger pipe or improved bedding and backfill shall be provided at the Contractor's own expense.

As an alternate to a vertical walled, flat-bottomed trench the contractor may shape the bottom of the trench to the exterior radius of the pipe to be placed, plus a minimum of 6-inches.

Trenching within the tree protection zone (TPZ) shall require a tree permit.

000. Cutting of Pavement

When the trench is in an existing paved area, the pavement shall be sawed or scored on neat lines parallel and equidistant from the trench centerline to a point 8-inches beyond the outside edge of the trench. Pavement between the lines shall be broken and removed immediately ahead of the trenching operations. The existing pavement shall be removed in conformance with Standard Drawing RD-21. Top backfill in existing paved areas shall conform to Standard Drawing RD-21.

Due to the uncertainty of the location of underground utilities, the pavement shall not be cut until the respective utility companies have marked the location of their facilities and the Engineer has given final approval of the trench alignment.

PPP. Earth Saw Trenching

Trenches to be made by this method shall be cut by a machine that will produce smooth edge cuts in the pavement and will move at a speed in excess of 4 feet per minute while cutting pavement. The trenching machine shall be shielded to prevent loose material from being thrown away from the machine.

The minimum trench depth shall be that which is necessary to provide for 6-inches of cover between the top of the conduit and the finished pavement grade. Under sealed shoulder areas, the trench depth shall be that which is necessary to provide for 8-inches of cover between the top of the conduit and the finished shoulder grade. The trench section shall conform to Standard Drawing RD-21.

Loose material deposited on the pavement behind the cutting machine shall be removed from the pavement immediately and the pavement cleared to allow the passage of traffic. Only those traffic lanes occupied by the cutting machine and the cleanup operation shall be closed and they shall be opened as soon as the work has moved sufficiently to clear them.

The conduit shall be placed in the bottom of the trench and the trench shall be back-filled with portland cement concrete to within 1-inch of the pavement surface of traveled ways of existing pavements and to within 5-inches of the shoulder surface of sealed shoulder. The concrete shall be Class C concrete or 4-sack slurry with 1-inch maximum size aggregate, 1-inch slump and shall contain calcium chloride in an amount not to exceed 3% of the cement content. For electrical work, concrete shall be Class B or 5 sack slurry. The concrete shall be tamped or vibrated to provide a dense material free from excessive voids and rock pockets.

The sides of the trench shall then be coated with an asphaltic emulsion and the remaining depth of the trench shall be backfilled with asphaltic concrete placed in one layer. The asphaltic concrete shall be manufactured with ½-inch maximum sized rock.

The asphaltic concrete shall be compacted by any method that will produce a uniform dense mixture with a surface elevation slightly higher than the adjacent pavement.

Once work is started on a trench, all work necessary to complete that trench shall be performed on the same day. This includes cutting, placing of conduit or cable, removing all spoils from work site, barricades, maintaining a clean road surface for the safety of vehicular and pedestrian traffic, and backfilling trench with concrete or slurry mix.

All trenches or excavations across paved driveways or in paved public rights-of-way, which have not been resurfaced or repaved at the end of the day, shall be backfilled up to within 1-inch of the adjacent surface. Temporary or same-day paving may be required for major streets.

Upon completion of all contract work, the trenches through existing pavement will be inspected, and if found necessary by the Engineer, they will be brought to grade with an appropriate asphaltic concrete mix.

Trenching in the medians may be performed as specified above, except that the requirement that "all work necessary to complete the trench shall be performed on the same day" shall not apply. As an alternate, median trenches may be backfilled to the surface of the median with concrete colored to match the color of the median surface.

The permanent asphaltic concrete pavement replacement shall be completed no later than the working day following placement of the concrete or slurry backfill, and shall be in accordance with these specifications. Seal coats in accordance with Section 2.6 of these Specifications shall be placed to the full width of the pavement replacement plus 12-inches on each side of trench except that seals shall not overlap concrete curb and gutter.

QQQ. Maximum Length of Trench Open

At the end of each working day, there shall be a maximum of 300 feet of open trench in unimproved areas, excluding manhole excavations, for each operation unless otherwise authorized by the Engineer. The remainder of the trench shall be backfilled and compacted, and when in streets, opened to traffic as soon as possible. If set forth in the Special Provisions for the interest of public safety and convenience, the entire trench and all excavations shall be backfilled and equipment relocated as directed at the end of each working day.

RRR. Control of Water

When water is encountered, either ground water or surface run-off, the Contractor shall furnish, install, maintain, and operate all necessary machinery, appliances, and

equipment to keep excavation reasonably free from water until the placing of the bedding material, laying and jointing of the pipe, pouring of concrete, and placing of the shading material has been completed, inspected, and approved, and all danger of flotation and other damage is removed. Water pumped from the trench shall be disposed of in such manner as will not cause injury to public or private property or constitute a nuisance or menace to the public, and the disposal method shall be subject to the approval of the Engineer. Water entering any pipe as a result of ground conditions, the Contractor's use in balling and flushing, storm waters, broken water pipes, or from any other condition shall not be allowed to enter the existing downstream system, except as specified in Section 9.1.7 of these Specifications.

SSS.Special Foundation Treatment

Whenever the bottom of the trench is soft or rocky, or, in the opinion of the Engineer, otherwise unsuitable as a foundation for the pipe, the unsuitable material shall be removed and replaced with crushed rock or gravel as directed by the Engineer, so as to provide a stable and satisfactory base. When the trench bottom is cobbled or of any other material which might, in the opinion of the Engineer, allow loss of sand backfill, the backfill material shall be crushed rock or gravel graduated so that 100% will pass the ¾-inch sieve and not more than 15% will pass the number 8 sieve. Such backfill material shall be compacted to a minimum relative compaction of 90%. If material more than 12-inches below the normal trench bottom as required for proper bedding of the pipe is ordered removed by the Engineer, the excavation below that point and the imported material required to backfill the trench to that elevation shall be paid for as extra work. Before excavation of the pipe trench in fill area or roadway embankments, the fill area or embankment shall be completed to a height above the pipe invert grade line of not less than twice the internal pipe diameter or to final fill or embankment subgrade, whichever is lower, but in no case less than 12-inches above the top of the pipe. Such embankment shall be compacted to a minimum relative compaction of 90% for a distance on each side of the pipe equal to at least two pipe diameters. The remainder of the embankment shall be compacted to the minimum relative compaction specified elsewhere in these specifications for the type of construction being done, or as specified in the Special Provisions or on the plans.

TTT. Excavation Method

Methods used in excavation shall be such as not to cause damage to surrounding property or to unnecessarily damage pavement. Street pads for backhoe outriders and other equipment to prevent unnecessary damage shall be utilized. Protection of trees and shrubbery shall conform to Article 12 of the General Provisions and section 9.1.9 of these Specifications.

5. Sheeting, Shoring and Bracing

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a lump sum price for sheeting, shoring and bracing of trenches and other excavations of 5 feet or greater depth. If no item for sheeting, shoring and bracing is included in the Proposal, it shall be understood that such work shall be done as herein specified, and that the cost for such work shall be included in the prices bid for other items of work, and that no additional compensation will be made. The lump sum price bid for shoring and bracing shall include all labor, materials, equipment, and supplies required for placing and removal of shoring and bracing as herein specified.

UUU. Specifications

The Contractor shall install sufficient shoring and bracing to insure the safety of workmen, protect the work, and protect adjacent improvements. Sheeting, shoring and bracing shall comply with the rules, orders, and regulations of the California Division of Industrial Safety. The Contractor shall submit a plan for protection of workmen in accordance with Section 11.1.2 of these Specifications.

Insofar as possible, sheeting shall not extend below the bottom of the pipe barrel. All sheeting, timbering, lagging, and bracing shall, unless otherwise required by the Engineer, be removed during backfilling, and in such a manner as to prevent any movement of the ground or damage to the piping or to other structures. When the Engineer requires that sheet piling, lagging, and bracing be left in place, such materials shall be cut off where designated and the upper part withdrawn. If steel piling is utilized, it may be withdrawn with compacting of backfill to proceed as it is removed.

VVV. Suspension of Work

Failure to comply with any of the rules, orders, or regulations mentioned herein shall be sufficient cause for, but shall not place any responsibility upon, the Engineer to immediately suspend the work. The Contractor shall be responsible for the adequacy of all shoring and bracing and compliance with the law, and failure of the Engineer to suspend the work or notify the Contractor of any inadequacy of shoring and bracing or non-compliance with the law shall not relieve the Contractor of this responsibility. No compensation for losses incurred by the Contractor for any such suspension will be allowed.

9.3 IMPORTED BORROW

1. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a unit price per cubic yard for imported borrow compacted in place. Imported borrow shall consist of material required for

the construction of embankments and shall be obtained from sources listed in the Special Provisions, or if no sources are listed, from sources the Contractor may elect. The Contractor's optional sources shall be approved in advance by the Engineer. Imported borrow shall be free of roots, vegetable matter, asbestos, and other unsatisfactory material, and be of such character that it will readily bind to form a firm and stable embankment when compacted.

If no item for imported borrow appears in the proposal, the project shall be considered balanced with no imported material required. If the Engineer deems it necessary to place imported borrow due to actual field conditions or actual shrinkage and/or swell factors experienced, the imported material shall be furnished and placed as extra work in accordance with Article 4.12 of the General Provisions.

2. Agreements

The Contractor shall enter into an agreement with the owner of any privately owned material site to hold said owner harmless from any claims for injury to persons or damage to property resulting from the Contractor's operations on said property. The agreement shall contain provisions to relieve the City of any obligation to the owner or claims for injury or damage of persons or property. Before commencing operations at the material site, the Contractor shall deliver satisfactory written evidence of said agreement to the Engineer. The Contractor's attention is directed to Section 6.2 of the State Specifications in regard to local materials and their sources.

3. Placement

The imported borrow material shall have a sand equivalent of not less than the average sand equivalent of the native material that is adjacent to the existing roadbed, or as otherwise set forth in the Special Provisions, and shall be placed and compacted as herein specified for roadway embankment.

9.4 IMPORTED SELECT MATERIAL

1. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a unit price per ton for furnishing and placing imported select material for pipe backfill as shown on the plans and in the Special Provisions or as directed by the Engineer.

The quantity shown for this item is approximate and is indicated for bid comparison only and no guarantee is made or implied that the quantities shown will not be reduced, increased, or deleted, as may be required by the Engineer.

Imported select backfill where required shall be measured on horizontal planes from 12-inches above the top of the pipe to 2 feet below ground surface and for the width of the

trench not to exceed the minimum trench width for the size of the pipe being installed. No compensation will be made for select imported backfill outside the area specified herein.

2. Material

Imported select backfill shall be pea gravel or crushed rock, with 100% passing the ¾-inch sieve and not more than 10% passing the No. 8 sieve, the material shall have a minimum sand equivalent of 50, as determined by Test Method No. Calif. 217.

9.5 SURPLUS MATERIAL DISPOSAL

1. Measurement and Payment

Surplus materials, resulting from excavations or trenching operations that are not required for backfill or embankment construction or to satisfy right-of-way agreements as set forth on the plans and in the Special Provisions, shall become the property of the Contractor, and the Contractor shall dispose of the surplus materials off the rights-of-way or easements unless permitted by the Engineer to be disposed of otherwise. No separate payment will be made for disposal of surplus material and all compensation therefore is to be included in other earthwork items.

2. Agreement

When any materials are to be disposed of outside the rights-of-way or easements, the Contractor shall obtain written permission from the owner upon whose property the disposal is to be made before any materials are deposited thereon. The agreement shall contain provisions to relieve the City of Folsom of any obligation to the property owner for any injury or damage to persons or property. The agreement shall also include a sketch showing the location where the material is to be deposited. A copy of the agreement shall be furnished the Engineer a minimum of 2 working days prior to placing the materials. Excess materials shall not be deposited in any location, which will block or restrict a natural or artificial drain. No material shall be deposited within the drip line of any oak tree except as permitted by Section 9.1.9 of these Specifications.

3. Permits

The Contractor or owner of property where excess material is to be deposited shall be responsible for obtaining all required permits from any agency, which may have jurisdiction over the proposed disposal site.

When any materials are to be disposed of outside the right-of-way or easements which would affect any waterway, the Contractor will be required to obtain a permit from that Agency of the affected waterway in addition to the property owner agreement as set forth above.

Material disposed of shall also conform to the City of Folsom Municipal Code Section 14.29. The Contractor or the owner of property on which material is to be disposed of shall obtain a grading permit, if required, prior to disposal of any excess excavated material.

Copies of any required permits shall be furnished to the Engineer. No permits will be required if disposal sites are shown on the plans unless otherwise specified on the plans or in the Special Provisions.

Section 10: LANDSCAPE AND IRRIGATION

10.1 GENERAL

All landscape and irrigation improvements within the City of Folsom shall be installed in conformance with these Standard Specifications, the City of Folsom Design Standards, the approved project improvement plans and as recommended by the material manufacturer. The Standard Construction Specifications and the manufacturer's guidelines shall be present at the construction site at all times.

All projects shall be in compliance with the State Water Quality requirements for Erosion and Sedimentation Control at all times.

10.2 LANDSCAPING

1. Lawn

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per square foot for lawn planting. The bid price shall include all labor, equipment, and materials necessary to perform the work as indicated on the drawings and specified herein.

WWW. Complete Soil Analysis, Soil Preparation, and Fertilization

Areas to be planted shall be cultivated until the soil is mixed thoroughly and in a loose and fine textured condition to a depth of 6-inches of area to be planted. If hard pan is encountered, cultivated depth shall be 18-inch minimum. Further cultivation shall be provided until all lumps are broken up to the satisfaction of the City.

The top 2-inches shall be cleared of all stones, stumps, dirt clods, debris, etc., larger than 1-inch in diameter, that are brought to the surface as a result of cultivations.

Fertilizer shall be applied in two stages:

1. Initial planting as specified in the Special Provisions.
2. During establishment period as specified in the Special Provisions.

XXX. Soil Settlement

The Contractor shall settle the ground by irrigation to a moisture depth of not less than 8-inches to the satisfaction of the Engineer, and shall be responsible to fill low spots as a result of the settlement. The work shall be so conducted that the existing flow line in the drainage ditches will be maintained.

Materials displaced by the Contractor's operations, which interfere with drainage, shall be removed and disposed of as directed by the Engineer.

YYY. Recultivate and Float

After cultivation and spreading of topsoil, if topsoil is required, finish soil grades shall be flush with grades of walks, curbs, paved areas, and flush with catch basins in all cases, unless indicated otherwise on the plans, and such that surface drainage shall be away from foundations of buildings in all cases. Finish surfaces in all cases shall be in uniform sloping planes to insure proper surface drainage.

ZZZ. Finish Grading

The Contractor shall then fine grade the entire area to smooth and even lines with no abrupt changes in grade or create areas that will pond after turf is established. The area shall have a natural and pleasing appearance, conforming to finished grades shown on the plans. No ridges or grooves over 1½-inches shall be accepted.

Soil around sprinklers shall be graded to prevent damage to sprinklers, and shall be graded to be even with the top of the sprinkler and feathered out 6 to 8 feet.

AAAA. Seeding (March 15th to May 15th, September 1st to October 15th)

1. Inspection of Seed Bed Prior to Seeding - The Contractor shall notify the Engineer 48 hours prior to seeding for inspection of seedbed. The Engineer shall provide the Contractor with written approval of acceptance or disapproval 24 hours prior to schedule of seeding. If the Engineer does not approve seedbed, the Contractor shall continue soil preparation at his expense until the provisions of these specifications are met. Seedbed shall be smooth and even with the top 2-inches cleared of all stones, stumps, dirt clods, debris, etc., larger than 1-inch in diameter.
2. Seeding Procedures - Fertilizer shall be applied at the rate as specified in Special Provisions for lawn areas prior to seeding. The fertilizer shall not be tilled into the ground any deeper than 2-inches. The Contractor shall obtain from the Engineer written approval of the rate of application, method of application, name of applicator or equipment, and areas to which the material is to be applied.
3. Rate of Application (Seed Mixture) - As specified in Special Provisions rate and variety. Immediately after seeding, provide water to moisten the ground.

The Contractor shall be responsible for any erosion or slippage of the soils caused by watering, and the Contractor at his expense shall repair such erosion or slippage and any ridges, gullies or valleys made by seeding equipment.

BBBB. Establishment of Lawn Planting

As a part of this contract there shall be a 90 calendar day establishment period that shall commence after all planting has been completed in accordance with the plans and specifications. Final approval of the completed project will follow the 90-day establishment period unless the planting areas are not acceptable due to poor horticultural practice. If, during the establishment period, areas are lacking in sufficient grass seedling to insure an adequate lawn, these areas shall be re-cultivated and reseeded within 24 hours after written notification from the Engineer. The establishment period, in this case, will be continued until all work meets the requirements of the plans and specifications. The establishment

period shall include continuous operation of watering, weeding, mowing, fertilizing, spraying, insect and pest control, and any other normal operation required to completely assure good growth. All work shall be regular and frequent enough to keep all planting areas in a neat and presentable condition at all times.

All lawn areas, when 3-inches high, shall be mowed to a 2-inch height, and cuttings picked up immediately. Mowing shall be repeated whenever the grass grows to a 3-inch height.

All weeds except broadleaf species, in planting areas shall be controlled or killed before they exceed 2-inches in height as specified in the Special Provisions and as directed by the Engineer. Where broadleaf weeds are in planting areas, they shall be killed or removed before they exceed 4-inches in height. The Engineer shall approve the method of removal. Insecticides, pesticides, or herbicides shall be applied no sooner than 60 days minimum following germination.

Where chemical weed control is permitted by the Special Provisions or the Engineer, the method, type, and recommended rates shall be approved by the Engineer.

All seeded areas will receive fertilizer uniformly spread at the rate as specified in Special Provisions immediately after the second mowing. The Engineer shall be notified at least 5 days in advance of fertilizing.

During the installation and establishment periods the Contractor shall continuously protect and maintain all planting areas, and will be responsible for the repair and replacement of all damaged areas and materials.

Only healthy plants will be accepted at the end of the establishment period. All repairs or replacements shall be made prior to the final inspection, and the Contractor shall continue to maintain all areas until the plants are approved and accepted.

The Contractor may utilize the existing water system during the execution of this contract for the establishment of lawn plantings. The sprinkler system is not designed to germinate seed and Contractor will be required to monitor seed-bed moisture and provide supplemental manual watering as required to develop an acceptable stand of grass. The Contractor shall be required to furnish his own hose and connecting devices.

Materials

1. Topsoil - Topsoil shall consist of fertile, friable soil of loamy character, and shall contain an amount of organic matter normal to the region. It shall be obtained from well drained arable land, and shall be reasonably free from subsoil, refuse roots, heavy or stiff clay, stones larger than 1-inch in size, coarse sand, noxious seeds, sticks, brush, litter, asbestos, and other deleterious substances. Topsoil shall be capable of sustaining healthy plant life.

Topsoil shall be obtained from sources within the project or shall consist of imported topsoil obtained from sources outside the limits of project or from both such sources, whichever is provided in the Special Provisions.

Topsoil obtained from sources within the limits of project shall be excavated to the lines and depths as directed by the Engineer. All lumps or clods shall be broken up before the topsoil is spread. Imported topsoil shall consist of material obtained from sources outside the limits of the project.

Topsoil shall be transported directly from the source to final position unless ordered in writing by the Engineer to be placed in stockpiles. If stockpiling is ordered, the Engineer will designate the locations and amounts of the stockpiles.

2. Commercial Fertilizer - Commercial fertilizer shall be standard uniform pellet form, and shall comply with the chemical analysis specified in the Special Provisions, and shall conform to the requirements of the California Food and Agricultural Code.
3. Superphosphate - Superphosphate shall be composed of finely ground rock as commonly used for agricultural purposes, containing not less than 18 % available phosphate acid. Superphosphate shall conform to the requirements of the California Food and Agricultural Code.
4. Soil Amendment - Soil amendment shall be a ground wood product such as bark or redwood fortified with nitrogen and treated to absorb water quickly, or a relatively dry organic compost derived from sewage sludge. Soil amendment shall be friable and shall be free of weed seed, dust and other objectionable materials. Substantially, all soil amendment shall pass a 1-inch sieve. Soil amendment shall comply with the requirements in the California Food and Agricultural Code.

All soil amendment shall be packaged so that compliance can be readily determined, or shall be accompanied by a Certificate of Compliance in accordance with the provisions in Section 6-3.05E of the State Specifications, "Certificate of Compliance", stating that the material substantially meets all pertinent specification requirements of the contract.

5. Seed - All seed shall be labeled in accordance with the California Food and Agricultural Code and delivered to the site in sealed bags or containers with vendor's certificate attached.

All shipments of seed not accompanied by a valid California Nursery Stock Certificate shall be reported to the Engineer at the point of destination for inspection and shall be held until released by the Engineer.

Seed treated with mercury compounds shall not be used.

6. Water (See Special Provisions)

2. Tree, Shrub, and Groundcover

A. Measurement and Payment

The Contractor shall bid a unit price per each for tree, shrub, and per flat for groundcover planting. The bid price shall include full compensation for furnishing, installing, and doing all necessary work to complete the tree, shrub, and groundcover planting as detailed on the City Standard Drawings, and in accordance with the plans and specifications.

CCCC. Plant Specification

All plants shall conform to ANSI Z60.1. All plants shall be typical of their species or variety and shall have a normal habit of growth. Plants shall be sound, healthy, and vigorous, well branched, and densely foliated when in leaf. Plants shall be free of disease, insects, pests, eggs, or larvae, and properly "hardened off" before planting. Plants shall have well-developed root systems and not be pot bound. All plants shall be true to name and one of each type shall be tagged. All plants shall be inspected by Project Manager or City Arborist prior to installation.

1. Substitutions - When plants of specific variety or sizes specified are not available within a reasonable distance, substitutions may be made, upon request by the Contractor, subject to approval by the City.
2. Inspections - Plants shall conform to accepted minimum standard size for container specified and shall be subject to inspection and approval at the place of growth or upon delivery by the City. Rejected plants shall be removed immediately from the site.
3. Special Provisions - The Contractor shall place an order for the required number of trees, shrubs, and groundcover, within 10 working days after he has received notice of approval of the contract. A copy of the order showing the number of plants ordered, from whom ordered, and the anticipated date of delivery as verified by the supplier, shall be submitted to the Engineer.

DDDD. Tree Planting Installation

Tree planting pits shall be dug two times the diameter of the container and to a depth of 1-2 inches less than the depth of the container. If holes are machine dug, roughen sides of holes by hand before planting. See Standard Drawing LS-01 for boring hole procedure.

The Contractor shall place fertilizer as specified in the Special Provisions and Section 10.2.1.H of these Specifications. Granular form fertilizer shall be slow release type and mixed thoroughly into backfill.

Backfill shall consist, by volume of 50% excavated soil removed from holes and 50% soil amendment thoroughly mixed. Trees shall be planted at 1 to 2 inches above natural grade with backfill settled around roots. Immediately soak newly planted trees thoroughly with water.

Immediately after plant hole is backfilled, a shallow basin slightly larger than hole shall be formed with a ridge of soil to facilitate and contain watering. Mulch 1-inch with soil amendment or peat moss, rake smooth and neatly outline.

Stake and tie trees immediately after planting. Locate stakes facing perpendicular to prevailing wind. Stakes shall be un-treated rough redwood, douglas fir, lodgepole or an approved equal. Tree ties shall be olive green ¾-inch USR tree-tie webbing cut to length and nailed or stapled with ¾-inch U-nails or staples. The stakes or RZ single stake shall be placed 18" from the tree and not through the root ball. Cut off the stakes 1 to 2 inches above the highest tree tie.

EEEE. Shrub Planting Installation

Shrubs shall be planted in holes twice the diameter of the can and 1½ times depth of root ball and at natural growing depth. Backfill around roots shall be settled with water.

Backfill shall consist, by volume of 50% excavated soil removed from holes and 50% soil amendment thoroughly mixed. The Contractor shall place fertilizer as specified in the Special Provisions and 11.2.1.H of these Specifications. Granular form fertilizer shall be slow release type and mixed thoroughly into backfill.

FFFF. Groundcover Planting Installation

All areas to be planted with groundcover shall be tilled to a depth of at least 6-inches, and soil amendment shall be incorporated as specified in Special Provisions. The soil amendment as specified shall be uniformly mixed in the soil. All rocks over 2-inches in diameter and other debris shall be removed from the planting area and disposed of. If topsoil is needed, it shall be first incorporated in the existing soil before soil amendment is added.

The planting area shall be smooth, free of debris and rocks. The planting area shall not be too dry, too wet, or in a condition not satisfactory to the Engineer. Planting areas that have been compacted for any reason, either before or after planting, shall be re-cultivated by the Contractor at his expense.

Groundcover shall be planted on centers as specified. Rows shall be neat and parallel and not be planted closer than 12-inches from curbs, walks, paved areas and fences, and 36-inches from trees and shrubs, unless otherwise shown on plans.

Mulch shall be applied at a rate shown on plans or as specified in the Special Provisions.

GGGG. Plant Establishment Period

As a part of this contract there shall be a 90 calendar day establishment period that shall commence after all planting has been completed in accordance with the plans and specifications. Final approval of the completed project will follow the 90-day establishment period, unless the planting areas are not acceptable, due to poor horticultural practice. The establishment period in this case, will be continued until all work meets the requirements of the plans and specifications. The establishment period shall include continuous operation of watering, weeding, fertilizing, spraying, insect and pest control, and any other normal operation required to completely assure good growth. All work shall be regular and frequent enough to keep all planting areas in a neat and presentable condition at all times.

Weed control shall be as specified in Section 10.2.1.G of these Specifications.

HHHH. Plant Materials and Guarantee

All plant materials shall be guaranteed to take root and grow when they have received normal care and maintenance.

Plant materials shall be replaced promptly when they have died or have failed to grow properly during the 90-day establishment period and any extensions thereof. Such replacements, including all planting, staking, etc., as originally specified, shall be without cost to the City. Plants shall be subject to a 2-year guarantee and irrigation trees shall have a 5-year guarantee.

All materials shall meet the same specifications as the original planting. The Contractor shall repair any damage created during the replacement operations, to the satisfaction of the City, and this at no cost to the City.

IIII. Water for Establishment

The Contractor shall be required to furnish his own hose and connecting devices. The Contractor may utilize the existing water system during the execution of this contract or as specified in Special Provisions.

JJJJ. Materials

1. Stakes - Shall be un-treated rough redwood, douglas fir, lodgepole or Single RZ stake or an approved equal.
2. Tree Ties - Tree ties shall be olive green ¾-inch USR tree-tie webbing cut to length and nailed or stapled to stake with ¾-inch U-nails or staples.
3. Soil Amendment - Soil amendment shall conform to Section 10.2.1.H of these Specifications.
4. Lawn Fertilizer - Fertilizer shall conform to Section 10.2.1.H of these Specifications.
5. Tree, Shrub and Ground Cover Fertilizer - Shall be granular form, slow release with a rate and analysis specified in the Special Provisions.

10.3 IRRIGATION SYSTEMS

1. Sprinkler Heads

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per each for furnishing and installing sprinkler heads as indicated on the plans and listed in the Proposal. The unit price bid for sprinklers shall include furnishing and installing the sprinkler with the double swing joint or as detailed in accordance with the Standard Drawing. Bid price shall include full compensation for furnishing all labor, materials, tools, and equipment to install the sprinkler heads.

KKKK. Specification

Sprinkler heads shall be of the types and sizes with the diameter or radius of throw, pressure, discharge, and any other designations necessary to determine the types and size, as indicated in the Special Provisions.

LLLL. Installation

All sprinkler heads shall be set perpendicular to finished grades unless otherwise designated on the plans. The irrigation system as shown on the plans is diagrammatic only. The various components of the system shall be installed so as to provide complete and adequate coverage of the areas to be watered.

Additional heads may be required for adequate coverage and shall be as directed by the Project Manager.

Full compensation for adjusting and relocating the various types of sprinklers for proper rate of flow and coverage after installation, shall be considered as included in the prices paid for the various types of sprinklers involved, and no separate payment will be made therefore.

MMMM. Sprinkler Heads

All rotary pop-up sprinklers shall be installed as detailed in accordance with Standard Drawing LS-10.

All pop-up lawn sprinklers shall be installed as detailed in accordance with Standard Drawing LS-59.

All shrub or bubbler sprinklers shall be installed as detailed in accordance with Standard Drawing LS-11.

All spray or rotary sprinklers shall be installed as detailed in accordance with Standard Drawing LS-12.

2. Drip Irrigation Emitters

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per each for furnishing and installing the drip irrigation emitters as indicated on the plans and listed in the Proposal. The unit price bid for drip irrigation emitters shall include furnishing and installing the emitter, emitter tubing, and tubing stakes at 4-foot o.c., and access sleeve (if multi-outlet emitter) as detailed in accordance with the City Standard Drawing. Bid price shall include full compensation for furnishing all labor, materials, tools, and equipment to install the emitters.

NNNN. Specification

Drip irrigation emitters shall be of the types and sizes with the hourly discharge rate, number of outlets, and any other designations necessary to determine the types and size, as indicated in the Special Provisions, plans, and listed in the Proposal. The emitter shall be constructed of durable, UV-resistant polypropylene. Single outlet emitters shall have a single barb for use with drip tubing. Multi-outlets shall have either a single barb for use with drip tubing or a ½-inch female NPT inlet for use on P.V.C. risers.

O000. Installation

The emitters shall be installed as detailed and in accordance with the City Standard Drawing unless otherwise indicated on the plans. The drip irrigation system as shown on the plans is diagrammatic only. The various components of the system shall be installed so as to provide complete and adequate coverage of the areas to be watered.

Additional emitters may be required for adequate coverage and shall be as directed by the Engineer.

Full compensation for adjusting and relocating the various types of emitters for proper rate of flow and coverage after installation, shall be considered as included in the prices paid for the various types of emitters involved, and no separate payment will be made therefore.

All multi-outlet emitters shall be installed a minimum of 4-inches below grade in drip irrigation access sleeves. Discharge ends of tubing shall be held in place by plastic or metal tubing stakes and shall have insect plugs at each.

All drip irrigation lines shall be flushed to remove all debris from lines prior to installing emitters.

PPPP. Emitters

All multi-outlet emitters shall be installed as detailed in accordance with Standard Drawing LS-60.

All single outlet emitters shall be installed as detailed in accordance with Standard Drawing LS-14.

QQQQ. Emitter Tubing

Emitter tubing shall be virgin polyethylene plastic. Tubing size shall be as recommended by the manufacturer of the emitter.

3. Drip Irrigation Pressure Regulator

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a unit cost per each for furnishing and installing the drip irrigation pressure regulator. The unit price bid for drip irrigation pressure regulators shall include furnishing and installing the pressure regulator. Bid price shall include full compensation for furnishing all labor, materials, tools equipment, and valve box to install the pressure regulator.

RRRR. Specification

Drip irrigation pressure regulators shall be constructed of durable, heat resistant plastic with pre-set outlet pressures of 15, 20, or 25 psi.

SSSS. Installation

The pressure regulator shall be installed below grade. The pressure regulator shall be installed in a rigid plastic valve box.

4. Drip Irrigation Y-Filter

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a unit cost per each for furnishing and installing the drip irrigation Y-filter. The unit price bid for drip irrigation Y-filter shall include furnishing and installing the Y-filter as detailed in accordance with Standard Drawing LS-13. Bid price shall include full compensation for furnishing all labor, materials, tools, equipment, and valve box to install the Y-Filter.

TTTT. Specification

Drip irrigation Y-filter shall be a Y-pattern filter constructed of durable, non-corrosive, polypropylene with replaceable and interchangeable polyester mesh filter screens.

UUUU. Installation

The Y-filter shall be installed below ground in a valve box constructed of heavy-duty green plastic and placed flush with grade. Installation to be as shown on Standard Drawing LS-13.

5. Quick Coupling Valves

A. Measurement and Payment

Under this item of the proposal, the Contractor shall bid a unit price per each for furnishing and placing the quick coupling valves. The unit price for the quick coupling valves shall include excavation, furnishing and placing the quick coupler valves, swing joint, valve box, backfilling, connection to the water source, restoration of surfaces and all other labor, equipment and material necessary for installing the quick coupler valve.

VVVV. Specification

The quick coupling valves shall be of brass or bronze construction with 1-inch IPS female pipe connections.

The valve body shall be of two-piece construction consisting of an upper and a lower piece body. The upper valve body shall be easily removable for replacement. Each valve shall have four stops or open position for regulation of flow.

All quick coupling valves shall be the type used on non-potable systems marked with special "Do Not Drink" warnings. Quick coupling valve shall have a durable locking rubber cover, red or purple in color.

All quick coupling valves shall be installed in accordance with Standard Drawing LS-09.

WWWW. Quick Coupling Valve Keys

All quick coupling valve keys shall be of the same manufacturer as the quick coupling valve, and shall be proper size to fit the valves as specified. The key shall be of brass or bronze construction.

XXXX. Valve Box

Valve box for the quick coupling valves shall be of precast rigid plastic set flush with ground level as detailed in Standard Drawing LS-09. Precast rigid plastic box size shall be 8-inch diameter. Cover shall be lockable.

6. Electric Remote Control Valve - Electric Solenoid Type

A. Measurement and Payment

Under these items of the proposal, the Contractor shall bid a price per each for furnishing and placing electric remote control valves as indicated on the plans and in the proposal. The unit price bid for remote control valves shall include furnishing and placing the respective size control valve, control wires, valve boxes to house the remote control valves as detailed in connection with Standard Drawing LS-23.

YYYY. Specification

Globe type electric control valve shall be normally closed diaphragm type with slow opening and closing action. Actuation shall be by an encapsulated type solenoid with a minimum rating of 24 volts; 60 cycle; 2-5 watts.

The valve body shall be constructed of heavy-duty brass, bronze, cast iron or non-corrosive glass reinforced/filled nylon.

Construction shall provide for convenient accessibility of all operating parts without removal of valve from the system plumbing. Valves shall be constructed with a manual flow control adjustment with shut-off provisions. The valve shall have provision for external "bleed" of diaphragm chamber to enable manual operation.

ZZZZ. Valve Box

Valve box for the remote control valve shall be of pre-cast rigid plastic set flush with ground level as detailed in City Standard Drawing LS-23. Precast rigid plastic box size shall be 17"x11- $\frac{3}{4}$ "x12" depth with 3"x4" knockouts. Cover shall be hinged type and equipped with flex lock lift slot. Cover shall be bolted shut.

AAAAA. Irrigation Control Wire

All wiring to be used for connecting the remote control valves shall be Type UF-600V, with a minimum of 1/16-inch vinyl insulation. The size of the control wire shall be as recommended in writing by the manufacturer for the valve used and may be any color except white. Size of common wire shall be No. 10, and the color must be white.

Lay control wire from each remote control valve to the controller and control valve to the common ground. Lay wiring from the remote control valve to the controller beneath the mains where practicable, and install control wiring in conduit when passing beneath paving.

The wire shall be taped together at 5-foot intervals. An 18-inch wire loop shall be provided at each valve. The splices shall be covered as follows: Coat the bare wire with an epoxy cement; wrap a

minimum of two coats of vinyl electric tape around the splice; apply a second coat of epoxy cement overall, or an approved connecting device. One Extra common and one extra valve wire shall be run in each conduit manifold. All conduit irrigation control wire shall have a tracing wire #10 attached to the outside.

7. Automatic Controller

A. Measurement and Payment

Under this item of the proposal, the Contractor shall bid a price per each for the automatic controllers listed in the proposal. The unit price bid for the automatic controller shall include furnishing and placing the controller, necessary hookup to the remote control valves and connection to the power sources and all other labor, equipment, and material to complete the work, in accordance with the drawings and specifications.

BBBBB. Specification

The automatic sprinkler controller shall be completely automatic in operation, and shall electrically start the sprinkling cycle and electronically time the individual stations. Timing of each station shall be independently variable, with the capability of omitting a station from a watering cycle. It shall be capable of a 14-day programming and automatically starting a water cycle at any time on the hour. It shall be possible to operate the controller manually and to select and operate manually any station. The controller shall be equipped with a rain shutoff device. The device shall be mounted in a vandal resistant enclosure and surface mounted to exterior of controller or as specified.

There shall be no loose pins or other parts that can become detached and lost. All controls can be manipulated at any time and in any sequence without damaging the controller.

The controller shall be wall or pedestal mounted as designated on the plans. The controller cabinet shall be weatherproof and locking and constructed of heavy gauge steel with corrosion resistant enamel finish inside and out.

The controller shall have as standard built-in features; an electrical circuit to operate a master valve; a reset circuit breaker to protect the controller from damage due to excessive voltage surges; a master "on-off" switch for turning controller "off" during rainy weather, while allowing day and hour clocks to continue in operation.

All wiring to and from the controller shall be through color-coded plugs and sockets.

Connect the remote valve to the controller in a clockwise sequence to correspond with the station setting beginning with Station 1, 2, 3, etc. Provide a schedule in the watertight container cover, showing valve connection to the controller.

The controller shall conform to NEC Class 2 requirements. (The controller output shall be less than 110 volt-amps, to qualify for direct burial of output wires.) The controller shall produce 26.5 volts A.C. output for continuous operation of 24-volt valves.

CCCCC. Installation

All wall-mounted controllers will be mounted with the bottom of the controller case a minimum of 4 feet from the floor or ground level and with the top of the controller case a maximum of 6 feet from the floor or ground level. All pedestal-mounted controllers shall be lockable and mounted on a suitable concrete base as designated by the detailed drawings.

All controller locations are essentially diagrammatic and shall be specifically located, by the owner, or his representative.

All local and applicable codes shall take precedence in the furnishing and/or connecting a 120 volt electrical service to the controller. A 15-amp reset circuit breaker in waterproof box shall be installed for each additional controller. If two or more controllers are specified at the same location, only one reset circuit breaker shall be required. Each controller shall be wired separately with a weatherproof on and off switch and receptacle to each controller.

Adequate coverage and protection of the 24-volt service wire leading from the controller shall be installed from the bottom of the controller as detailed in accordance with the Standard Drawing LS-22.

All electrical equipment, materials and workmanship shall be in strict accordance with the requirements of the National Electrical Code, the Electrical Safety Orders of the Industrial Accident Commission of the State of California, the National Electrical Manufacturers' Association, applicable City ordinances, and the Sacramento Municipal Utility District requirements.

The Contractor shall give the City 48 hours' advance notice of any testing to be performed on the system. The Contractor shall furnish keys and incidentals to the City for operation of equipment.

8. Heavy Duty Controller Enclosure

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per each for furnishing and installing a heavy-duty enclosure to house the automatic sprinkler controller. The enclosure shall be as detailed in accordance with Standard Drawing LS-22.

The enclosure shall be constructed of cold rolled or stainless steel and be a minimum of 36" high x 24" wide and deep enough to enclose the controller and sensor control panel.

Lockable cold rolled or plain stainless steel enclosures shall be painted with a rust resistant product in either light green or beige.

DDDDD. Installation

The enclosure shall be mounted on a concrete pad with a minimum dimension of 36"x36"x6".

9. Reduced Pressure Backflow Preventer

A. Measurement and Payment

The unit price for the reduced pressure backflow preventer shall include excavation, furnishing and placing the vacuum breaker, including blocking, backfilling, restoration of surfaces, labor and material necessary for installing the unit.

Heavy-duty enclosures will be required on all public owned backflow preventer units. Backflow preventer shall be provided in accordance with Section 4.12.6.

10. Polyvinyl Chloride Pipe (PVC) Schedule 40 (¾-Inch – 1½-Inch Size)

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes and classification of Schedule 40 polyvinyl chloride pipe as indicated on the plans and in the Proposal.

EEEE. Specification

Polyvinyl chloride pipe shall be Schedule 40, and shall be manufactured of and shall conform to ASTM Designation D1785-60T for rigid PVC compounds. It shall bear the National Sanitation Foundation Seal of Approval and shall conform with the requirements of commercial standard 207-60. Pipe shall be manufactured to iron pipe size (IPS) dimensions and furnished in minimum standard lengths of 20 feet.

FFFF. Joints

PVC pipe shall be solvent weld and shall be installed as recommended by the manufacturer. Use only the solvent supplied and recommended by the manufacturer. Clean pipe and fittings thoroughly of dirt, dust and moisture before applying solvent. Make solvent welds with a non-synthetic bristle brush and allow at least 15 minutes set-up time for each welded joint. When making plastic to steel connection, male adapters shall be used. Use Teflon tape on threaded plastic to steel joints.

GGGG. Fittings

All plastic fittings to be installed shall be molded fittings manufactured of the same material as the pipe and shall be suitable for either solvent weld or screwed connections. Solvent weld type couplings and fittings shall be of a pressure rating greater than that of the pipe and shall be of a type recommended by the pipe manufacturer.

HHHH. Installation

Pipe shall be installed in a manner so as to provide for expansion and contraction as recommended by the manufacturer.

The plastic pipe shall be cut with a handsaw or hacksaw with the assistance of a square, in a sawing vise, or in a manner so as to insure a square cut. Burrs at cut ends shall be removed prior to installation.

11. Polyvinyl Chloride Pipe (PVC) (Ring Type)

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes and classifications of polyvinyl chloride pipe as indicated on the plans and in the Proposal. The use of PVC pipe will only be allowed where specifically referred to in Special Provisions or contract drawings.

IIII. Specification

Polyvinyl chloride pipe shall be minimum Class 200, and shall be manufactured of Type I, Grade I or II, 2000 psi design stress compound designated as PVC 1120 or 1220 and shall conform to ASTM designation: D1784 for rigid PVC compounds. It shall bear the National Sanitation Foundation seal of approval and shall conform with the requirements of Commercial Standard 256 and ASTM D2241. Pipe shall be furnished in minimum standard lengths of 20 feet.

JJJJ. Joints

The pipe joint for polyvinyl chloride pipe shall be of the gasketed O-ring type with seal ring grooves for positively holding the rubber ring in place against water pressure. It shall be a coupling sleeve of polyvinyl chloride, minimum Class 200, employing two rubber gaskets, which conform to ASTM D1869, and shall have an internal stop within the coupling. As an alternate to the coupling sleeve the pipe shall have a thickened wall bell end manufactured as an integral part of the pipe employing a triple edge-sealing ring.

The pipe shall have a pipe stop indicated on the barrel that will accurately position the pipe end within the joint. The pipe in place shall permit thermal expansion and contraction of the pipe ends.

KKKK. Fittings

Fittings for polyvinyl chloride pipe shall be those specified for use by the pipe manufacturer. The fitting shall employ a gasketed O-ring as specified in these specifications with seal ring grooves for positively holding the rubber ring in place against water pressure.

12. Polyvinyl Chloride Pipe (PVC) Class 315 (2-Inch Size and Larger)

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes and classification of Class 315 polyvinyl chloride pipe as indicated on the plans and in the Proposal.

LLLL. Specification

Polyvinyl chloride pipe shall be Class 315, Type I, and shall be manufactured of and shall conform to ASTM Designation D2241-64T for rigid PVC compounds. It shall bear the National Sanitation Foundation Seal of Approval and shall conform to the requirements of commercial standard 256 and

ASTM D 2241. Pipe shall be manufactured to Iron Pipe Size (IPS) dimensions and furnished in minimum standard lengths of 20 feet.

MMMMM. Joints

PVC pipe shall be solvent weld and shall be installed as recommended by the manufacturer. Use only the solvent supplied and recommended by the manufacturer. Clean pipe and fittings thoroughly of dirt, dust and moisture before applying solvent. Make solvent welds with a non-synthetic bristle brush and allow at least 15 minutes set-up time for each welded joint. When making plastic to steel connection, male adapters shall be used. Use Teflon tape on threaded plastic to steel joints.

NNNNN. Fittings

All plastic fittings to be installed shall be molded fittings manufactured of the same material as the pipe and shall be suitable for either solvent weld or screwed connections. Solvent weld type couplings and fittings shall be of a pressure rating equal to or greater than that of the pipe and shall be of a type recommended by the pipe manufacturer.

OOOOO. Installation

Pipe shall be installed in a manner so as to provide for expansion and contraction as recommended by the manufacturer.

The plastic pipe shall be cut with a handsaw or hacksaw with the assistance of a square, in a sawing vise, or in a manner so as to insure a square cut. Burrs at cut ends shall be removed prior to installation.

13. Polyvinyl Chloride Pipe (PVC) Class 200

A. Measurement and Payment

Under these items of the Proposal, the Contractor shall bid a price per lineal foot for furnishing and placing the respective sizes and classification of Class 200 polyvinyl chloride pipe as indicated on the plans and in the Proposal.

PPPPP. Specification

Polyvinyl chloride pipe used for sprinkler lines shall be solvent weld, minimum Class 200, and shall be manufactured of Type 1, Grade I or II, 2000 psi design stress compound designated as PVC 1120 or 1220, and shall conform to ASTM designation D 1784 for rigid PVC compounds. It shall bear the National Sanitation Foundation Seal of Approval and shall conform to the requirements of commercial standard 256 and ASTM D 2241. The pipe shall be furnished in minimum standard lengths of 20 feet.

QQQQQ. Joints

PVC pipe shall be solvent weld and shall be installed as recommended by the manufacturer. Use only the solvent supplied and recommended by the manufacturer. Clean pipe and fittings thoroughly of dirt, dust and moisture before applying solvent. Make solvent welds with a non-synthetic bristle brush

and allow at least fifteen minutes set-up time for each welded joint. When making plastic to steel connection, male adapters shall be used. Use Teflon tape on threaded plastic to steel joints.

RRRRR. Fittings

All plastic fittings to be installed shall be molded fittings manufactured of the same material as the pipe and shall be suitable for either solvent weld or screwed connections. Solvent weld type couplings and fittings shall be of a pressure rating equal to or greater than that of the pipe and shall be of a type recommended by the pipe manufacturer.

SSSSS. Installation

Pipe shall be installed in a manner so as to provide for expansion and contraction as recommended by the manufacturer.

The plastic pipe shall be cut with a handsaw or hacksaw with the assistance of a square, in a sawing vise, or in a manner so as to insure a square cut. Burrs at cut ends shall be removed prior to installation.

10.4 FLUSHING, DISINFECTING, AND TESTING

1. Measurement and Payment

Pressure testing, disinfecting, and flushing of the water main system shall be as specified in Sections 4.15 and 1.16 of these Specifications.

Full compensation for flushing, disinfecting, and testing shall be included in other items of the proposal and no additional compensation will be paid therefore.

2. Testing

After installation and prior to backfilling, the sprinkler system including piping, fittings, sprinklers, valves, controllers, and all appurtenances, shall be flushed and tested as follows:

A. Flushing

Prior to installation of sprinklers, all lines shall be flushed as necessary, so that foreign materials will not remain in pipe. Divert water to prevent ponding or soil erosion.

TTTTT. Pressure Test

All necessary equipment for pressure testing shall be provided by the Contractor. Test system as follows:

1. Test at a pressure of 125 psi for a minimum of eight hours. Immediately correct any pipe joint or fitting showing visible leakage and retest.

2. After piping has been approved, trenches may be backfilled prior to adjustment and testing of sprinklers and valves.

UUUUU. Sprinkler Test

Test to determine that all sprinklers function according to manufacturer's data. Replace any sprinklers not functioning as specified; otherwise correct system to provide satisfactory performance and retest.

Test controller for automatic, semi-automatic and manual operation. Check automatic valves by manually operating controller.

The Contractor shall give the City 48 hours' advance notice of any testing to be performed on the system.

3. Grouted Cobbles

A. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a price per square foot of area for grouted cobbles (landscape) in place. The contract unit price paid for grouted cobbles shall include cobbles, grout, and all labor, equipment, and other materials, tools, and equipment necessary for completion in accordance with the plans, special provisions, and these Specifications.

VVVVV. Materials and Placement

Cobbles shall be sized between 4-inches and 8-inches in dimension. Cobbles shall be rounded or well-rounded stones. Cobbles shall be relatively spherical; unacceptably flat or elongated stones shall be rejected. Cobbles shall be free of all clay, dirt or other deleterious material. Contractor shall submit a small representative sample of cobbles (six to ten cobbles) proposed to be used on the project a minimum of two weeks prior to placement for City approval.

Grout shall consist of Class "B" Portland Cement Concrete conforming to the provisions of Section 2.4 of these Specifications. Aggregate for the grout shall conform to the provisions of Section 90-3.03 of the State Specifications. Sand shall be free from clay or organic material and shall be of such size that from 90% to 100% will pass a No. 4 sieve and not more than 5% shall pass a No. 200 sieve.

The grout shall be placed such that, after seating of cobbles, the finish grade of grout shall meet the grades indicated on the plans. The minimum thickness of grout prior to seating of cobbles shall be 4 inches.

The cobbles (one layer) shall be half seated in the grout and shall produce a neat appearance. The cobbles shall be placed touching so as to minimize areas of grout between cobbles. Cobbles shall be cleaned of any grout visible above the level of the grout.

Grouted cobbles shall be cured as provided in Section 90-7 of the State Specifications.

No deduction for areas of pullboxes or other utility facilities shall be made to the measured quantity of grouted cobbles (landscape). Within 2 feet of the end of medians, the median treatment shall be

4-inch P.C.C. on 4-inch Class II Aggregate Base and finished in a manner similar to sidewalk. These areas shall be measured and paid for as grouted cobbles (landscape).

STANDARD DRAWINGS

LS-01	Tree Planting
LS-02	Tree Planting on Slope
LS-03	Boxed Tree 25" or Greater
LS-04	Shrub Planting
LS-05	Shrub Planting on Slope
LS-06	Concrete / Asphalt / Engineered Fill over Tree Roots
LS-07	Tree Root Barrier
LS-08	Boring within Tree Protection Zone
LS-09	Quick Coupling Valve
LS-10	Rotary Sprinkler Head with Double Swing Joint
LS-11	Pop-up Bubbler
LS-12	Pop-up Broadcast Head
LS-13	Drip Irrigation Valve Pressure Regulator
LS-14	Single Outlet Emitter
LS-15	Drip Irrigation Multi-Outlet Emitters
LS-16	Emitter with Valve Box
LS-17	Flow Sensor
LS-18	Flow Sensor for Low Flows
LS-19	Ball Valve 3" and Smaller
LS-20	Irrigation System Trenching
LS-21	Landscape Sleeves Under Pavement
LS-22	Irrigation Controller Enclosure
LS-23	Electric Control master Valve Ball Valve
LS-24	Solenoid Valve
LS-25	Electrical Service Pedestal
LS-26	Electrical Service Pedestal with Combined Irrigation and Lighting Controls
LS-27	Service Riser
LS-28	Wall Mounted Controller
LS-29	Pedestal Mounted Controller
LS-30	Sewer and Water Main Markers in Landscaped Areas
LS-31	Valve Box Layout
LS-32	Pullbox
LS-33	Drinking Fountain In-Ground Mount with Drain
LS-34	Drinking Fountain In-Ground Mount with Sump
LS-35	Picnic Table
LS-36	Trash Can Tie-Down
LS-37	Concrete Walk
LS-38	Decomposed Granite Path
LS-39	Bike Trail Section
LS-40	Exposed Aggregate Paving
LS-41	Collapsible Bollard
LS-42	Pipe Gate (Single Gate)
LS-43	Pipe Gate (Double Gate)

- LS-44 Line Post
- LS-45 Bike Path Striping and Bollard Placement
- LS-46 Post and Cable
- LS-47 Headerboard
- LS-48 Play Area Containment Curb
- LS-49 Concrete Mow Strip
- LS-50 Concrete Seat Wall
- LS-51 Play Area Curb
- LS-52 Playground Subdrain
- LS-53 Playground Underdrain
- LS-54 Chain Link Fence
- LS-55 Rodent Barrier Fence
- LS-56 Jute Mesh Installation
- LS-57 Park Sign Monument

Section 11:

QUALITY CONTROL AND SAFETY

The Contractor shall be solely responsible for the quality of the work and for ensuring job site safety at all times. All projects shall be in compliance with State and Local laws.

11.1 SHEETING, SHORING AND BRACING

1. Measurement and Payment

Under this item of the Proposal, the Contractor shall bid a lump sum price for sheeting, shoring and bracing of trenches and other excavation of 5 feet or greater depth. If not item, for sheeting, shoring and bracing is included in the proposal, it shall be understood that such work shall be done as herein specified, and that the cost for such work shall be included in the prices bid for other items of work, and that no additional compensation will be made.

The lump sum price bid for shoring and bracing shall include all labor, materials, equipment, and supplies required for placing and removal of shoring and bracing as herein specified.

2. Installation

The Contractor shall install sufficient shoring and bracing to insure the safety of workmen, protect the work, and protect the adjacent improvements. Sheet, shoring and bracing shall comply with the rules, orders, and regulations of the California Division of Industrial Safety. The Contractor shall submit a plan for protection of workmen in accordance with Article 10 of the General Specifications.

Insofar as possible, sheeting shall not extend below the bottom of the pipe barrel. All sheeting, timbering, lagging, and bracing shall, unless otherwise required by the Engineer, be removed during backfilling, and in such a manner as to prevent any movement of the ground or damage to the piping or to other structures. When the Engineer requires that sheet piling, lagging, and bracing be left in place, such materials shall be cut off where designated and the upper part withdrawn. If steel piling is utilized, it may be withdrawn and compacting of backfill to proceed as it is removed.

3. Suspension of Work

Failure to comply with any of the rules, orders, or regulations mentioned herein shall be sufficient cause for, but shall not place any responsibility upon, the Engineer to immediately suspend the work. The Contractor shall be responsible for the adequacy of all shoring and bracing and compliance with the law, and failure of the Engineer to suspend the work or notify the Contractor of any inadequacy of shoring and bracing or non-compliance with the law shall not relieve the Contractor for any such suspension will be allowed.