

STANDARD SPECIFICATIONS



TOWN OF COLMA

JANUARY, 1999

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City Engineer

PRICE \$10.00

EDITION 2.A

SCOPE AND APPLICABILITY

These Town of Colma Standard Specifications apply to all public works and development construction performed within the Town of Colma. Sections pertaining to contractual arrangements between the Town and its contractors and to measurement and payment are enforced by the Town only on its own contract work. All other sections apply equally, regardless of the identity or nature of the parties contracting for the work. These Standard Specifications are included in and part of the contract documents for every Town public works project unless otherwise stated in the individual project's contract. They are also included by reference, whether specifically so stated or not, as a condition of every permit issued by the City Engineer or the Town of Colma Engineering Department.

This first edition, Number I A, is a work in progress. Headings only are provided for certain sections of the Technical Provisions. These sections will be added in future editions. Purchasers of earlier editions will be provided with new pages to update their copies of the Standard Specifications at no cost. Items of work not covered by these specifications may be covered in the special provisions. If the current edition of these specifications does not include a section applicable to a particular matter, State Specifications will be applicable as provided in Section 15.

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DEFINITIONS AND TERMS

Acceptance - Formal action by the Colma City Council accepting the Work as complete in all respects.

Acknowledgment of Completion - A written notice issued by the City Engineer acknowledging completion of Work on a Private Project in accordance with the Plans, Specifications and Agreements. This is not a recorded Notice of Completion.

Advertisement for Bids or Notice to Bidders - A notice issued by the Town describing the Work in general terms, inviting prospective Bidders to submit Proposals and setting a time, date and place for submitting Proposals and opening Bids.

Addendum - Written or graphic materials, issued before opening Bids, that clarify, correct or change the bidding or Contract Documents.

Agreement - Same as Contract.

Bid - The offer of a Bidder to perform the Work described in the Contract Documents for the price or prices set forth in the bid schedule.

Bidder - The person or legal entity submitting a bid for the Work, whether acting directly or through a duly authorized representative.

Bid Guarantee or Bid Security - Cash, cashier's check or a bidder's surety bond that is required to accompany a Bid to guarantee that the bidder will enter into a Contract with the Town.

Bond - Any bond posted to secure a Bid, performance, payment or correction of defective workmanship and material under a Contract with the Town.

City or Town - The Town of Colma, California.

City Attorney - The City Attorney of the Town of Colma, or the Attorney's authorized designee.

City Clerk - The City Clerk of the Town of Colma or the City Clerk's authorized designees.

City Engineer - The Registered Civil Engineer appointed by the Town of Colma to have the authority and to act on the Town's behalf in matters relating to construction work performed within the Town. The term also includes properly authorized agents of the City Engineer acting within the scope of their authority.

City Project or Town Project - Work undertaken by the Town under a Contract between the Town and a Contractor or by Force Account and paid for by the Town.

Change Order - A written order to the Contractor, signed by the City Engineer, directing an addition, deletion or revision in the Work or an adjustment in a price or Time for Completion,

and issued after execution of the Contract for the Work.

Construction Contract, Contract or Agreement - The written Agreement describing and covering the performance of the Work and the furnishing of labor, materials, tools and equipment in the construction of the Work. The Contract includes the Advertisement for Bids, Proposal, Plans and Specifications, Special Provisions Bonds, Change Orders and supplemental agreements plus all other materials listed in the Special Provisions and in Section 1.01 these Standard Specifications.

Contract Documents - Those documents listed in Section 1.01 of the Standard Specifications.

Contractor - The person or legal entity that enters into a Contract with the Town to perform Work or any person or legal entity that performs Work governed by a City permit or agreement.

Contract Price - The total amount of money for which a Contract is awarded or the total price for a specific item in the contract.

Contract Unit Price, Unit Price or Bid Price - The amount stated in the Bid for a single unit of an item of Work.

Engineer - A Registered, Civil Engineer hired by the Owner of a Private Project to prepare designs or Plans or to act as “Engineer of Work.”

Fixed Costs - Any necessary labor, material and equipment cost directly expended on the item or items of Work under consideration, that remain constant regardless of the quantity of Work done.

Force Account - The method of determining the amount of compensation to be paid the Contractor for Work not provided for by the items or a combination of items in the Bid Schedule based on accurate records of the actual expenditure of labor and use of material and equipment by the Contractor plus a prescribed markup as described in Section 4.07, Extra Work.

Laboratory - The Materials Testing Laboratory authorized by the City Engineer to test materials and work as called for in the these Standard Specifications and the Special Provisions.

Legal Holiday - A day designated as a State Holiday in the California Government Code.

Major Bid Item - Any single contract item that constitutes 10% or more of the original contract price.

Notice of Award - A written notice issued by the Town to the successful Bidder stating that upon the Bidder’s compliance with the required conditions the Town will execute a Contract for the Work.

Notice of Completion - A written and recorded notice issued by the Town after “Acceptance” acknowledging physical completion of the all Work shown on the Plans and required by the Contract.

Notice to Proceed - A written notice issued by the City Engineer to the Contractor, fixing the date on which the Contract Time for Completion will start.

Owner - In the case of Town projects, Owner means the Town. In the case of other projects, it means the person or entity who is performing or having Work done pursuant to a permit issued by or an agreement with the Town.

Plans - The drawings, profiles, cross-sections and working drawings, or reproductions thereof, that show the location, character, dimensions and details of the Work to be done and that are approved by the City Engineer.

Private Construction or **Private Project** - Any Project, other than a City/Town Project, that is constructed pursuant to a Town permit or agreement.

Project - The intended result of the performance of all Work called for in the Contract.

Proposal - The offer of a Bidder for the Work when made out on the prescribed Proposal form provided by the Town and properly guaranteed and submitted along with all other documents called for in the Notice to Bidders.

Punch List - An unofficial term for any list of work or items that are remaining, lacking, deficient, incomplete, in need of repair or consideration or that the Town wants to bring to the attention of the Contractor prior to Acceptance of the work or the end of the Contractor's Guarantee Period. Punch lists may be prepared on a regular, occasional or incidental basis. Punch lists are not intended to define or limit the extent of corrective or completion work remaining to be performed or to prevent the Town from requiring additional corrective or completion work prior to Acceptance or releasing the Contractor from responsibilities under Section 5.13 of these specifications.

Site - The property upon which the Contractor shall perform the Work described in the Contract.

Soils Engineer - A soils engineering firm or authorized representative of such a firm that is retained by the Owner of a Project for the purpose of reporting on, designing, testing or maintaining quality control relating to grading, installation of pavements, trench backfill and/or the handling of subsurface water.

Special Provisions - Written Specifications, specific terms, conditions and requirements, prepared for a specific project, that augment and take precedence over Standard Specifications and Standard Drawings for that project.

Specifications - The directions, provisions and requirements contained herein, in the Special Provisions or included by reference pertaining to performance of Work, quantities and qualities of materials and labor to be furnished under the Contract. The term Specifications includes these Standard Specifications, the Special Provisions and any other Specification included therein by reference.

Standard Details- The drawings and graphic details designated by the City Engineer as Standard Details on the date a Town Contract or Agreement is entered into or a Town permit is issued.

State - State of California.

State Specifications - The latest edition of the Standard Specifications, State of California, Department of Transportation, on the date of approval of Plans by the Town.

Subcontractor - An individual or legal entity having a direct contract with the Contractor or with another subcontractor for the performance of part of the Work.

Substantially Completed - Refers to the state of completion of the work where all parts can be used for their intended purposes with only minor repair or cleanup work, and where the value of such minor repair or cleanup work does not exceed one percent of the total cost of work under the contract, or such other amount as stated in the Special Provisions.

Supervision - Where used to indicate supervision by the Engineer or City Engineer, supervision shall mean performance of obligations and the exercise of rights specifically imposed upon and granted to the Town in becoming a party to the Contract or upon the Engineer upon assuming responsibilities as "Engineer of Work." Except as specifically stated herein, supervision by the City Engineer shall not mean active or direct superintendence of details of the Work or responsibility for the quality of Work or safety of workers employed on the Work..

Time for Completion - The number of Working Days or calendar days prescribed in the Advertisement for Bids that are allowed for completion of the Work.

Work - Furnishing all materials, equipment, tools, labor and incidentals required, specified, indicated, shown or contemplated in the Contract to construct the Project in a good and worker-like manner satisfactory to the City Engineer.

ABBREVIATIONS

Wherever used in these specifications and other contract documents the following abbreviations and terms shall represent the full name that follows each abbreviation.

ANN	American Association of Nurserymen
ABAG	Association of Bay Area Governments
AASHO	American Association of State Highway Officials
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
APHA	American Public Health Association
API	American Petroleum Institute
AREA	American Railway Engineering Association
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing Materials
AWPA	American Wood-Preservers Association
AWS	American Welding Society
AWWA	American Water Works Association
BAAQMD	Bay Area Air Quality Management District
BART	Bay Area Rapid Transit District
BCDC	San Francisco Bay Conservation and Development Commission
BMP	Best Management Practice - relating to storm water pollution prevention
Caltrans	California Department of Transportation
Cal Water	California Water Service Company
EIA	Electronic Industries Association
IEEE	Institute of Electrical and Electronics Engineers
MTC	Metropolitan Transportation Commission
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NOAA	National Oceanic and Atmospheric Administration
OSHA	Occupational Safety and Health Act
Pac Bell	Pacific Bell Telephone
PG&E	Pacific Gas and Electric Company
Sam Trans	San Mateo Transportation District
SFWD	San Francisco Water District
SWPPP	Stormwater Pollution Prevention Program
TCI	TCI Cablevision
UBC	Uniform Building Code
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
UL	Underwriters Laboratories, Inc.
USA	Underground Service Alert
USGS	United States Geological Survey
USASU	United States of America Standards Institute
WCLB	West Coast Lumber Inspection Bureau
WWPA	Western Wood Products Association

CONTRACT PROVISIONS

Section 1. Contract Documents

1.01 - Contract Documents - The contract documents, which shall constitute the entire contract for the work, include the following:

1. Advertisement for Bids
2. Instructions to Bidders
3. All Addenda
4. Notice of Award
5. Accepted Proposal
6. Contractor's and Subcontractors' Statements of Experience and Qualifications
7. Non-Collusion Affidavit
8. Construction Contract
9. Faithful Performance and Payment Bonds
10. Notice to Proceed
11. Town of Colma Standard Specifications and Drawings
12. Plans, Drawings and Special Provisions identified in the Special Provisions
13. All Change Orders and Extra Work Orders issued pursuant to Sections 4.07 and 4.08 of these specifications
14. All supplemental agreements amending or extending the contemplated work and that may be required to complete the work in a substantial and acceptable manner.

1.02 - Intent of Plans and Specifications - The intent of the plans and specifications is to prescribe the details for the construction and completion of the work that the Contractor undertakes to perform in accordance with the terms of the contract. Where the plans or specifications describe portions of the work in general terms, but not in complete detail, it is understood that only the best general practice is to prevail and that only materials and workmanship of the first quality are to be used. Unless otherwise specified, the Contractor shall furnish all labor, materials, tools, equipment and incidentals, and do all the work involved in executing the contract in a satisfactory and worker like manner.

1.03 - Coordination of Contract Documents - All contract and supplementary documents are essential parts of the contract. A requirement occurring in one is as binding as though occurring in all. In case of conflict, plans shall govern over specifications and special provisions shall govern over standard specifications.

Section 2. Proposal Requirements and Conditions

2.01 - Fee for Plans and Specifications - A printing and service charge will be made for each set of plans, specifications and drawings. The fee is non refundable, and the plans, specifications and drawings need not be returned to the Town, unless otherwise specified.

2.02 - Approximate Estimate - The quantities stated in the bid schedule and contract are approximate. They are given only as a basis for comparing bids. The Town does not expressly or by implication, agree that the actual amount of work will correspond therewith, and reserves

the right to increase or decrease the amount of any item or portion of work or to omit portions of work. No claim for anticipated or lost profits resulting from changes of less than 25% in any individual bid item will be recognized or paid.

2.03 - Examination of Site of Work, Plans and Specifications - The bidder shall carefully examine the site of the work, proposal, plans, specifications, and contract forms. The submittal of a bid shall be conclusive evidence that the bidder has made a complete investigation and is satisfied as to the conditions to be encountered, the character, quality and quantities of work to be performed, the materials to be furnished, all applicable Federal, State and local laws and regulations and the requirements of these specifications and the contract. Bidders failure to make an adequate examination of the site and all relevant materials and conditions shall not relieve Bidder with respect to his bid or performance of the work.

2.04 - Proposal - Proposals must be made on the forms furnished by the Town. All proposals must be made for the entire work, and give the prices bid for each of the various items of work. Proposals must be signed by the bidder.

All proposals shall be submitted as directed in the Advertisement for Bids in a sealed envelope plainly marked "PROPOSAL" and identifying the project and date of bid opening.

2.05 - Bidder's Guarantee - When stated in the Advertisement for Bids proposals must be accompanied by a certified or cashier's check, payable to the Town of Colma, for an amount not less than 10% of the total Base Bid, or by a surety bond in the same amount, payable to the Town and valid for a period of 60 days following the bid opening.

2.06 - Delivery and Withdrawal of Bids - Bids may be mailed or delivered by messenger. It is the bidder's responsibility alone to ensure the bid is received by the City Clerk prior to the hour and date set for the bid opening in the Advertisement for Bids. Any bid received by the City Clerk after the specified hour and date will be returned unopened.

After a bid is received by the City Clerk, the bid may be withdrawn only by a written request signed by the bidder, that is received by the City Clerk prior to the hour and date set for the bid opening. No oral request for withdrawal of a bid will be considered.

A bidder will be permitted to withdraw a bid after the opening of bids only if the bidder establishes to the satisfaction of the City Engineer all of the following:

- A. The Bidder made a clerical error in filling out the bid and the error was not due to an error in judgement or an error in examining the site or contract documents.
- B. The clerical error made the bid materially different than the bidder intended the bid to be.
- C. The bidder gave the Town written notice of the error and specifics in detail regarding the nature of the error and how it was made, within five calendar days after the opening of bids.

2.07 - Qualifications of Bidders - Each bidder shall be licensed in accordance with the provisions of Chapter 9, Division of the Business and Professions Code and be skilled and

regularly engaged in the general class or type of work called for under the contract. A statement setting forth his experience and business standing shall be submitted by each bidder on the form provided by the Town.

It is the intent of the Town to award a contract only to a bidder who furnishes satisfactory evidence that he has the experience, ability, capital, facilities and plant to prosecute the work successfully and promptly and to complete it within the time stated in the special provisions. The Town will weigh evidence that the bidder has performed satisfactorily on other contracts of like nature, magnitude and difficulty at similar rates of progress.

2.08 - Disqualification of Bidders - More than one proposal from an individual or legal entity or an association under the same or different names will not be considered. Reasonable ground for believing that any bidder is interested in more than one proposal for the work will cause the rejection of all proposals in which such bidder is interested. If there is reason to believe that collusion exists among the bidders, none of the participants in such collusion will be considered. Proposals in which the prices bid for certain items of work are obviously unbalanced or obviously bear little or no relationship to the actual cost of those certain items may be rejected .

2.09 - List of Subcontractors - Each proposal must contain, on the form provided by the Town, a list of the name and address of each subcontractor to whom the bidder proposes to subcontract portions of the work in an amount in excess of 1/2% of the Base Bid or \$10,000, whichever is greater.

2.10 - Opening of Proposals - Proposals will be opened and read publicly at the time and place indicated in the Advertisement for Bids. Bidders are invited to attend.

2.11- Rejection of Proposals - Proposals may be rejected if they have been transferred to another bidder, or if they show any alteration of form, additions not called for, conditional bids, incomplete bids, erasures or irregularities of any other kind. When a proposal is signed by an agent, other than the officer or officers of a corporation authorized to sign contracts on its behalf or a member of a partnership, a "Power of Attorney" must be submitted with the proposal; otherwise, the proposal may be rejected as irregular and unauthorized.

Section 3. Award and Execution of Contract

3.01 - Award of Contract - The Town reserves the right to reject any and all proposals and/or to waive any irregularities therein.

The award of contract, if it is awarded, will be to the lowest responsible bidder whose proposal complies with all the requirements prescribed. The award, if made, will be made within 60 calendar days after opening bids. This period may be extended by mutual agreement, in writing, of the Town and the Bidder.

All bids will be compared and the lowest bidder determined on the basis of the Engineer's Estimate of the quantities of work to be done. Where bidders are required to submit prices for alternatives or "Add Items," bids will be compared and the lowest bid determined on the basis stated in the special provisions

3.02 - Contract Bonds - The successful bidder shall furnish one bond to secure the payment of the claims of laborers, mechanics and materialmen employed on the work under the contract and another bond to guarantee the faithful performance of the contract. The bond forms will be furnished to the successful bidder by the Town. Each of the two bonds shall be in the sum equal to the full contract price, except for contracts between \$5,000,000 and \$10,000,000 the payment bond shall be 50 percent of the contract price and for contracts over \$10,000,000 the payment bond shall be 25 percent of the contract price.

The Contractor's and Surety's attention is directed to Section 5.13 of these Standard Specifications which provides that, as part of the contract, the Contractor guarantees the entire work against defective workmanship, equipment and materials and agrees to correct defects in same for a period of 365 calendar days after acceptance. The faithful performance bond shall remain in full force and effect after acceptance and throughout said 365 day period. After acceptance and upon the Contractor's request, the Town will accept a rider to the performance bond reducing its amount to 10% of the final contract price

Any of the following actions of the Contractor shall constitute default under the faithful performance bond.

Contractor makes an assignment for benefit of creditors, admits inability to pay debts, files a petition for bankruptcy, or is otherwise determined bankrupt or insolvent.

Contractor commits a material breach of the contract and fails to cure the breach within 10 days of the date of notice from the Town demanding cure, or if such failure is curable but not within the 10 day period, within such period of time as is reasonably necessary to accomplish the cure, provided that within 10 days of the Town's notice demanding the cure the Contractor provides a written plan acceptable to the City Engineer to cure the breach and then diligently commences and continues the cure according to the written plan.

Contractor violates or allows a violation of any law, statute, regulation, rule, ordinance, permit condition, license or order of any government agency applicable to the project and does not cure the violation within 10 days of the date of the notice from the Town to the Contractor demanding the cure.

In the event of default by the Contractor, the Town reserves the right to approve or reject any contractor the surety proposes to take over the work.

All alterations, extensions of time, extra and additional work, and other changes authorized by these specifications or any part of the contract may be made without securing the consent of the surety or sureties on the bonds.

The surety or sureties providing the bonds required by this section shall submit evidence that they are admitted by the California Department of Insurance to transact business in the State and have a Best's rating of at least A+.

3.03 - Contractor's Insurance - The Contractor shall obtain all insurance required hereunder and shall maintain same at all times through the guarantee period. The Contractor shall, prior to

the Town's execution of the construction contract, file with the Town for its approval the original or certified copies of such policy or policies. Said insurance shall cover the following:

- A. Worker's Compensation and Employer's Liability Insurance to cover employees as required by the California Labor Code. The policy shall include language stating specifically, "All rights of subrogation are hereby waived against the Town of Colma, its officers, agents and employees when acting within the scope of their appointment or employment."
- B. Occurrence based General Liability insurance including bodily injury and property damage for all activities of the Contractor and its subcontractors arising out of or in connection with the contract. The policy is to be written on a commercial general liability form including, but not limited to, Broad Form Property Damage, blanket contractual, completed operations, vehicle coverage, products liability and employers non-ownership liability in an amount of no less than \$1 million dollars combined, single limit personal injury and property damage for each occurrence. The completed operations and product liability insurance shall continue for not less than 365 days following acceptance of the work by the Town. Each policy shall be endorsed with the following language:
 - 1. The Town of Colma is named as an additional insured for all liability arising out of the operations by or on behalf of the named insured, and this policy protects the additional insured, its officers, agents and employees against liability for personal and bodily injuries, deaths or property damage or destruction arising in any aspect, directly or indirectly, in the performance of the contract.
 - 2. The inclusion of more than one insured shall not operate to impair the rights of one insured against another insured, and the coverages afforded shall apply as though separate policies had been issued to each insured.
 - 3. The insurance provided herein is primary and no insurance held or owned by the Town of Colma shall be called upon to contribute to a loss.
 - 4. This policy does not exclude explosion, collapse, underground excavation hazards or removal of lateral support.

Each insurance policy shall contain a clause that requires the insurance company to notify the Town no fewer than 30 calendar days in advance of cancellation or expiration of the policy. Should any such policy be canceled or allowed to expire before final completion of the work, and the Contractor fail to procure other insurance as herein required immediately, the Town may procure such insurance and deduct the cost thereof from any amounts due or to become due the contractor.

3.04 - Execution of Contract - The contract shall be signed by the successful bidder and returned, together with required contract bonds and insurance meeting the requirements of Sections 3.02 and 3.03, within 15 working days of receipt of the contract. If the bidder fails or refuses to enter into the contract, to provide the bonds and insurance required, or to produce the schedule required by Section 6.03 within the time permitted therein, the Town may elect to cancel its award of the contract, collect on the check or bid bond accompanying the Contractor's

bid and award the contract to the next lowest responsible bidder.

Section 4. Scope of Work

4.01 - Work to be Done - The work to be done consists of furnishing all survey points, plant, labor, materials, methods and processes, implements, tools and machinery, except as otherwise specified, that are necessary and required to lay out, construct and complete the work designated in the contract and to leave all areas occupied by the Contractor in the course of construction in a neat and presentable condition.

4.02 - Removal of Obstructions - Where completion of the work requires their removal, the Contractor shall remove and dispose of all structures, debris or other obstructions encountered in making the improvement. The cost of this work shall be included in the bid items in the contract.

4.03 - Disposal of Materials - The Contractor shall make his own arrangements for disposing of materials outside the public right-of-way, construction area or limits of work and for complying with all regulations relating to disposal of hazardous materials. Full compensation for all costs involved in the disposal of materials shall be considered as included in the price paid for the contract item of work involving such materials.

4.04 - Sanitation - The Contractor shall provide all necessary privy accommodations for the use of his employees on the work and shall maintain same in a clean and sanitary condition.

4.05 - Trench Shoring - If the contract work includes excavation of any trench 1.5 meters (5 feet) or more in depth and costing more than \$25,000, the following requirements shall apply:

Excavation for any trench more than 1.5 meters (5 feet) in depth shall not begin until the Contractor has received approval from the Engineer, of the Contractor's detailed plan for worker protection from the hazards of caving ground during the excavation of that trench, and any design calculations used in the preparation of the detailed plan. The detailed plan shall show the details of the design of shoring, bracing, sloping or other provisions to be made for worker protection during excavation. No plan shall allow the use of shoring, sloping or a protective system less effective than that required by the Construction Safety Orders of the Division of Occupational Safety and Health. If the plan complies with the shoring system standards established by the Construction Safety Orders, the plan shall be submitted at least 5 working days before the contractor intends to begin excavation for the trench. If the plan varies from the shoring system standards established by the Construction Safety Orders, the plan shall be prepared by a Civil Engineer in the State of California, and the plan and design calculations shall be submitted at least 3 weeks before the Contractor intends to begin excavation for the trench.

4.06 - Final cleanup - Before acceptance and final payment, the Contractor shall clean all streets, roads, material and disposal sites and all ground occupied by him in connection with the work, of all rubbish, excess materials, temporary structures and equipment. All parts of the work shall be left in a neat and presentable condition. Natural ground cover disturbed by the Contractor's operations shall be restored to its condition prior to the start of work. The cost of final clean up shall be included in the bid items in the contract.

4.07 - Extra Work - New and unforeseen work will be classified as extra work when such work cannot be covered by any of the various items or combination of items for which there are bid prices. Extra work shall be authorized or ordered by Change Order and shall be paid for as provided in sections 4-1.03 and 9-1.03 through 9-1.03C of the State Specifications, except as follows:

The Contractor shall not proceed with changed or extra work before receipt of a change order signed by the City Engineer.

Where the Contractor files a protest dealing with Liquidated Damages, this provision of these Standard Specifications shall apply.

The markup allowed on the Contractor's labor, materials and equipment shall be limited to 15 percent of cost.

4.08 - Changes - The Town reserves the right to make such alterations, deviations, additions to or deletions from the plans and specifications, including the right to increase or decrease the quantity of any item or portion of the work or to delete any item or portion of the work, as may be deemed by the City Engineer to be required for the proper completion or construction of the whole work contemplated. Those changes will be set forth in a contract change order with the change made, adjustment of time, if any, and the basis for compensation for that work. A contract change order will not become effective until signed by the City Engineer.

Proposed change orders may be presented to the Contractor for consideration prior to approval by the City Engineer. If the Contractor signifies acceptance of the terms and conditions of the proposed change order by executing the document and if the change order is subsequently approved by the City Engineer and issued to the Contractor, payment in accordance with the provisions as to compensation set forth therein shall constitute full compensation for all work included in the change order.

Upon receipt of a change order signed by the City Engineer, the Contractor shall proceed with the ordered work, whether the change order is signed and agreed to by the Contractor or not. Where the Contractor disagrees with a change order, the Procedure for Protest contained in Section 4-1.03A of the State Specifications shall be followed.

When the compensation for a change order is subject to adjustment under this section, the Contractor shall, upon request, furnish the City Engineer with adequate detailed cost data for that item of work.

The Contractor may request changes in specific methods of construction, or changes in the plans and specifications by submitting a written change order proposal to the City Engineer. Any change order proposal submitted by the Contractor shall be signed by the Contractor or an authorized representative and include the information set forth below:

- A. Project name and number
- B. A detailed description of the change
- C. The reason for the change

- D. The exact increase or decrease in the contract price resulting from the change or the method to be used in determining the change in contract price.
- E. The number of working days that will be added to or subtracted from the time for completion of the project.

The Contractor's change proposal will be reviewed by the City Engineer, and may be approved if the change does not materially affect the work and is not detrimental to the work or the interests of the Town.

4.09 - As-Built Plan - The Contractor shall mark up clearly and legibly one set of paper prints to show the As-Built conditions. They shall include all information as shown on the contract set of clean drawings and a record of all deviation, modifications, or changes from those drawings, however minor, which were incorporated in the work, all additional work not appearing on the contract drawings and all changes that are made after the final inspection of the contract work. These As-Built marked prints shall be kept current and available on the job site at all times. All changes from the contract plans that are made in the work or additional information which might be uncovered in the course of construction shall be accurately and neatly recorded as they occur by details and notes. The As-Built marked prints will be jointly inspected for accuracy and completeness by the City Engineer's representative and a responsible representative of the Contractor prior to submission of the monthly pay estimate. Failure to keep the As-Built marked prints on a current basis shall be sufficient justification to suspend progress payments. The drawings shall show the following information, if applicable, but not be limited thereto:

- A. The location of any utility lines or other installations of any kind or description known to exist within the construction area. The location includes dimensions to permanent features.
- B. The location and identification of all surface installations within 10 feet of the construction area.
- C. The location and dimensions of any changes within the building or structure.
- D. Correct grade or alignment of roads, structures, or utilities if any changes were made from contract plans.
- E. Correct elevations if changes were made in site grading.
- F. Change in details of design or additional information obtained from working drawings specified to be prepared or furnished by the Contractor including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.
- G. The topography and grades of all drainage installed or affected as part of the project construction.
- H. All changes or modifications that result from the final inspection.

The As-Built marked prints shall be delivered to the City Engineer at the time of final inspection for his review and approval. All approval and acceptance of As-Built drawings shall be accomplished before final payment is made to the Contractor.

4.10 - Errors and Omissions - If the Contractor, in the course of the work finds any error or omission in the plans or layout as given by Town supplied survey points or instructions, or if he finds any discrepancy between the plans and the physical conditions of the site, he shall promptly notify the City Engineer. Work done after discovery shall be done at the Contractor's risk and expense.

4.11 - Daily Reports - For every day on which the Contractor's own or subcontractor's employees are engaged in work on the construction site, the Contractor shall provide a daily report to the Town Engineer. The report shall be in a form approved by the City Engineer at the start of work and shall include, as a minimum, the following information:

Name of the job	Equipment in use
Date	Equipment on job and idle
Weather	Type, location and approximate quantity of work performed
Starting and ending times of work	Extra work or changes in work performed and with who's authorization
Controlling operation (from Section 6.03 progress schedule)	Changed conditions encountered
Contractor's labor force	Out of ordinary occurrences
Subcontractors working & labor force	

Daily reports may be handwritten or printed, but must be legible. They shall be delivered to the City Engineer or his representative by the middle of the work day following the day to which they relate. Failure to provide daily reports when due will be cause for delaying progress payments until reports are caught up.

Section 5. Legal Relations and Responsibility

5.01 - Laws to be Observed - The Contractor shall keep himself fully informed of and comply with all existing and future State and Federal laws and Town ordinances and regulations that in any manner affect those engaged or employed in the work, or the materials used in the work, or which in any way affect the conduct of the work, and of all orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. The Contractor shall protect and indemnify the Town and all its officers, agents and employees connected with the work against any claim or liability arising from or based on the violation of any law, ordinance, regulation order of decree, whether by the Contractor or the Contractor's employees. If any discrepancy or inconsistency is discovered in the plans, drawings, specifications, or contract for the working relation to the law, ordinance regulation order or decree, the Contractor shall forthwith report the same to the City Engineer in writing.

5.02 - Hours of Labor - Eight hours labor constitutes a legal day's work. The Contractor shall forfeit, as a penalty to the Town, \$25 for each worker employed in the execution of the contract by the Contractor or any subcontractor for each calendar day during which that worker is required or permitted to work more than 8 hours in any one calendar day and 40 hours in one calendar week in violation of the Labor Code, and in particular Section 1810 to Section 1815, thereof, inclusive, except that work performed by employees of Contractors in excess of 8 hours per day,

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

5.03 - Prevailing Wage - The Contractor shall comply with Labor Code Sections 1771 through 1775, and in accordance therewith shall forfeit as a penalty to the Town, \$50 for each calendar day or portion thereof, for each worker paid less than the stipulated prevailing wage rates for such work or craft in which such worker is employed for any work done under the provisions of the Labor Code and in particular Labor Code Sections 1770 through 1780.

The prevailing wages to be paid are those determined by the California Director of Industrial Relations. A file of Prevailing Wage Rate Determinations is maintained by the City Clerk and available to any interested party on request. The Contractor shall post copies of applicable Determinations at the job site.

The Town will not recognize any claim for additional compensation because of the payment of the Contractor of any wage rate in excess of the prevailing wage called for herein. The possibility of wage increases during the life of the contract is one of the elements to be considered as the basis of a claim against the Town.

5.04 - Payroll Records - Attention is directed to the provisions of Labor Code Section 1776, a portion of which is quoted below. Regulations implementing the Labor Code Section 1776 are located in Sections 16207.10 through 16207.19 of Title 8, California Code of Regulations. The Contractor shall be responsible for compliance by the Contractor's subcontractors.

“(a) Each contractor and subcontractor shall keep an accurate payroll record, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each journeyman, apprentice worker, or other employee employed by him in connection with the public work.

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

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

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

(3) A certified copy of all payroll records enumerated in subdivision (a) shall be made available upon request by the public for inspection or copies thereof made; provided, however, that the request by the public shall be made through the body awarding the contract, the Division of Apprenticeship Standards or the Division

of Labor Standards Enforcement. If the requested payroll records have not been provided pursuant to paragraph (2), the requesting party shall, prior to being provided the records, reimburse the costs of preparation by the contractor, subcontractors, and the entity through which the request was made. The public shall not be given access to the records at the principal office of the contractor.

(c) Each contractor shall file a certified copy of the records enumerated in subdivision (a) with the entity that requested the records within 10 days after receipt of a written request.

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

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

(f) In the event of noncompliance with the requirements of 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 with this section. Should non-compliance still be evident after the 10-day period, the contractor shall, as a penalty to the state or political subdivision of whose behalf the contract is made or awarded, forfeit twenty-five dollars (\$25) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, these penalties shall be withheld from progress payments then due.”

A copy of all payrolls shall be submitted weekly to the City Engineer. Payrolls shall contain the full name, address, and social security number of each employee, the employee's correct classification, rate of pay, daily and weekly number of hours worked, itemized deductions made and actual wages paid. They shall also indicate apprentices and ratio of apprentices to journeymen. Each payroll shall be accompanied by a “Statement of Compliance” signed by the employer or the employer's agent indicating that the payrolls are correct and complete and that the wage rates contained therein are not less than those specified by the contract.

Prior to making a progress payment for any month, the City Engineer must have received acceptable payrolls and “statements of compliance” for all work performed during the month preceding the period for which the progress payment is to be made. The Contractor and each subcontractor shall preserve their payroll records for at least 3 years from the date of completion of the contract.

5.05 - Labor Nondiscrimination - Attention is directed to Section 1735 of the Labor Code, which reads as follows:

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

Attention is directed to the following “Nondiscrimination Clause” that is required by Chapter 5 of Division R of Title 2, California Code of Regulations.

See Section 7-1.01A(4) of the State Specifications for the full texts of the NONDISCRIMINATION CLAUSE and STANDARD CALIFORNIA NONDISCRIMINATION CONSTRUCTION CONTRACT SPECIFICATIONS (GOV. CODE, SECTION 12990)

5.06 - Apprentices - Attention is directed to Sections 1777.5, 1777.6 and 1777.7 of the California Labor Code and Title 8 California Code of Regulations, Section 200 et seq. To ensure compliance and complete understanding of the law regarding apprentices, and specifically the required ratio thereunder, each Contractor or subcontractor should, where some question exists, contact the Division of Apprenticeship Standards, 455 Golden Gate Avenue, San Francisco, CA 94102, or one of its branch offices prior to commencement of work on the public works contract. Responsibility for compliance with this section lies with the Contractor.

5.07 - Workers’ Compensation - Pursuant to the requirements of Section 1860 of the Labor Code, the Contractor will be required to secure the payment of workers’ compensation to the Contractor’s employees in accordance with the provisions of Section 3700 of the Labor Code. Prior to the commencement of work, the Contractor shall sign and file with the City Engineer a certification in the following form:

“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.”

This certification is included in the construction contract. Signature and return of the contract as provided in section 3.04 shall constitute signing and filing the certificate.

5.08 - Contractor’s Licensing Laws - Attention is directed to the provisions of Chapter 9 of Division 3 of the Business and Professions Code concerning the licensing of contractors. All bidders and contractors shall be licensed in accordance with the laws of this State and any bidder or contractor not so licensed is subject to the penalties imposed by those laws.

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

5.09 - Fair Labor Standards Act - The attention of bidders is directed to the fact that contractors engaged in highway construction work are required to meet the provisions of the Fair Labor Standards Act of 1938 and as amended (52 Stat. 1060).

5.10 - Assignment of Antitrust Actions - The Contractor's attention is directed to the following provisions of Public Contract Code 7103.5 and Government Code Sections 4553 and 4554, which shall be applicable to the Contractor and Contractor's subcontractors:

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

If an awarding body or public purchasing body receives, either through judgement or settlement, a monetary recovery for a cause of action assigned under this chapter, the assignor shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the public body any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the public body as part of the bid price, less the expenses incurred in obtaining that portion of the recovery.

Upon demand in writing by the assignor, the assignee shall, within one year from such demand, reassign the cause of action assigned under this part if the assignor has been or may have been injured by the violation of law for which the cause of action arose and (a) the assignee has not been injured thereby, or (b) the assignee declines to file a court action for the cause of action.”

5.11 - Payment of Taxes - The contract prices paid for the work shall include full compensation for all taxes that the Contractor is required to pay, whether imposed by Federal, State or local government.

5.12 - No Town responsibility - The Town shall not be held responsible for the care or protection of any material or parts of the work prior to final acceptance, except as expressly provided in these specifications.

5.13 - Contractor's Guarantee - The Contractor guarantees that the entire work performed, and all materials, parts, and equipment furnished in constructing the work by the Contractor, all subcontractors, suppliers and vendors shall meet the requirements of the contract as to quality and workmanship during the Guarantee period. The guarantee period shall begin on the date on which the work is accepted by the Town and shall be in effect for 365 calendar days thereafter: except when the supplier or manufacture of materials, or equipment provides a longer guarantee. Contractor expressly agrees to act as co-guarantor of such equipment and materials. Contractor shall supply the Town with all warranty and guarantee documents relative to equipment and

materials that have been incorporated in the work and guaranteed by the Contractor's suppliers and manufactures.

If the City Engineer determines that any of the work performed, or any of the materials, parts or equipment furnished are defective, or have become defective during the guarantee period, the Town will have the unqualified option to make any needed replacements or repairs itself or to have such replacements or repairs performed by the Contractor. For the purposes of this guarantee the term "defective shall mean any work performed, or any materials, parts, or equipment furnished that fails for any reason to be in a condition as originally intended in accordance with the plans and specifications for the work.

If the Town elects to have needed replacements or repairs performed by the Contractor, and the City Engineer gives written notice of this election to the Contractor, the Contractor agrees to perform the replacements or repairs at no cost to the Town within 30 days after the date of the City Engineer's written notice. If the Contractor fails to perform within the 30 days, or if the Town elects to perform the needed replacements or repairs itself, the Town shall be entitled to compensation from the Contractor for all costs and expenses reasonably incurred in restoring the work to the condition as originally intended, including the cost of such equipment or materials replaced, the cost of removing and replacing any other work necessary, and attorney's fees.

Section 6. Prosecution and Progress

6.01 - Subletting and Assignment - The Contractor shall give his personal attention to the fulfillment of the contract and shall keep the work under his control. Subcontractors will not be recognized as such. All persons engaged in the work of construction will be considered as employees of the Contractor, and he will be held responsible for their work. The contract may be assigned only with the consent of the Town.

The Contractor shall perform, with his own organization, work of a value amounting to not less than 50 % of the total contract, unless other arrangements have been approved by the City Engineer prior to the submittal of the proposal. No subcontractors, except those listed in the proposal, shall do work on the project without the written consent of the City Engineer. Substitution of a subcontractor shall be allowed only in accordance with the law.

The foregoing notwithstanding, when a portion of the work that has been subcontracted by the Contractor is not being prosecuted in a satisfactory manner, the subcontractor shall be removed immediately on the request of the City Engineer and shall not again be employed on the work.

6.02 - Beginning of Work - The Contractor shall commence work within the number of working days stated in the Notice to Proceed, and shall diligently prosecute the same to completion within the time limit provided.

The Contractor shall not commence the work until he has, on the ground, or can furnish definite assurance that there will be available when required, or such other interval of time stated in the special provisions all materials necessary to complete the portion of work on which work is begun.

6.03 - Progress Schedule - The Contractor shall submit a practicable critical path progress schedule within 20 working days of being informed that he has been awarded the contract. Updated schedules showing actual progress to date and revised projections for the remaining work, along with a written narrative explaining the reasons for any significant schedule changes shall be submitted along with requests for progress payments on a monthly basis. Progress payments shall not be paid unless progress schedule submittals are current.

The view or form of the first schedule must be approved by the City Engineer. Once a view or form has been approved, the initial schedule and all subsequent schedules shall be presented in the same view or form, unless a change is approved by the City Engineer.

The schedule shall show the order in which the Contractor proposes to carry out the work and the dates on which the Contractor will start the salient features of the work. It shall also include scheduling for prerequisite steps such as submittal and approval of material lists, shop drawings, trench shoring designs, ordering and receiving materials, coordination with work being or to be performed by others at the site and all other activities that affect the ability to start and finish the salient items of work. The schedule shall be consistent with the time and order of work requirements in the contract. Controlling operations or critical path activities shall be specifically identified with no more than 1/3 of the activities deemed controlling or critical.

When the City Engineer finds the initial and subsequent schedules to be reasonable and practicable, he will notify the Contractor of his “acceptance” of the schedule. Any schedule showing early completion will not normally be accepted unless a corresponding shortening of the contract Time for Completion is proposed by the Contractor and agreed to by the City Engineer.

6.04 - Temporary Suspension of Work - The City Engineer shall have the authority to suspend the work wholly or in part, for such a period as he may deem necessary, due to unsuitable weather, or to such other factors as he considers unfavorable for the suitable prosecution of the work, or for such time as he may deem necessary for the Contractor to correct portions of the work that are faulty due to failure on the Contractor’s part to carry out orders given, or to perform any provision of the contract. The Contractor shall immediately comply with the written order of the City Engineer to suspend all or part of the work. The suspended work shall be resumed when conditions are favorable, and methods are corrected as ordered or approved in writing by the City Engineer.

If a suspension of work on a public street, sidewalk, pedestrian or bicycle way is ordered as provided above, the Contractor, at his expense, shall do all the work necessary to provide a safe, smooth, and unobstructed passageway through the construction area for use by public vehicular and pedestrian traffic during the period of such suspension. In the event the Contractor fails to perform the work specified above, the Town shall have such work performed by any means of its choice and the cost thereof will be deducted from moneys due or to become due the Contractor.

If a suspension of work is ordered because of unsuitable weather conditions, and in the sole opinion of the City Engineer, the Contractor has prosecuted the work with diligence prior to the time that operations were suspended, the cost of providing a smooth and unobstructed passageway through the work will be paid for as extra work as provided in Section 4.07 of these specifications.

In the event of a suspension of work for any reason, such suspension shall not relieve the Contractor from his responsibilities as set forth in Section 12 of these specifications.

6.05 - Time for Completion - The Contractor shall complete all or any designated portion of the work called for under the contract, in all parts and requirements, within the number of working days set forth for completion in the special provisions.

A working day is defined as any day, except Saturdays, Sundays, legal holidays, and days on which the Contractor is specifically required by the special provisions to suspend construction operations. On days that the Contractor is prevented by inclement weather or conditions resulting therefrom as determined by the City Engineer, from proceeding with at least 75% of the normal labor and equipment force engaged on the controlling operation or operations, the Contractor will not be charged for a working day. A controlling operation for these purposes is any facet of the work which, if delayed or prolonged, will delay the completion of the work. The progress schedule required by Section 6.03 of these specifications shall be used by the City Engineer to determine what is controlling operation on any day to be considered for this exemption.

The City Engineer will provide the Contractor with a statement of work days charged to the contract in the previous month by the fifth working day of each month. If the Contractor disagrees with the number of days charged by the City Engineer he must file a written protest setting forth in what respects he considers the statement of working days incorrect within 10 working days. If no protest is filed, the statement shall be considered accepted by the Contractor as correct.

6.06 - Liquidated Damages - It is agreed that, if all the work required under the contract is not substantially completed within the number of working days set forth in the special provisions, damage will be sustained by the Town, and that it will be impractical and extremely difficult to ascertain and determine the actual damage that the Town will sustain in the event and by reason of such delay. It is therefore agreed that the Contractor will pay the Town the sum set forth in the special provisions for each and every working day's delay in finishing the work in excess of the number of working days prescribed. The Contractor agrees to pay said liquidated damages and further agrees that the Town may deduct the amount thereof from any money due or that may become due the Contractor under the contract.

It is further agreed that in case the work called for under the contract is not finished and completed in all parts and requirements within the number of working days specified, the City Engineer shall have the right to charge the Contractor, his heirs, assigns or sureties and to deduct from the final payment for the work all or any part, as he may deem proper, of the actual cost of engineering, inspection, superintendence, and any other overhead expenses of the Town that are directly chargeable to the contract, and that accrue during the period of such extension.

The Contractor will be granted an extension of time and will not be assessed with liquidated damages or the cost of Town overhead for any portion of a delay in completion of the work caused by acts of God or the public enemy, fire, floods, epidemics, quarantine restrictions, strikes, labor disputes, shortage of materials and freight embargos, provided that the Contractor shall notify the City Engineer in writing of the causes of such delay within 15 calendar days

from its beginning. Upon such notice, the City Engineer shall ascertain the facts and the extent of the delay, and his findings shall be final and conclusive. No extension of time will be granted for delay caused by material shortage unless the Contractor furnishes proof that he has made a diligent effort to obtain materials from all known sources within reasonable reach of the work and further proof in the form of the updated progress schedules as required by Section 6.03, that the inability to obtain materials when originally planned did in fact cause a delay in the final completion of the entire work. Only the physical shortage of material will be considered as a basis for an extension of time. No consideration will be given to any claim that the material could not be obtained for the cost the Contractor originally estimated.

If the Contractor is delayed by failure of the Town to provide clear right-of-way or by an act of the Town not contemplated in the contract, an extension of time commensurate with the delay will be granted. The Contractor shall notify the City Engineer in writing of the causes of such delay within 15 calendar days from the beginning of such delay. Upon such notice, the City Engineer shall ascertain the facts and the extent of the delay, and his findings shall be final and conclusive.

6.07 - Differing Site Conditions and Hazardous Waste - If in preparing for or during the course of performing work the Contractor encounters what he believes to be any of the following and before same is disturbed he shall notify the Town Engineer of same in writing:

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.
1. Subsurface or latent physical conditions at the site differing from those indicated.
1. Unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the contract.

The Town Engineer shall promptly investigate the conditions, and if he finds 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 under the provisions of section 4.07 of these specifications. In the event a dispute arises between the Contractor and Town 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, but shall proceed with all work to be performed under the contract. The Contractor shall retain any and all rights provided either by the contract or by law which pertain to the resolution of disputes and protests.

6.08 - Cooperation and Collateral Work - The Contractor shall be responsible for ascertaining the nature and extent of any simultaneous, collateral and essential work at the site, by others. The Town, its workers and contractors, and others, shall have the right to operate within or adjacent to the work site to perform such work. The Town, the Contractor and each of such workers, contractors and others shall coordinate their operations and cooperate to minimize interference. The Contractor shall include in his bid all costs involved as a result of coordinating his work with others. The Contractor will not be entitled to additional compensation from the

Town for damages resulting from such simultaneous, collateral and essential work. If necessary to avoid or minimize such damage or delay, the Contractor shall redeploy his work force to other parts of the work.

6.09 - Utility and Non-Highway Facilities - Attention is directed to Section 12.07 “Preservation of Property” and Section 13 “Underground Obstructions.” The Contractor shall protect from damage utility and other non-highway facilities that are to remain in place, be installed, relocated or otherwise rearranged.

It is anticipated that some or all of the utility and other non-highway facilities, both above ground and below ground, that are required to be rearranged (as used herein rearrangement includes installation, relocation, alteration or removal) as a part of any highway improvement will be rearranged in advance of construction operations. Where it is not anticipated that rearrangement will be performed prior to construction, or where rearrangement must be coordinated with the Contractor’s construction operations, the existing facilities that are to be rearranged will be indicated on the plans or in the special provisions. Where rearrangement is indicated on the plans or in the special provisions to be done by others, the Contractor will have no liability for the costs of performing the work involved in the rearrangement.

The right is reserved to the Town and the owners of facilities or their authorized agents, to enter upon any right-of-way or easement for the rearrangement of their facilities or for making necessary connections or repairs to their properties. The Contractor shall cooperate with forces engaged in this work and shall conduct operations in such a manner as to avoid any unnecessary delay or hindrance to the work being performed by the other forces. Wherever necessary, the work of the Contractor shall be coordinated with the rearrangement of utility or other non-highway facilities, and the Contractor shall make arrangements with the owner of those facilities for the coordination of the work.

Attention is directed to the possible existence of underground main or trunk line facilities not indicated on the plans or in the special provisions and to the possibility that underground main or trunk lines may be in a location different from that which is indicated on the plans or in the special provisions. The Contractor shall ascertain the exact location of underground main or trunk lines whose presence is indicated on the plans or in the special provisions, the location of their service laterals or other appurtenances, and of existing service lateral or appurtenances of any other underground facilities which can be inferred from the presence of visible facilities such as buildings, meters and junction boxes prior to doing work that may damage any of the facilities or interfere with their service.

If the Contractor cannot locate an underground facility whose presence is indicated on the plans or in the special provisions, the Contractor shall so notify the City Engineer in writing. If the facility for which the notice is given is in a substantially different location from that indicated on the plans or in the special provisions, the extra cost of locating the facility will be paid for as extra work as provided in Section 4.07.

If the Contractor discovers underground main or trunk lines not indicated on the plans or in the special provisions, the Contractor shall immediately give the City Engineer and the Utility Company written notification of the existence of those facilities. The main or trunk lines shall be located and protected from damage as directed by the City Engineer and the cost of that work

will be paid for as extra work as provided in Section 4.07. The Contractor shall, if directed by the City Engineer, repair any damage which may occur to the main or trunk lines. The cost of that repair work, not due to the failure of the contractor to exercise reasonable care, will be paid for as extra work as provided in Section 4.07. Damage due to the Contractor's failure to exercise reasonable care shall be repaired at the Contractor's cost and expense.

Where it is determined by the City Engineer that the rearrangement of an underground facility is essential in order to accommodate a highway improvement and the plans and specifications do not provide for that the facility is to be rearranged, the City Engineer will provide for the rearrangement of the facility by other forces or the rearrangement shall be performed by the Contractor and will be paid for as extra work as provided in Section 4.07

When ordered by the City Engineer in writing, the Contractor shall rearrange any utility or other non-highway facility necessary to be rearranged as a part of a highway improvement, and that work will be paid for as extra work as provided in Section 4.07.

Should the Contractor desire to have any rearrangement made in any utility facility or other improvement for the Contractor's convenience in order to facilitate the Contractor's construction operations, which rearrangement is in addition to or different from, the rearrangements indicated on the plans or in the special provisions, the Contractor will make whatever arrangements are necessary with the owners of the utility or other non-highway facility for the rearrangement and bear all expenses in connection therewith.

The Contractor shall immediately notify the City Engineer of any delays to the Contractor's operations as a direct result of underground main or trunk line facilities which were not indicated on the plans or in the special provisions or were located in a position substantially different from that indicated on the plans or in the special provisions, or as a direct result of utility or other non-highway facilities not being rearranged as herein provided (other than delays in connection with rearrangements made to facilitate the Contractor's construction operations or delays due to a strike or labor dispute). These delays will be considered right-of-way delays and compensation for the delay will be determined in accordance with Section 4.07 and will entitle the Contractor to a time extension as provided in Section 6.06.

6.10 - Suspension or Termination of Contract - The Town may, at its option either terminate the contract or suspend operation of the contract for a specified period of time, upon the occurrence of any one or more of the following events:

1. The Contractor is adjudged bankrupt, or makes a general assignment for the benefit of creditors, or a receiver is appointed on account of insolvency.
2. If, at any time and in the sole and absolute discretion of the City Engineer it is determined that the Contractor has failed to supply adequate and suitable equipment, work force or material, or has failed in any other respect to prosecute the work with the diligence specified and intended by the contract documents and further neglects or refuses to correct such failure within a time specified by written notice served upon him.
3. If the work is, in the opinion of the City Engineer, substantially damaged by an act of God or by the fault of the Contractor or any subcontractor.

Upon receiving notice of suspension or termination, the Contractor shall discontinue said work or such parts of it as the City Engineer may designate. Upon Suspension or termination, the Contractor's control shall terminate, and the Town may do all or any combination of the following:

- A. The City Engineer may take possession of all or any part of the Contractor's materials, tools, equipment and appliances on the premises and use same to complete the contract: hire such forces, buy or rent such additional machinery, tools, equipment and appliances and buy such additional materials and supplies as may be necessary for the contract work and completion thereof.
- B. The Town may employ other parties to carry the contract to completion, employ the necessary workers, substitute other machinery and materials, and purchase the materials contracted for in such manner as the Town may deem proper.
- C. The City Council may annul and cancel the contract and relet the work or any part thereof.

Any excess of cost arising from the foregoing action or actions of the Town and above the contract price will be charged against the Contractor and his sureties, who will be liable therefore.

In the event of suspension or termination, all money due the Contractor, or retained under the terms of the contract, shall be retained by the Town for payment of any excess of cost over the contract price arising from the suspension or termination and the completion of the work by the Town as provided above. The contractor will be credited with any surplus remaining after all just claims for such completion have been paid. Upon completion of the work under the original contract the original Contractor shall be entitled to the return of all his unused materials and his equipment, tools and appliances, except that he shall have no claim on account of usual and ordinary depreciation, loss and wear and tear.

The City Engineer's determination as to whether any circumstance or act of the Contractor warrants suspension or termination of the contract under this section shall be binding and conclusive upon the Contractor. Any suspension or termination by the Town shall be without prejudice to any other right or remedy that the Town may have in the circumstances.

6.11 - Contractor's Responsibility for the Work and Materials - Until the work under the contract is accepted by the Town, the Contractor shall have the charge and care of the work and of the materials to be used therein (including materials for which he has received partial payment and materials that have been furnished by the Town) and shall bear the risk of injury, loss or damage to any part thereof by action of the elements or from any other cause whatsoever. The Contractor shall rebuild, repair, restore and make good all injuries, losses or damages to any portion of the work or the materials occasioned by any cause, before its completion and acceptance and shall bear the expense thereof, except for such injuries, losses or damages as are directly and proximately caused by acts of the Federal Government or the public enemy.

Where necessary to protect the work or materials from damage, the Contractor shall, at his expense, provide suitable drainage of the site and erect such temporary structures as are necessary to protect the work or materials from damage. The suspension of work for any cause

whatsoever shall not relieve the Contractor of his responsibility for the work and materials herein specified. If ordered by the City Engineer, the Contractor shall, at his expense, properly store materials that have been partially paid for by the Town or that have been furnished by the Town. Such storage by the Contractor shall be on behalf of the Town and the Town shall at all times be entitled to the possession of such materials. The Contractor shall promptly return same to the site of the work when requested. The Contractor shall not dispose of any of the stored materials unless authorized in writing by the City Engineer.

6.12 - Removal of Defective and Unauthorized Work - All work that has been rejected as defective in its construction or deficient in any of the requirements of the contract documents shall be remedied or removed and replaced by the Contractor in an acceptable manner. No compensation will be paid for such corrections. Any work done beyond the lines and grades shown on the plans or established by the City Engineer, and any extra work done without written order by the City Engineer will be considered unauthorized and will not be paid for. Work so done may be ordered removed at the Contractor's expense. In giving the Contractor notice of defective or unauthorized work, the City Engineer shall set a time limit for remedying, removing or replacing the work. If the Contractor fails to comply within that time limit, the City Engineer shall have the authority to cause the defective or unauthorized work remedied, replaced or removed and to deduct the costs thereof from any monies due or to become due to the Contractor.

6.13 - Reexamination of Work - Reexamination of work may be ordered by the City Engineer, and, if so ordered, the work must be uncovered by the Contractor. If such work is found to be in accordance with the contract documents, the Town shall pay the cost incurred in the reexamination or replacement. If such work does not comply with the contract documents, the Contractor shall pay the cost. This provision shall not apply to paying the cost of examining work that was covered or otherwise concealed without according the City Engineer a reasonable opportunity to inspect it nor to the cost of examining work that was covered or concealed without first obtaining any inspection required by the contract documents.

6.14 - Acceptance of Contract - When the City Engineer has made the final inspection and determined that the work has been completed in all respects in accordance with the contract documents, he will recommend that the Town Council formally accept the work. Immediately upon and after the acceptance of the work by the Town Council, the Contractor will be relieved of the duty to maintain and protect the work as a whole, and the Contractor will not be required to perform any further work thereon, except in fulfillment of the Contractor's Guarantee pursuant to Section 5.13 of these specifications; and the Contractor shall be relieved of the responsibility for injury to persons or property or damage to the work that occurs after the formal acceptance by the Town Council.

Section 7. Measurement and Payment

7.01 - Measurement of Quantities - Measurement of the completed work will be in accordance with either the United States Standard Measures or the International System of Units, whichever is used in the bid schedule supplied by the Town. In determining quantities, all measurements shall be made in place, as constructed, unless otherwise specified.

Material paid for by mass or weight shall be weighed on platform scales furnished by the Contractor, or on public scales, at the expense of the Contractor. Calibration and certification of

scales furnished by the Contractor may be required by the City Engineer, and if so required said calibration and certification will be at the Contractor's expense. When material is weighed on public or supplier's certified scales, weight tags shall be turned in to the Town's Inspector on the job at the time the weighed materials are delivered to the job site. Scale sheets may be required by the City Engineer at any time subsequent to delivery of weighed materials in addition to the aforementioned weigh tags.

When material is to be measured on a volume basis and it would be impractical to determine the volume, or if requested by the Contractor and approved by the City Engineer, the material will be weighed and converted to volume measure for payment purposes. Factors for conversion from weight measurement to volume measurement will be determined by the City Engineer and shall be agreed to by the Contractor before such method of measurement is employed.

All expense incurred in conforming to the above requirements for measuring materials shall be included in the contract prices paid for the materials that are measured, and no additional compensation will be paid therefore.

7.02 - Scope of Payment - The Contractor shall accept the compensation as provided in the contract documents as full payment for furnishing all plant, labor, tools, equipment and paying all taxes, royalties and other fees related thereto and incidentals necessary to the completed work and for performing all work contemplated and embraced under the contract; also for loss or damage arising from the nature of the work, action of the elements, unforeseen difficulties, expenses incurred in consequence of the suspension or discontinuance of the work as herein specified, and for completing the work according to the contract documents. Neither the payment of any estimate nor retained percentage shall relieve the Contractor of his obligation to correct defective work or material.

7.03 - Notice of Potential Claim - Pursuant to Section 20104 through 20104.6 of the Public Contract Code, the Contractor shall not be entitled to the payment of any additional compensation for any act or failure to act by the City Engineer, including failure or refusal to issue a change order, or for the happening of any event, thing, occurrence, or other cause, unless the Contractor shall have given the City Engineer due written notice of potential claim as hereinafter specified. Compliance with this section shall not be a prerequisite as to matters within the scope of the protest provisions in Section 4.07 "Changes" or Section 6.05 "Time for Completion," or the notice provisions in Section 6.06 "Liquidated Damages", Section 6.07 "Differing Site Conditions" or Section 6.08 "Utility and Non-Highway Facilities." nor to any claim that is based on differences in measurements or errors of computation as to contract quantities.

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

The written notice of potential claim shall include reference to the California False Claims Act, Government Code Sections 12650 through 12655. The notice shall set forth the reasons for which the Contractor believes additional compensation will or may be due and the nature of the costs involved. Unless the amount of the potential claim has been stated in the written notice,

the Contractor shall, within 15 calendar days of submitting the notice, furnish an estimate of the cost of the affected work and impacts, if any, on project completion. The estimates of costs may be changed or updated by the Contractor when conditions have changed.

When the affected work is completed, the Contractor shall submit substantiation of the Contractor's actual costs. Failure to do so shall be sufficient cause for denial of any claim subsequently filed on the basis of the notice of potential claim.

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

To facilitate the Town's investigation of a claim the Contractor's records of the project, as deemed by the City Engineer to be pertinent to the potential claim, shall be made available to the Town for inspection and copying.

7.04 - Progress Payments - The City Engineer will, once a month, on or about the 25 th of each month, make an inspection of the work in progress and prepare an estimate of the amount of work completed since the last such inspection or start of work. Monthly progress payments in the amount of 90% of the value of the work satisfactorily completed will be made to the Contractor, based on this estimate and the schedule of prices contained in the accepted bid.. The remaining 10% will be retained by the Town as partial security for the fulfillment of the contract. Providing the Contractor is satisfactorily maintaining As-Built plans required by Section 4.09 and Contractor's submittals of payroll records required by Section 5.04 and progress schedules and written narratives required by Section 6.03 of these specifications are current, progress payments will be made as soon as possible after the regular monthly meeting of the Colma Town Council. The regular meeting date of the Town Council is the second Wednesday of each month.

No estimate or progress payment will be made if, in the judgement of the City Engineer, the work is not proceeding in accordance with the provisions of the contract, or when, in his judgement, the total value of the work done since the last estimate amounts to less than \$1000. No progress payments will be made when the time allotted for completion of the work is 30 working days or fewer.

7.05 - Payment of Withheld Funds - Pursuant to Public Contract Code Section, 10263, the Town will permit the substitution of securities for any moneys withheld by the Town to ensure performance under the contract. At the request and expense of the Contractor, securities equivalent to the amount withheld shall be deposited with the State Treasurer or, a state or federally chartered bank in this state, as the escrow agent, who shall then pay the moneys to the contractor . Upon satisfactory completion of the contract, the securities shall be returned to the Contractor.

Alternatively, upon the Contractor's request, the Town will make payment of retentions earned directly to the escrow agent. The Contractor may direct the investment of the payments into securities and the Contractor shall receive the interest earned on the investments upon the same

terms provided 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 Town, pursuant to the terms in Section 10263 of the Public Contract Code.

Alternatively, and subject to the approval and a the sole discretion of the Town, the payment of retentions earned may be deposited directly with a person licensed under Division 6 (commencing with Section 1700) of the Financial Code as the escrow agent. Upon written request of an escrow agent who has not been approved by the Town under this section, the Town shall provide written notice to that escrow agent within 10 business days of receipt of the request indicating the reason or reasons for not approving that escrow agent. An escrow agent that has been disapproved by the public agency may not maintain any cause of action of any nature against the Town, officer, agent, or employee of the Town in connection with the disapproval of that escrow agent. The payments shall be deposited in a trust account with a federally chartered bank or savings association within 24 hours of receipt by the escrow agent. The Contractor shall not place any retentions with the escrow agent in excess of the coverage provided to that escrow agent pursuant to subdivision (b) of Section 17314 of the Financial Code. In all respects not inconsistent with this subdivision, the remaining provisions of this section shall apply to escrow agents acting pursuant to this subdivision. In addition, an escrow agent subject to this subdivision shall maintain insurance to cover negligent acts and omissions of the escrow agent in connection with the handling of retentions under this section in an amount not less than one hundred thousand (\$100,000) per contract, executed by an admitted and in a form satisfactory to the Town.

Securities eligible for investment shall include those listed in Section 16430 of the Government Code, bank or savings and loan certificates of deposit, interest-bearing demand deposit accounts, standby letters of credit, or any other security mutually agree to by the Contractor and the Town. The escrow agreement used pursuant to this Section shall be substantially similar to the "Escrow Agreement for Security Deposits In Lieu of Retention" in Section 10263 of the Public Contract Code, deemed as incorporated herein by reference. The Contractor shall obtain the written consent of the surety to the agreement and shall pay all costs.

Any Contractor who elects to receive interest on moneys withheld in retention by the Town shall, at the request of any subcontractor, make that option available to the subcontractor regarding any moneys withheld in retention by the contractor from the subcontractor. If the Contractor elects to receive interest on any moneys withheld in retention by a public agency, then the subcontractor shall receive the identical rate of interest received by the contractor on any retention moneys withheld from the subcontractor by the Contractor, less any actual pro rata costs associated with administering and calculating that interest. In the event that the interest rate is a fluctuating rate, the rate for the subcontractor shall be determined by calculating the interest rate paid during the time that retentions were withheld from the subcontractor. If the Contractor elects to substitute securities in lieu of retention, then, by mutual consent of the Contractor and subcontractor, the subcontractor may substitute securities in exchange for the release of moneys held in retention by the Contractor. This provision shall apply only to those subcontractors performing more than five percent of the Contractor's total bid. No Contractor shall require any subcontractor to waive any provision of this section.

7.06 - Final Payment After Completion of Work - The City Engineer shall make a final estimate of the amount of work done and the value of such work, based on the completed

quantities and prices contained in the bid schedule and after incorporating change orders issued in the course of the work. The Town shall pay this entire sum after deducting all previous payments, all amounts to be retained or assessed as penalties or liquidated damages under the provisions of the contract and all amounts necessary to cover and Stop Notices or liens properly filed by subcontractors or suppliers of labor or materials. All prior partial estimates and payments shall be subject to correction in the final estimate and payment. The final payment shall be released within 60 days after acceptance except it shall not be due before 35 days after the recording of the Notice of Completion. In the event of an outstanding dispute between the Town and Contractor, the Town may withhold from the final payment and amount not to exceed 150 percent of the disputed amount, including costs estimated by the Town for preparing acceptable as-built drawings in the event the contractor fails to provide same as required by Section 4.09 of these specifications. With the specific exception of disputed claims, acceptance by the Contractor of undisputed amounts in the final estimate and final payment shall operate as a release to the Town from any and all claims and liabilities to the Contractor relating to the items of contract work to which they pertain.

Making final payment or filing a Notice of Completion shall not constitute acceptance by the Town of any latent defects in the work.

7.07 - Force Account Payment - Extra work as herein before defined, when ordered and accepted, shall be paid for under a written change order in accordance with the terms therein provided. Payment for extra work will be made at the unit price or lump sum previously agreed upon by the Contractor and Town or by force account. When payment is made on a force account basis, the amount shall be determined in accordance with Section 4.07 of these specifications.

7.08 - Arbitration - Claims (demands for monetary compensation or damages) arising under or related to performance of the contract shall be resolved by arbitration unless the Town and Contractor agree in writing to waive arbitration and have the claim litigated in court. Arbitration shall be pursuant to Public Contract Code Sections 10240 through 10240.13 and applicable regulations. Arbitration shall be initiated by a Complaint in Arbitration made by the Contractor not later than 180 calendar days after the date of service in person or by mail on the Contractor of the final written decision by the City Engineer on the claim.

Section 8. Layout and Stakes

8.01 - Control Points - The Town shall provide horizontal and vertical control reference points as shown on the plans, described in the Special Provisions or both. Control points shall be protected and preserved throughout the course of the work. Control points that are lost or damaged through actions or failure to act to protect on the part of the Contractor will be replaced by the Town at the Contractor's expense. The cost of replacement will be deducted from any moneys due or to become due the Contractor. No time extension shall be granted for delay due to the time it takes for the Town replace control points lost through actions or failures to act by the Contractor.

8.02 - Tie-Out and Staking of Monuments - Existing survey monuments that will or might be removed or disturbed in the course of the work will be tied out by the Town at no cost to the Contractor, provided the Contractor gives the City Engineer at least 5 working day's written notice in advance of the time of expected removal or disturbance. Where survey monuments

are removed or disturbed without the required 5 working day notice and before they are tied out by the Town, the Contractor will be charged the full cost of reestablishing such removed or disturbed monuments. Locations of replacement and new monuments called for on the plans will be staked by the Town.

8.03 - Layout and Staking to be Provided by Contractor - Unless otherwise stated in the Special Provisions, the Contractor shall provide grade and alignment stakes for curbs, berms, pavement edges and surface grades not controlled by curbs, sanitary sewer and storm drain lines and structures, ditches, slopes, benches and all other structures and features required to occupy specific locations, and/or be constructed to designed surfaces, elevations or grades. An adequate

number of stakes shall be set to facilitate accurate construction of improvements to the lines, grades and locations shown on the plans. Stakes shall be set to provide reference to all beginning and ending points, changes in grade or alignment, slopes, catch points and structures in accord with standard construction surveying practice for the work being staked. Where curb, street, swale, sanitary and storm sewer grades are 2 percent or less, stakes shall be set no farther than 7 ½ meters (25 feet) apart. For steeper grades, the maximum spacing of stakes shall be 15 meters (50 feet). All stakes shall be clearly marked, and where cut sheets are produced, copies shall be given to the Town. For more specifics on stakes, see Section 10.09. Stakes and cut sheets where appropriate shall be provided at least 2 working days in advance of their planned use. The Town may spot check stakes and cut sheets provided by the contractor, but such spot checking shall not relieve the Contractor of responsibility for assuring final grades, alignments and locations of improvements conform to the plans.

8.04 - Qualifications of Contractor's Surveyors - Persons or firms retained by the Contractor to provide layout and staking shall be experienced in performing the kind of staking to be done and shall be or work under the direct supervision of a person licensed to practice land surveying in the State of California.

8.05 - Payment for Layout and Staking - Where the Bid Schedule includes a lump sum pay item for layout and staking, payment shall be made accordingly. Progress payments attributable to this pay item shall be based on the fraction or percentage of the total layout and surveying work performed in relation to the work required for the total job, as estimated by the City Engineer. Payments made shall include full compensation for furnishing all plant, labor, materials, tools, equipment and incidentals required to completely layout and stake all work shown on the plans and described in the Special Provisions. Where there is no separate pay item for layout and staking, the cost thereof shall be included in the prices bid for other items of work and no extra compensation will be paid therefore.

GENERAL PROVISIONS

Section 10. Control of the Work

10.01 - Authority of the City Engineer and Engineer of Work - The City Engineer shall decide all question concerning quality or acceptability of materials furnished and work performed, the manner of performance, rate of progress, interpretation of contract plans and specifications, compensation for work performed and all questions as to the acceptable fulfillment of the contract by the Contractor. The City Engineer's decision shall be final, and he shall have the authority to enforce and effectuate such decisions and orders he has issued and that the Contractor has failed to carry out promptly. On work where a private Engineer has furnished the design or been designated Engineer of Work by the owner, his approval of proposed changes, materials, quality of work, manner of performance, rate of progress, and interpretation of plans and specifications shall be sought and obtained as a prerequisite and in addition to the approvals granted by the City Engineer

10.02 - Plans and Working or Shop Drawings - The contract plans furnished consist of general drawings and show such details as are necessary to give a comprehensive idea of the construction contemplated. All authorized alterations affecting the requirements and information given on he contract plans shall be in writing. The contract plans shall be supplemented by such working drawings or shop drawings as are necessary to adequately control the work. No change shall be made in any working or shop drawing after it has been approved by the City Engineer. Working or shop drawings for any part of the permanent work shall include but not be limited to: stress sheets, anchor bolt layouts, shop details, erection plans, equipment lists and any other information specifically required elsewhere in the specifications.

Working or shop drawings shall be subject to approval by the City Engineer insofar as the details affect the character of the finished work and for compliance with design requirements applicable to the construction. However, technicalities of design will be left to the Contractor who shall be responsible for the successful construction of the work.

Working or shop drawings shall be approved by the City Engineer before any work involving the drawings is performed. It is expressly understood that approval of the Contractor's working drawings shall not relieve the Contractor of any responsibility under the contract for the successful completion of the work in conformity with the requirements of the plans and specifications. Approval of working or shop drawings shall not operate to waive any of the requirements of the plans and specifications or relieve the Contractor of any obligation thereunder, and defective work, material and equipment may be rejected notwithstanding the approval.

Full compensation for furnishing all working and shop drawings shall be considered as included in the prices paid for the contract items of work to which the drawings relate, and no additional compensation will be allowed therefore.

10.03 - Suggestions to the Contractor - Any plan or method of work suggested by the City Engineer to the Contractor, but not specified, required or ordered, if adopted or followed by the Contractor in whole or in part, shall be used at the risk and responsibility of the Contractor. Neither the City Engineer nor the Town shall assume any responsibility therefore.

10.04 - Conformity with Contract Documents and Allowable Deviations - Work and materials shall conform to the lines, grades, typical cross sections, dimensions and material requirements, including tolerances, shown on the plans or indicated in the specifications. Although measurement, sampling and testing may be considered evidence as to conformity, the City Engineer shall be the sole judge as to whether the work or materials deviate from the plans and specifications, and the City Engineer's decision as to any allowable deviation therefrom shall be final.

10.05 - Coordination and Interpretation of Plans Specifications and Special Provisions - Project plans shall govern over standard plans. Standard plans and project plans shall govern over these Standard Specifications. The special provisions shall govern over both these Standard Specifications and the project plans. In the event of any discrepancy between any drawing and the figures written thereon, the figures shall be taken as correct. Detail drawings shall prevail over general drawings.

Should it appear that the work to be done or any of the matters relative thereto are not sufficiently detailed or explained in these specifications, the special provisions, or the plans, the Contractor shall apply to the City Engineer for such further explanations as may be necessary and shall conform to such explanations as part of the contract. In the event of doubt or questions arising respecting the true meaning of these specifications, the special provisions or the plans, reference shall be made to the City Engineer, whose decision thereon shall be final.

10.06 - Plans and Specifications at the Job Site - The Contractor shall keep and maintain at the job site, a complete set of project plans and special provisions, applicable standard plans and specifications, copies of all change orders and plan and specification revisions issued by the City Engineer or Engineer. Said documents shall be maintained in good and readable condition and be available for inspection by the City Engineer at all times any portion of the work is in progress.

10.07 - Superintendence - Before any work is begun, the Contractor and his superintendent or foreman that is to be the Contractor's on-site representative shall file with the City Engineer the addresses and telephone numbers where they can be reached during working and non-working hours.

The Contractor or his supervising employee who is competent and authorized to receive and carry out any instructions or orders that may be given to him by proper authorities shall be on the job site constantly while work is in progress. The Contractor will be held responsible and liable for faithful observance of any instructions or orders that may be delivered to him or the supervising employee on the work site or at the addresses or telephone numbers filed as required above.

10.08 - Character of Workers - If any subcontractor or person employed by the Contractor fails or refuses to carry out the directions of the City Engineer or appears to the City Engineer to be incompetent or acts in a disorderly or improper manner, he shall be removed from the project site immediately on demand by the City Engineer, and such person shall not again be employed on the work.

10.09 - Use of Stakes - All distances and measurements are to be made in a horizontal plane, unless otherwise provided. Grades will be given from tops of stakes, nails, or other marks. Three consecutive points shown on the same rate of slope must be used together, in order to detect and variation from a straight grade. In case any such variation is found, it must be reported to the Engineer or City Engineer.

10.10 - (blank)

10.11 - Inspection - The City Engineer shall have safe access to the work at all times during construction, and shall be furnished with every reasonable facility to determine that the workmanship and character of materials used and employed in the work are in accordance with the requirements and intentions of the contract documents.

Inspection of the work or materials shall not relieve the Contractor of any of the Contractor's obligations to fulfill the contract as prescribed. Work and materials not meeting the requirements shall be made good and unsuitable work or materials may be rejected, notwithstanding that the work or materials have been previously inspected by the City Engineer or that payment therefore has been included in a progress payment.

The Contractor shall give the City Engineer notice of the time when he or any subcontractor will start the various units or operations of the work, or resume units or operations of work when suspended. Notice shall be given at least 1 working day in advance of the starting or resumption time. Any work performed by the Contractor or his subcontractors outside the scope of this notice shall be removed if so ordered by the City Engineer or his representative on the work.

10.12 - Right of Access to Street - The right is reserved to the Town and to utility companies and agencies to enter upon any street within the project for the purpose of making inspections, repairs, changes and new installations necessitated by the work or for necessary maintenance or operation.

10.13 - Placing Portions of Work in Service - If requested by the City Engineer, portions of the work, as completed, shall be placed in service. The Contractor shall give proper access to the work for this purpose. Such use and operation shall not constitute acceptance of the work, and the Contractor shall be liable for defects due to faulty construction until acceptance of the entire work under the contract.

10.14 - Extent of Trench to Opened at One Time - In previously constructed roadways, no more than 100 meters (330 feet) of trench shall be open at any time. An open trench is a trench that has not been completely backfilled, satisfactorily compacted, and in paved areas, capped with at least 25 mm (1 inch) of temporary paving conforming to the provisions of Section 50.09 of the Technical Provisions.

10.15 - Monuments - The Contractor shall not disturb any survey monument until the monument, rivet, disk, nail or other reference mark therein has been "tied out" by a person licensed to perform surveying and a plat showing the ties is submitted to and approved by the City Engineer. The Contractor shall reinstall monuments and have a person licensed to perform surveying reestablish points as a part of his work. In the event the Contractor disturbs or removes a monument before it is "tied out" by a field survey or **unnecessarily** disturbs or

removes a survey monument, the Town will have such monument reestablished and a corner record filed at the Contractor's expense.

10.16 - Stop Work Order - Whenever work is proceeding contrary to plans or specifications, or in violation of applicable ordinances or laws, or in such way as to endanger life of property, the City Engineer may order the work stopped by notice in writing served on any persons engaged in doing or causing such work to be done, and such persons shall forthwith stop such work until authorized to proceed again by the City Engineer.

On private projects, a stop work order may be issued for any reason stated in the paragraph above and also when the Contractor owes the Town money to reimburse it for work done or paid for by the Town to protect public or private property, eliminate hazards, eliminate or clean up water pollution and erosion or for any other condition requiring timely action by the Contractor's and where the Contractor failed or refused to act or his action was deemed by the City Engineer to be inadequate.

Section 11. Control of Material

11.01 - Source and Trade Name of Materials - Prior to the start of work, the Contractor shall submit to the City Engineer, a list of the suppliers or sources of materials and the trade names of manufactured materials to be incorporated in the work. The sources and trade names on the list shall be approved by the City Engineer before any materials are brought to the job site.

Notwithstanding any prior inspection or approval, only materials conforming to the requirements of these specifications and the special provisions shall be incorporated in the work. The materials furnished and used shall be new except as may be specifically provided on the plans or in the special provisions. The materials shall be manufactured, handled and used in a worker-like manner to insure completed work in accordance with the contract documents.

11.02 - Samples and Tests - Submittal of representative preliminary samples or inspection and testing of materials at their source or place of manufacture may be required by the City Engineer. All tests of materials or work done by the Contractor shall be made in accordance with the methods called for in the State Specifications or by commonly recognized standards of national organizations, and such special methods and tests as are prescribed in the special provisions. Whenever a reference is made to a test method, it shall mean the method in effect on the date the Town approved the plans for the work unless specifically referred to by edition, volume or date. Materials may be tested at any time during the progress of the work, and defective materials will be rejected.

11.03 - Town Furnished Materials - Materials furnished by the Town will be made available at the locations designated in the special provisions. The cost of handling, transporting and placing Town furnished materials shall be considered as included in the price paid for the contract item involving such materials. The Contractor will be held responsible for all materials furnished to him, and he shall pay all demurrage and storage charges. The Contractor will be held liable to the Town for the cost of replacing Town furnished material and such costs may be back-charged to the Contractor or deducted from any monies due or to become due him.

11.04 - Storage of Materials - Materials shall be stored in a manner what will insure the

preservation of their quality and fitness for the work. When considered necessary by the City Engineer, materials shall be placed on platforms or other hard clean surfaces and covered when directed. Materials shall be stored in a manner that facilitates inspection. No materials shall be stored within 4.5 meters (15 feet) of nor obstruct access to a fire hydrant, nor within 1.5 meters (5 feet) of a U. S. mailbox, nor within 6 meters (20 feet) of a drainage inlet, watercourse or curb return.

11.05 - Trade Names, Alternatives and Substitutions - For convenience in designation on the plans or in the specifications, certain articles or materials to be incorporated in the work may be designated under a trade name or the name of the manufacturer and its catalogue information. The use of an alternative article or material that is of equal quality and of the required characteristics for the purpose intended will be permitted, subject to the following requirements:

The burden of proof as to the quality and suitability of alternatives shall be upon the Contractor and the Contractor shall furnish all information necessary and as required by the City Engineer. The City Engineer shall be the sole judge as to the quality and suitability of the alternative articles or materials and his decision shall be final.

Whenever the specifications permit the substitution of a similar or equivalent material or article, no tests or action relating to the approval of the substitute material will be made until the request for substitution is made in writing by the Contractor accompanied by complete data to show the equality of the material or article proposed. The request shall be made within 5 calendar days of bid the opening and prior to the action of the Town Council to award the contract, whichever date is later.

11.06 - Plant Inspection - The City Engineer may inspect the production of material, products and equipment to be incorporated in the work at the source of supply or manufacture. Source or plant inspection, however will not be undertaken until the City Engineer is assured of the cooperation and assistance of both the Contractor and the supplier, producer or manufacturer. The City Engineer shall have free entry at all times to those parts of the plant that concern the manufacture or production of materials to be used in the work. Adequate facilities shall be furnished free of charge to make the necessary inspections. The Town assumes no obligation to inspect material or equipment at its source or point of manufacture.

11.07 - Certificates of Compliance - A Certificate of Compliance, in a form acceptable to the City Engineer, shall be furnished prior to the use of any material for which these specifications or the special provisions require that such a certificate be furnished. In addition, when so authorized in these specifications or the special provisions, the City Engineer may permit the use of certain materials or assemblies without prior sampling or testing if accompanied by a Certificate of Compliance. The certificate shall be signed by the manufacturer of the material or the manufacturer of assembled materials and shall state that the materials involved comply in all respects with the requirements of the specifications. A separate Certificate of Compliance shall be furnished with each lot of material delivered to the work and the lot so certified shall be clearly identified in the certificate. The form of the Certificate of Compliance and its deposition shall be as acceptable to the City Engineer.

Materials used on the basis of a Certificate of Compliance may be sampled and tested at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve

the Contractor of responsibility for incorporation of material in the work that conforms to the requirements of the contract documents and any such material not conforming to such requirements will be subject to rejection, whether in place or not.

Section 12. Responsibilities to the Public

12.01 - Applicable Laws - The Contractor shall keep himself fully informed of all State and Federal Laws and Town ordinances and regulations that, in any manner, affect those engaged or employed in the work, materials used in the work, the conduct of the work and of all such orders and decrees of bodies or tribunals having any jurisdiction or authority over the same. The Contractor shall at all times observe and comply with, and shall cause all his agents, employees and subcontractors to observe and comply with all such existing and future laws, ordinances regulations, orders, and decrees of bodies or tribunals having any jurisdiction over the work. If any discrepancy or inconsistency is discovered in any of the contract documents in relation to any such law, ordinance, regulation order of decree, the Contractor shall report the same to the City Engineer.

12.02 - Vehicle Code - Within those areas of the project that are open to public traffic, the Contractor shall comply with all the requirements of Divisions 11 through 15 of the Vehicle Code. The Contractor shall take all necessary precautions for safe operation of his equipment and the protection of the public from injury and damage from such equipment.

12.03 - Cleanup and Dust Control - Throughout all phases of construction, including suspension of work, and until final acceptance of the work, the Contractor shall keep the work site clean and free from dirt, mud, waste matter, rubbish and debris. The Contractor shall abate dust nuisance by cleaning, sweeping, and sprinkling with water, or other means as necessary. Any mud or other debris that results from the Contractor's abatement of dust shall be cleaned up by the Contractor.

When required by the City Engineer, the Contractor shall furnish and operate a self-loading motor sweeper with spray nozzles as often as needed, but no less often than once each working day, to keep paved areas acceptably clean whenever construction, including restoration, is incomplete.

No materials or equipment shall be stored on the site more than 5 working days prior to installation or use, unless otherwise approved in writing by the City Engineer. All materials and equipment not installed or used in the work shall be removed from the site within 5 working days after they are no longer needed for the work, unless otherwise approved by the City Engineer in writing.

Excess excavated material from the Contractor's operations shall be removed from the site immediately. Sufficient material may remain for use as backfill or required fill. Forms and form lumber shall be removed from the site as soon as practicable after stripping.

Care shall be taken by the Contractor to prevent spillage on haul routes. Any such spillage shall be removed immediately and the area cleaned by the Contractor.

12.04 - Permits and Licenses - The Contractor shall procure all permits and licenses, pay all

charges and fees, and give all notices necessary and incident to the due and lawful prosecution of the work. In the event the Town has obtained permits, licenses or other authorizations applicable to the work, the Contractor shall comply with the conditions of such permits, licenses and authorizations.

12.05 - Safety Provisions - The Contractor shall conform to all safety rules and regulations established by the California Division of Industrial Safety and OSHA.

12.06 - Preservation of Facilities and Property - Due care shall be exercised to avoid injury to and to protect if necessary existing improvements, facilities and other property, including trees, shrubs, lawns, ground covers, walks, pavements, structures, utilities and underground facilities, at the site or adjacent thereto that are not designated for removal in the course of construction. Any such facility or property that is injured or damaged by the Contractor's operations shall be restored, repaired or replaced at the Contractor's expense. Restoration, repair or replacement shall be to a condition as good as when the Contractor started work, shall be at least equal in quality and shall match in character, dimension and finish of said facility or property. The cost of such restoration, repair or replacement shall be borne by the Contractor.

To prevent possible or further damage to facilities or property or to reduce hazards to public or private safety, if the Contractor fails to act on the order of the City Engineer or the Town is unable to reach the contractor if the need occurs when the Contractor is not at the job site, the City Engineer may make take necessary preservative actions or cause to be made temporary repairs as he deems necessary. The cost of such work done by the Town may be deducted from any monies due or to become due to the Contractor or, on private projects, will be billed to the Contractor.

12.07 - Responsibility for Damage - The Town and all its officers, employees and agents connected with the work shall not be answerable or accountable in any manner: for any loss or damage that may happen to the work or any part thereof; for loss or damage to any of the materials or other things used or employed in performing the work; for injury to or death of any person either worker or the public; or for damage to property from any cause that might have been prevented by the Contractor, his workers or anyone employed by him.

With respect to third party claims against the Contractor, the Contractor waives any and all rights to any type of express or implied indemnity against the Town and its officers, employees and agents. It is the intent of the parties that the Contractor will indemnify and hold harmless the Town and its officers, employees and agents from any and all claims, suits or actions as set forth above, regardless of the existence or degree of fault or negligence on the part of the Town, the Contractor, subcontractors or employees or agents of these, other than the active negligence of the Town or its officers, employees or agents. In addition to any remedy authorized by law, so much money due the Contractor under and by virtue of a contract with the Town as shall be considered necessary by the City Engineer may be retained by the Town until disposition has been made of such third party claims or suits for damages.

12.08 - Public Safety - Whenever the Contractor's operations affect normal conditions for traffic or for the public, the Contractor shall furnish, erect and maintain, at his expense, all fences, barricades, lights, signs and other devices necessary to prevent accidents or damage or injury to the public. Construction area signs shall be furnished, installed, maintained and removed, when

no longer required, in accordance with the provisions of Section 12-3.01 through 12-3.12 of the State Specifications and any requirements of the special provisions, except all compensation therefore shall be included in the prices paid for the various contract items of work, and no additional compensation will be paid therefore.

The Contractor shall also furnish, at his own expense, flaggers and guards necessary to give adequate warning to traffic or to the public of construction conditions. Flaggers and guards assigned to direct traffic or to warn the public of construction conditions shall perform their duties, and shall be provided with necessary equipment, in accordance with the current edition of the Caltrans publication "Instructions to Flaggers." The equipment shall be furnished and kept clean and in good repair by the Contractor at his expense. Signs, lights, flags and other warning and safety devices shall conform to the requirements set forth in the current Caltrans "Manual of Traffic Controls for Construction and Maintenance Work Zones."

No material or equipment shall be stored where it will interfere with the free and safe passage of public 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 that portion of the roadway open for use by public traffic.

Where any items or facilities required under the provisions of this Section are not provided or are out of service, and an emergency exists that necessitates protective measures, the City Engineer may provide or arrange to have provided such facilities during the emergency and the cost thereof will be deducted from money due or to become due to the Contractor or on private projects, will be billed to the Contractor. Before taking such emergency action, the City Engineer will endeavor to notify the Contractor of the conditions, and to allow the Contractor to correct them with his own crew, provided he acts promptly and expeditiously.

12.09 - Public Convenience - The Contractor shall conduct his operations in a manner that will result in the least possible obstruction and inconvenience to the public and abutting property owners. He shall undertake no greater length or amount of work than he can prosecute properly with due regard to the rights of the public. Unless otherwise stated in the special provisions, all public traffic shall be permitted to pass through the work with as little inconvenience and delay as possible.

Convenient access to driveways, houses and buildings along the line of the work shall be maintained. Temporary approaches to crossings or intersecting streets shall be provided and kept in good condition. When an abutting property resident's access across the right-of-way line is to be relocated under the contract, the existing access shall not be closed until the replacement access facility is useable.

Roadway excavation and fill shall be conducted in a manner that will provide a reasonably smooth and even surface for use by public traffic, at all times. Sufficient fill at culverts and bridges to permit traffic to cross shall be placed in advance of other grading operations. If ordered by the City Engineer, roadway cuts shall be excavated in lifts and roadway fills shall be constructed part width at a time, construction being alternated from one side to the other and traffic routed over the side opposite the one under construction. After subgrade preparation for a specific layer of road section material has been completed, the Contractor shall, at his expense, repair any damage to the roadbed or completed subgrade resulting from his operations or from

use by public traffic. While subgrade and paving operations are under way on a road that continues to carry public traffic, public traffic shall be permitted to use the side of the road opposite the one under construction. When sufficient width is available, a passageway wide enough to accommodate at least 2 lanes of traffic shall be kept open at all times where subgrade and paving operations are in active progress.

The installation of underground drains, sewers, and utility conduits crossing roads open to public traffic shall be conducted one lane at a time. The remaining width of the road shall be kept open and unobstructed until the work in the lane where construction is taking place is completed and ready to receive traffic.

Where it is necessary to restrict through traffic on a public street to one lane, the Contractor shall provide competent flaggers.

12.10 - Maintenance of Traffic - The Contractor shall plan and conduct his activities to minimize the disruption of normal traffic and parking. Normal movement of traffic through the project area shall be maintained at all times to the greatest extent possible.

The Contractor shall be responsible for placing “No Parking” barricades and signs at least 48 hours prior to any work requiring such traffic control. At least one-way traffic shall be maintained on all streets within the limits of work during actual work hours. During other times, all street lanes shall be free of obstructions and hazards, and shall be made available for use by traffic.

In the areas designated on the plans, in the special provisions or in permit conditions as “Limited Operations Areas,” all normal street lanes shall be free of obstructions and available for use by traffic at all times, except the hours specifically allowed by the City Engineer or as stated on the plans or in the special provisions or permit.

The Contractor shall provide for safe and convenient passage of pedestrian traffic throughout the work area at all times.

12.11 - Street Closures and Detours- No street shall be completely closed to through traffic at any time unless permitted in writing by the City Engineer. The City Engineer may require that detours be established when streets are closed or partially closed. All detour routes and their signing shall be approved by the City Engineer before they are implemented. When detours are approved, the Contractor shall notify Sam Trans, police and fire departments, and all other public transportation and emergency service agencies that might be affected of the hours and dates of the street closures and detour routes at least 24 hours in advance of their occurrence and immediately upon their discontinuance.

12.12 - Haul Routes - The City Engineer may require the Contractor to use only roads designated by him as haul routes for passage of heavy vehicles carrying materials or supplies to or from the job. Additional special haul routes and conditions or limitations on their use may be set forth in the special provisions or imposed by the City Engineer.

12.13 - General and Automobile Liability Insurance - Unless the Contractor has provided insurance in accordance with Section 3.02 of these specifications or the requirement is waived by the City Engineer, Contractors performing work under encroachment or grading permits,

issued by the Town shall provide occurrence form general and automobile liability insurance in the amounts of at least \$1,000,000/\$2,000,000 any one occurrence/aggregate or endorsements of existing policies providing the following:

This endorsement is issued in consideration of the policy premium. Notwithstanding any inconsistent statement in the policy to which this endorsement is attached or any other endorsement attached thereto, it is agreed as follows:

1. INSURED. The Town, its elected or appointed officers, officials, employees and volunteers are included as insureds with regard to damages and defense or claims arising from: the ownership, operation, maintenance, use, loading or unloading of any auto owned, leased, hired or borrowed by the Named Insured, regardless of whether liability is attributable to the Named Insured or a combination of the Named Insured and the Town, its elected or appointed officers, officials, employees or volunteers.
2. CONTRIBUTION NOT REQUIRED. As respects work performed by the Named Insured for or on behalf of the Town, the insurance afforded by this policy shall: (a) be primary insurance as respects the Town, its elected or appointed officers, officials, employees or volunteers; or (b) stand in a unbroken chain of coverage excess of the Named Insured's primary coverage. In either event, any other insurance maintained by the Town, its elected or appointed officers, officials, employees or volunteers shall be in excess of this insurance and shall not contribute with it.
3. SCOPE OF COVERAGE. This policy, if primary, affords coverage to the Named Insured at least as broad as:
 - (1) Insurance Services Office form number CA 0001 (Ed. 1/78), Code 1 ('any auto') an endorsement CA 0025.
 - (2) If excess, affords coverage which is at least as broad as the primary insurance forms referenced in the preceding section (1).
4. SEVERABILITY OF INTEREST. The insurance afforded by this policy applies separately to each insured who is seeking coverage or against whom a claim is made or a suit is brought, except with respect to the Company's limit of liability
5. PROVISIONS REGARDING THE INSURED'S DUTIES AFTER ACCIDENT OR LOSS. Any failure to comply with reporting provisions of the policy shall not affect coverage provided to the Town, its elected or appointed officers, officials, employees or volunteers.
6. CANCELLATION NOTICE. The insurance afforded by this policy shall not be suspended, voided, cancelled, reduced in coverage or in limits except after thirty (30) days' prior written notice by certified mail return receipt requested has been given to the Town. Such notice shall be addressed as shown in the heading of this endorsement.

Endorsements must bear original signatures of authorized representatives of insurers and be accompanied by information needed to submit claims.

12.14 - Contractor's Identification - At all street entrances to the project area the Contractor shall install signs indicating the name of the project, the Contractor's name and business address and the Contractor's regular business hours telephone number. Lettering shall be at least 75 mm

(3 inches) high and in a color that contrasts with the background color of the sign. The Contractor shall submit a sample of the signs and descriptions of their locations to the Town Engineer at least 7 days prior to the start of work. Sign details and locations shall be approved prior to sign installation. Signs shall be installed before work is started. Contractor owned barricades used on the project shall bear the Contractor's name. On Town contract jobs, all costs associated with providing signs and labeling barricades shall be included in the cost of bid items of work and no separate payment will be made therefore.

Section 13. Underground Obstructions and Facilities

13.01 - General - The Contractor's attention is directed to section 6.09 Utilities and Non-Highway Facilities.

13.02 - Location of Utilities - Utility locations and depths shown on the plans were supplied by the respective utility companies and are approximate. Every effort has been made to assure their accuracy and completeness, but no guarantee is implied. The Contractor shall excavate all possibly conflicting underground facilities before commencement of work that may affect their safety.

13.03 - Underground Service Alert - At least two working days in advance of starting excavation, if the excavation will be conducted in an area that is known or could be reasonably expected to contain subsurface facilities, the Contractor shall contact the regional notification center (Underground Service Alert of Northern California) at 1 (800) 642-2444 and obtain an inquiry identification number. The Contractor shall also contact Caltrans for the location of its subsurface facilities in Highway 82 (El Camino Real) or BART for the location of its subsurface facilities if excavation will be performed within or near their respective rights-of-way.

13.04 - Adjustment of Castings, Boxes, Lids and Covers- Adjustment to grade of the castings, lids and covers of manhole, underground utility box, valve, monument and other access openings made necessary by changing street grade or the grade of ground in the course of work done on Town projects shall be performed by the Contractor and the cost thereof shall be included in other items of work, unless specific pay items for any or all of said adjustments are provided in the contract. All work involved shall be done to the specifications and satisfaction of the owner of the affected facility.

13.05 - Tree Roots- No tree root shall be unnecessarily cut in trenching operations. Excavation around roots shall be performed by hand. Where a root conflicts with the required location of the underground facility being installed, the root shall be trimmed neat at the edge of the excavation or trench, and shall be painted with an approved tree seal, as directed by the City Engineer.

Section 14 - Water Pollution and Erosion Control

14.01 - General - Care shall be exercised to preserve all vegetation beyond the limits of construction. The Contractor shall exercise every reasonable precaution to protect streams, lakes, reservoirs, bays, detention ponds, drainage facilities and the waters therein from pollution by fuels, oils, bitumens, calcium chloride, mud, silt and other harmful materials. Water pollution and erosion control work is intended to provide prevention, control, and abatement of water pollution and siltation to drainage systems, streams, waterways and other bodies of water, and

shall consist of constructing those facilities that may be shown on the plans, specified herein or in the special provisions, required as a condition of a permit or directed by the City Engineer.

14.02 - Scheduling of Work - No grading or other surface or ground cover disturbing work will be permitted to take place between the calendar dates of October 1 through April 15 without an approved and implemented Stormwater Pollution Prevention Program (SWPPP). In order to provide effective and continuous control of water pollution and erosion it may be necessary for the Contractor to perform the contract work in small or multiple units, on an out of phase schedule, and with modified construction procedures. The Contractor shall coordinate water pollution and erosion control work with all other work done on the contract.

14.03 - Contractor's Program - Before starting any work on a project, the Contractor shall submit to the City Engineer for his acceptance, a SWPPP to control water pollution and erosion during construction of the project. The SWPPP shall show the schedule for and the measures that the Contractor proposes to take in connection with construction of the project to minimize the effects of the work upon adjacent drainage systems, streams and bodies of water, shall be consistent with all Best Management Practices (BMPs) adopted by the San Mateo Countywide Stormwater Pollution Prevention Program, the Minimum Best Management Practices contained in Section 14.05 of these specifications, and employ methods that are the same as or at least equal in effectiveness to those in the "Manual of Standards for Erosion and Sediment Control Measures" written and distributed by ABAG. The Contractor shall not perform any clearing and grubbing, excavation or other vegetation or surfacing disturbing work, other than that authorized by the City Engineer, until the Contractor's SWPPP has been approved. The Town will not be liable to the Contractor for failure to accept all or any portion of an originally submitted or revised SWPPP nor for any delays to the work due to the Contractor's failure to submit an acceptable SWPPP.

14.04 - Waiver of Pollution and Erosion Control Plan Requirement - The Contractor may request the City Engineer to waive the requirement for submission of a written SWPPP when the nature of the Contractor's operation or work is such that erosion is not likely to occur or when it is clear that that no work will be performed between October 1 and April 15 and assured in a manner acceptable to the City Engineer that all required permanent erosion control measures will be in place and established before October 1. Approval or denial of a request for waiver shall be at the sole discretion of the City Engineer. Waiver of this requirement will not relieve the Contractor from responsibility for compliance with the other provisions of this section. Waiver will not preclude requiring submittal of a written SWPPP at a later time if the City Engineer deems it necessary because of delays in the progress of the work or the effects of the Contractor's operations.

14.05 - Minimum Best Management Practices - The practices that follow shall be employed, to the extent applicable, to all construction activities. Where a job specific SWPPP is prepared for a job and approved by the City Engineer, provisions of the SWPPP that conflict with the Minimum Best Management Practices that follow shall govern over the practices below. Where the City Engineer has waived preparation of a SWPPP pursuant to section 14.04, these minimum best management practices shall become the de-facto SWPPP and shall be enforced as such.

MINIMUM BEST MANAGEMENT PRACTICES

Avoid grading and work that disturbs large areas of earth in the wet season.

Provide stabilized (rocked and/or paved) areas at points of entrance or exit from construction sites to protect streets from mud and dust being tracked onto the pavement.

Locate drainage inlets that receive runoff from the project, and protect them with berms or filters.

Install berms and settling basins to protect ditches and creeks.

Protect streets with berms or other silt barriers and settling basins.

Control the amount of runoff crossing the construction site by diverting it around the site.

Provide channels that incorporate erosion and velocity reducing measures for water that must pass through the site.

Clearly label all hazardous materials, such as pesticides, paints, thinners, solvents, fuels, waste oil, and waste antifreeze, and store them only in designated places where spills can be contained in the immediate area.

Designate an area or areas for auto parking, vehicle refueling, vehicle and equipment maintenance. Isolate these areas to prevent runoff from them from draining into any street, storm drain facility, ditch or creek.

Inspect all equipment on the site regularly for leaks or drips, and remove leaking equipment from the site or repair promptly.

Perform major vehicle and equipment cleaning, servicing and repairs away from the job site.

Do not use diesel oil to lubricate or clean equipment or parts.

Use drip pans or drop clothes under equipment when it is necessary to change vehicle or equipment fluids on site. Collect spent fluids on containers and dispose or recycle them off site.

Clean up leaks, drips and spills immediately as they occur. Excavate and properly dispose of contaminated soil. Report large spills immediately to the City Engineer.

Locate stockpiles of granular material at least 6 meters (20 feet) from any drainage inlet, watercourse or curb return.

Keep stockpiles of earth and granular materials out of the rain by covering them.

Minimize waste storage and handling by not over ordering and by removing waste and excess from the site immediately.

Never bury construction debris or leave it on a street or near a drainage ditch or creek.

Provide appropriate sized trash containers or dumpsters. Keep them covered, empty them regularly before overfilling, and check frequently for leaks and spillage.

Remove no more ground cover vegetation than necessary and don't remove before necessary.

Finish graded surfaces as quickly as possible and plant erosion control vegetation immediately after finishing. Install temporary or permanent irrigation as needed to establish new vegetation.

Don't order or mix more concrete than can be used in the time it is plastic.

Isolate on-site concrete mixing areas from runoff, and protect the ground within the mixing area from contamination with tarps or heavy plastic drop clothes.

Wash out concrete redi-mix trucks, tools and equipment on site only into contained wash-out areas where the water will flow into containment ponds or onto dirt. Never dispose of washout into a street, drainage inlet, ditch or creek.

Sweep, shovel and/or vacuum slurry and grit resulting from washing concrete for an exposed aggregate surface or from sawing concrete or asphalt. Protect streets, drainage inlets and ditches from slurry and grit with berms, silt barriers and filters.

Dispose of large chunks of concrete by incorporating in fills where shown on the plans or by removal to an off-site landfill.

Remove all asphalt concrete that is not being recycled in the work from the site. Do not bury.

Protect broken but not yet removed asphalt concrete chunks from contact with runoff or rainfall.

Do not pave or apply seal coats when it is raining or when rain is forecast within the week.

Cover and seal drainage inlets and manholes when applying prime or tack coat, asphalt concrete paving or pavement seals.

Do not apply herbicides or fertilizers at rates that exceed label directions.

Dry sweep paved surfaces. Never wash down streets.

Maintain portable toilet facilities in sanitary and good working order conditions.

Provide training for employees and subcontractors as to the purpose, importance and maintenance of erosion control measures.

Instruct all personnel on site to report to the City Engineer immediately any soil that has an unusual color or smell, any unexpected underground tank and any abandoned well or buried barrels, debris or trash.

14.06 - Correction of Inadequate Pollution and Erosion Control Measures - If the measures being taken by the Contractor are inadequate to control water pollution or erosion effectively, the City Engineer may direct the Contractor to revise operations and the SWPPP. The directions will be in writing and will specify the items of work for which the Contractor's SWPPP is inadequate. No further work shall be performed on those items until the water pollution control measures are made adequate and, if also required, a revised SWPPP has been approved. The City Engineer will notify the Contractor of the acceptance or rejection of any submitted revised SWPPP in not more than 5 working days of its submittal.

14.07 - Responsibility and Payment for Removal of Silt from Storm Drains, Channels and Retention Basins - When, as a result of the absence, failure or inadequacy of the Contractor's STOPPP, silt is deposited in any storm drain, storm water channel, retention basin, catch basin, or any other drainage structure or facility, the Contractor shall be required to completely clean and remove all silt from said drainage structure or facility and from all downstream elements of the drainage system of which the structure or facility is a part, for whatever distance the City Engineer determines likely to have received silt as a result of the absence, failure or inadequacy of the Contractor's SWPPP. Should the Contractor fail to respond promptly to the City Engineer's demand for removal of silt and correction of the absence or inadequacy he deems to be the cause, the City Engineer will take the steps he deems appropriate, including hiring others to remove silt and to stop additional silt from the Contractor's operations to enter any part of the storm drain and related systems. On Town projects the cost of such action by the City Engineer shall be deducted from any monies due or to become due to the Contractor. On private jobs, the costs will be billed to the Contractor and a Stop Work Order shall be placed on the entire job until the bill is paid.

14.08 - Abatement of Other Water Pollution - The cleanup of water pollution by chemicals, petroleum products, cement or by the escape of any other material that is harmful or potentially harmful, from the work site as a result of the Contractor's operations, into drainage systems, their receiving waters, waterways or other bodies of water shall be the financial responsibility of the Contractor. The means of cleanup and the party or parties to be engaged to perform the cleanup work shall be determined by the City Engineer in consultation with appropriate hazardous materials, pollution control, safety, health and wildlife authorities and officials. The Contractor shall immediately carry out cleanup orders issued to him through or by the City Engineer and shall make the work site accessible to personnel and equipment from outside pollution control resources called in by the City Engineer. On Town projects the cost of cleanup action called for by the City Engineer and performed by outside resources shall be deducted from any monies due or to become due the Contractor. On private jobs, the costs will be billed to the Contractor and a Stop Work Order shall be placed on the entire job until the bill is paid.

14.09 - Other Requirements - The Contractor's submittal and the City Engineer's approval of the Contractor's STOPPP shall not relieve the Contractor from responsibility for compliance with Sections 5650 and 12015 of the Fish and Game Code or other applicable statutes relating to prevention or abatement of water pollution and erosion control. The Contractor is advised that if the area covered by the project excess 5 acres, he is required to file a Notice of Intent and his

STOPPP with the State Water Resources Control Board before starting work.

14.10 - Compensation - Unless there is a contact bid item or items for water pollution and erosion control work, full compensation for conforming to the requirements of this section shall be considered as included in the prices paid for the various items of work and no additional compensation will be allowed therefore.

Section 15. Reference to State Specifications

15.01 - Applicability of State Specifications - Where these specifications and the special provisions do not cover or fail to provide sufficient information regarding an item of work, the applicable provisions of the State Specifications shall be deemed to be included in these specifications by this reference and applicable to that work, except, provisions for measurement and payment shall not apply unless provided for by an item in the bid schedule. Where these specifications make specific reference to the State Specifications the relevant section or sections of the State Specifications are called out as “Section _____ of the State Specifications.”

15.02 - Meanings of Terms used in State Specifications - Wherever the State Specifications use the following terms, they shall be interpreted to have the equivalent meanings shown below as applied to work covered by these specifications:

<u>State Specification Term</u>	<u>Meaning in context of Town of Colma Standard Specifications</u>
Department	Town of Colma
Director	City Engineer
Engineer	City Engineer
State	Town of Colma

TECHNICAL PROVISIONS

GRADING

Section 20. General Requirements

20.01 - Description - All clearing and grubbing, earthwork and subgrade construction shall be done in conformance with the following general requirements. Compliance with these requirements shall be considered a part of other items of work and no separate payment shall be made therefore.

20.02 - Specifications - Where a Soils Engineer is retained by the owner for the purpose of controlling grading, the Soil Engineer's specifications (or in the absence of specifications, recommendations), when approved by the City Engineer, shall be included by reference in the special provisions and shall take precedence over these specifications. However, the Soils Engineer's specifications shall only modify certain provisions of these specifications and all provisions not modified shall remain in full effect.

Work not covered by these specifications or the Soil Engineer's specifications shall be governed by the provisions of Sections 16 and 19 of the State Specifications: except that Section 19-3, Structural Excavation and Backfill, shall not apply unless structure backfill is specifically called for in the special provisions.

20.03 - Seasonal Limits - No fill, subbase or base material shall be spread and compacted during unfavorable weather conditions. When the work is interrupted by heavy rain, fill operations shall not be resumed until field tests by the Soil Engineer indicate that the moisture content of the fill material is satisfactory for achieving proper compaction. The Contractor's attention is further directed to Section 14, Pollution and Erosion Control for other rainy season working requirements.

20.04 - Tree Preservation - Trees not shown on the plans or designated in the field for removal shall be saved, and no work, cutting or placing earth fill, nor storage of equipment or material shall be permitted within their drip lines. As used in this specification, "tree" shall mean any live woody plant having a single trunk with a circumference of 0.3 meter (12 inches) or more or multiple trunks having an aggregate diameter of 1 meter (40 inches) or more measured 1.2 meters (4 feet) above the ground. "Tree" shall also mean any smaller plant that has been planted by the Town or required by a Town issued permit or condition of approval.

Trees shall be protected by suitable fences, rails or barriers if so ordered by the City Engineer. Trees needlessly damaged shall be repaired as directed by the City Engineer at the Contractor's expense. Trees needlessly removed or damaged beyond repair shall be replaced with equal or specimen size trees, whichever is smaller, at the Contractor's expense.

20.05 Drainage - No grading that could affect natural or artificial drainage courses or patterns shall be commenced until the Contractor or his Engineer has submitted to the City Engineer a plan showing the proposed re-routing of storm water runoff and that plan has been approved and implemented.

20.06 - Inspection and Reports - No work shall progress without the knowledge and approval of the Soil Engineer who will be ultimately required to certify its compliance with his own and these specifications. The Soil Engineer is to be charged with keeping the City Engineer informed of unforeseen or unusual conditions, including soil materials, formations or conditions not anticipated in the soil or geological investigation, unexpected ground water, buried hazardous materials and any deficiency on the part of the Contractor in meeting the specifications for the work.

The tests used to determine compliance with these specifications shall be those stated in the latest edition of the Caltrans Materials Manual, unless otherwise specified in the special provisions. The Soil Engineer shall report test results to the City Engineer at the approximate same time as they are reported to the Contractor and/or owner and provide the City Engineer with 2 copies of all written reports regarding the work within a reasonable time, as defined by the City Engineer.

When the Soil Engineer is hired and paid by the Contractor or project owner, the Contractor or project owner shall instruct the Soil Engineer in writing, with a copy to the City Engineer, to keep the City Engineer informed and to provide him with copies of all written reports as specified above. Failure to keep the City Engineer so informed shall be reason for the City Engineer to issue a Stop Work Order for the entire work.

20.07 - Restoration of Natural Terrain - Before and as a part of completion of grading work all loose fill shall be removed or compacted, slopes shall be finished to receive revegetation, all areas shall be graded to drain and temporary water pollution and erosion control measures shall be replaced with permanent measures. Haul roads shall be regraded to blend in with the surrounding topography and to avoid collecting and concentrating storm runoff except by approved design.

Section 21. Clearing and Grubbing

21.01 - Description - This work consists of removing existing pavements, surfacings, other improvements, timber, logs, stumps, trees, brush, abandoned underground lines, debris, rubbish, obstruction, and objectionable or perishable material within the limits of the public right-of-way, additional work shown on the plans and the hauling away and disposal of all matter and material generated in the course of clearing and grubbing.

Tree branches extending over roadways that hang within 4 meters (13 feet) of finished grade shall be cut off close to boles in conformance with the provisions of section 73 of these specifications. Tree roots and stumps shall be removed completely except where the plans or special provisions call for removing stumps to a specified depths below finished grade and/or treating them with stump or root killer.

As part of clearing , buried ties and timber, existing pavements, concrete, brick or masonry foundations, walls piers, slabs, floors, curbs, gutters, sidewalks and driveways shall be removed or broken out and removed to a depth of at least 0.3 meter (1 foot) below subgrade elevation. All basement and pit floors on which fill material is to be deposited shall be thoroughly broken up in order to provide drainage.

As part of the work, the Contractor shall stockpile all topsoil obtained in stripping operations in

those locations shown on the plans or designated by the City Engineer. This topsoil shall be used for filling planter strips and for final grading in yard and slope areas.

Unless otherwise shown on the plans, the Contractor shall, as part of clearing work, carefully remove and store on the adjacent property fences not on proper line and grade or in the way of the work. The Contractor shall protect fences that are to remain in place and he shall be held solely responsible for damage done to them as a result of his grading or construction operations.

The Contractor shall salvage all signs, barricades, castings, frames, covers, riser rings, reusable culvert materials and other materials specified, and stockpile them at locations on the job where the Town can claim and remove them. Those not claimed by the Town before the completion of work on the project shall become the property of the Contractor and shall be removed by him.

As part of clearing work, the Contractor shall remove all existing manholes, catch basins, drop inlets, and turning strictures shown to be removed on the plans to a depth of at least 0.3 meters (1 foot) below subgrade, plug the remaining conduit ends with concrete or brick and mortar, and fill all such structures with clean sand, pea gravel or drain rock. On Town projects, payment for such removals shall be included in the price paid for clearing and grubbing.

21.02 - Measurement - Clearing and Grubbing will be paid for at a lump sum price. Large tree and/or stump removal, if provided for by a separate bid item, will be paid for as indicated in the bid schedule for that bid item.

21.03 - Payment - The lump sum price paid for clearing and grubbing shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals for doing all the work involved in clearing and grubbing as specified in these specifications and the special provisions, including removing all resulting material and disposing of it off the site.

When the contract does not include a contract pay item for clearing and grubbing, full compensation for any necessary clearing and grubbing required to perform the construction operations shall be considered as included in the price paid for earthwork, or if there is no item for earthwork, as included in the other items of work, and no additional compensation will be allowed therefore.

Section 22. Earthwork

22.01 - Description - This work consists of excavation for roadway improvements, construction of cuts and fills, furnishing suitable fill material from on or off the site, removal and disposal of all surplus material that may result from the grading operations, and all subsidiary work necessary to complete the grading to conform with the lines, grades and slopes shown on the plans.

As part of the grading work, the Contractor will be required to raise or lower the tops or frames and covers of all storm drain structures and appurtenances that are not at the required grade. He shall also be required to arrange with the owners for the adjustment of all utility frames, covers, and appurtenances that do not match finished grades, or to adjust them himself to the satisfaction of their owners. The cost of all such adjustments will be included in other items of work and no additional compensation will be allowed therefore.

22.01 - Preparation of Ground to be Filled - All vegetation shall be removed from the areas to be filled. Existing grass sod shall be removed to a depth of at least 150 mm (6 inches). Existing soils underlying areas to be filled that are in the opinion of the Soils Engineer or City Engineer unsuitable as a foundation for the fill shall be removed to a depth as required by the Soil Engineer or City Engineer and the resulting space refilled with approved material compacted to a relative compaction of at least 90 percent.

Where fill is to be constructed on relatively level ground, the total width on which the fill is to be placed shall be plowed or scarified and finely broken up to a depth of at least 150 mm (6 inches). It shall then be brought to the proper moisture content by applying water or aerating, and compacted to at least 90 percent relative compaction. Where fill material is to be placed on existing streets surfaces, all pavement, curbs, gutters, concrete sidewalk, etc., shall be thoroughly broken up. No piece over 100 cm (4 inches) in size will be permitted in the upper 0.6 meter (2 feet) immediately below subgrade in the proposed street areas.

Where the slope of the original ground is steeper than 5 horizontal to 1 vertical, fills shall be keyed into the original ground per the soils report. In the absence of a soils report, the base key at the toe of the fill shall be at least 3.6 meters (12 feet) wide cut into firm natural ground and sloped back into the hillside at a gradient of at least 2 percent. Subsequent keys shall be placed at vertical heights of not more than 4.6 meters (15 feet) and be at least 3 meters (10 feet) wide. Such keys or benches shall be inspected by the Soil Engineer and City Engineer before fill is placed on them.

Where embankments are to be constructed across low, swampy ground that will not support the weight of trucks or other hauling equipment, either all of the wet material shall be removed to solid ground that will support hauling equipment or the fill must be engineered by a Soil Engineer.

22.03 - Fill Material - Prior to the commencement of grading operations, the material to be used for fill shall be approved by the City Engineer who, at his option, may require concurrence from a Soil Engineer and/or data supporting its suitability for fill from a qualified material testing laboratory. Fill material shall be free of organic matter, thrash and other deleterious material and shall have an expansion pressure of no more than 2.4 MPa (50 pounds per square foot). Material used in the top 0.6 meter (2 feet) below subgrade for street improvements, parking lots and building pads shall have a sand equivalent of at least 10.

Fill material shall be free of rocks or lumps over 100 mm (4 inches) in diameter in the top 0.6 meter (2 feet) of fill. Larger material may be used in locations approved by the Soil Engineer, so long as sufficient fine material is used to fill the voids between rocks or lumps and the rocks are not allowed to nest and are not in the way of future trenching.

22.04 - Placing and Compacting Fill Material - All fills shall be compacted to at least 90 percent relative compaction. The top 150 mm (6 inches) of fill material placed under street improvements, parking lots and building pads shall be compacted to at least 95 percent relative compaction. The maximum thickness of each layer of fill placed before compaction shall be determined by the Soil Engineer or City Engineer and shall be based on achieving the specified compaction with the equipment being used by the Contractor. Soil being compacted shall be

brought to the proper moisture content by adding water or aerating as required.

Field density tests shall be performed by the Soil Engineer and the results made known to the City Engineer or his representative in the field as soon as they are available. At least one test shall be made for every 400 cubic meters (520 cubic yards) of fill or fraction thereof, with a minimum of 2 tests in isolated areas. Where the total volume of a particular fill exceeds 23,000 cubic meters (29,900 cubic yards) the number of tests may be reduced to one test per 800 cubic meters (1040 cubic yards) if approved by the City Engineer. Where sheepsfoot rollers are used, the soil may be disturbed to a depth of several centimeters. Density tests shall be taken in compacted material below the disturbed surface. Where these tests indicate that the density of any layer of fill or portion thereof is below the required compaction, the particular layer or portion shall be reworked until the required density is obtained.

Fill slope faces shall be compacted by means of sheepsfoot rollers or other suitable equipment. Compacting operations shall continue until slopes are stable. While no appreciable amount of loose soil will be permitted on the slopes, compaction shall not be so dense as to prohibit planting. Compacting slope faces shall be done progressively in increments of 1 to 2 meters (3 to 6 feet) in fill height. When fill slopes steeper than 2 horizontal to 1 vertical are permitted, they shall be constructed 0.3 to 0.6 meter (1 to 2 feet) beyond the limit of finished grade measured normal to the slope, and then cut to the design finish grade.

22.05 - Allowable Variation from Design Grade - In all areas where street improvements are to be constructed, rough grading shall be within 25 mm (1 inch) plus or minus of design rough grade.

Cut and fill banks shall be graded to within 0.3 meter (1 foot) plus or minus, measured normal to the slope. Greater variations may be allowed by the City Engineer on cut slopes in rock.

All other finish elevations shall be within the following tolerances:

<u>Slope of Finish Grade</u>	<u>Allowable Variation</u>
Less than 1%	+ or - 25 mm (1 inch)
1% to 5%	+ or - 75 mm (3 inches)
over 5%	+ or - 150 mm (6 inches)

22.06 - Slope Rounding - The tops of all cut and fill slopes, except those that separate building pads, shall be rounded. Rounding shall extend a minimum horizontal distance of 1/4 the vertical height of the cut or fill bank, measured from the normal break point. The quantities involved in rounding the tops of slopes will not be included in the quantities of fill and excavation to be paid for. This work will be considered as a part of finishing the slopes, and no additional compensation will be allowed therefor.

22.07 - Measurement - Where there is a separate pay item for earthwork, it will be measured by volume in the unit of measure indicated in the bid schedule. Quantities for roadway excavation and fill will be computed by the average end area method or such other method as the City Engineer deems appropriate. The City Engineer's sections or other basis for calculating volumes will be made available to the Contractor for his inspection in the City Engineer's office. Volumes will be calculated to the nearest whole cubic meter or yard. Cut quantities will be

based on the volume of material removed. Fill quantities will be based on the volume of in place and compacted fill. When a project includes both excavation and fill, the basis of payment will be the larger of the two unless otherwise specified in the special provisions.

Unauthorized or excess excavation or fill, beyond the limits and planes shown on the plans or cross sections, will not be paid for. The Contractor shall backfill and compact over excavations and remove excess fills as directed by the City Engineer, at his own expense.

22.08 - Payment - The price paid per bid schedule unit of excavation or fill shall include full compensation for furnishing all, plant labor, materials, tools, equipment and incidentals for doing all work involved in preparing the ground to be filled, stockpiling topsoil, furnishing fill material and water, compacting original ground to be filled and fill material, excavating and disposing of cut material, finishing banks, adjusting structures, and all other work necessary to construct fills and excavations complete, in place and as specified.

When there is no bid item for excavation or fill, full compensation for necessary excavation and fill will be included in the prices paid for other items of work.

Section 23. Subgrade

23.01 - Description - Subgrade is that portion of a roadbed on which pavement, surfacing, base, subbase, or a layer of any other material that is specified will be placed. The preparation of subgrade will be required at various and multiple depths within the roadway section for each layer of material specified to support the final wearing course of pavement or surfacing.

23.02 - Subgrade Preparation - The finish subgrade, immediately prior to placing subsequent layers of pavement material thereon, shall have a relative compaction of not less than 95 percent for a depth of 150 mm (6 inches), or the depth of that particular structural layer if greater, as determined by California Test Method Nol 231 or 216. The subgrade shall be free of segregated material and shall be smooth and true to the required grade and cross section within the tolerance hereinafter specified. The Contractor shall repair at his expense, any damage to the prepared subgrade caused by his operations or by the use of public traffic. No material shall be placed on the prepared subgrade until the subgrade meets the requirements of this section and has been approved by the City Engineer.

23.03 - Construction - If the Contractor elects to remove rocks, lumps or to break up hard material in order to facilitate subgrade preparation, such work will be at his own expense. All material removed shall be disposed of off-site or in a manner approved by the City Engineer.

If subgrade is prepared on an existing subbase, base or other material put in place in the course of the work, those portions of the subbase, base or other material which become damaged or destroyed shall be repaired, reconstructed or replaced to the specified tolerance requirements, at the expense of the Contractor, prior to placing any subsequent layer. The surface shall be thoroughly cleaned of any loose material by brooming or other approved methods, if required by the City Engineer, immediately prior to placing new material.

The finish grade of subgrade shall not vary more than 25 mm (1 inch) above or below design grade. Areas that vary from design grade by more than the allowable tolerance shall be

loosened, reshaped and recompact, all at the Contractor's expense.

23.04 - Payment -No separate payment will be made for preparing subgrade. Full compensation for furnishing all plant, labor, materials, tools, equipment and incidentals, and for doing all the work and compacting involved in preparing subgrade as shown on the plans, specified in the specifications and directed by the City Engineer shall be considered as included in the contract price paid for the material to be placed on the subgrade. No separate payment shall be made for supplying water.

Section 24. Subgrade Stabilization

24.01 - Description - When the Contractor has completed roadway grading to the lines and grades shown on the plans, areas of unstable subgrade may be encountered. Upon specific direction of the City Engineer or Soil Engineer, the unstable area shall be excavated to the depth and horizontal limits directed. The excavated material shall be disposed of in the same manner as other excavated material resulting from work on the project. The excavation shall be filled with selected native material or aggregate subbase with an R-Value of at least 50, as directed by the City Engineer or Soil Engineer. The soil report or special provisions may also provide for the use of geotextile, lime or Portland cement in the filling operation. Handling, shaping and compacting of the fill material shall conform to the appropriate section of these specifications.

Subgrade stabilization will be paid for only in areas of excavation. Unsuitable subgrade encountered in fills placed by the Contractor shall be corrected, as described above, at the Contractor's expense.

24.02 - Measurement - Subgrade stabilization will be measured by the volume of the excavation after unsuitable material is removed. No payment will be made for excavation in excess of that specified by the City Engineer or Soil Engineer, and over excavated areas shall be filled and compacted at the Contractor's expense.

24.03 - Payment - The price paid per volume measure of subgrade stabilization shall include full compensation for furnishing all plant, labor, materials, tools, equipment and incidentals required for excavating and disposing of unsuitable material and supplying and installing specified replacement material complete, in place as specified.

The estimated quantity stated in the bid schedule is only for establishing a unit price. The quantity may be increased or decreased, or the item may be deleted altogether by the City Engineer, and no adjustment will be made in the unit price of subgrade stabilization or any amount of overhead contained in the bid item.

When there is no bid item for subgrade stabilization, this work will be paid for as roadway excavation and subbase or base and the bid prices therefore or, at the discretion of the City Engineer, by force account.

SUBBASES AND BASES

27.01 - General Requirements - All construction of subbases and bases shall conform to the

provisions of this section and to the requirements of the sections of these specifications pertaining to the type of subbase or base used. Payment for each type of subbase or base shall include full compensation for conforming to the requirements of this section.

27.02 - Utilities - The bottom layer of subbase or base shall not be placed until all underground utility lines and structures have been installed in the street area. The Contractor shall arrange for each utility company to notify the City Engineer that this requirement has been met before the City Engineer will approve the subgrade.

27.03 - Subgrade - No subbase or base material shall be placed until the City Engineer has inspected and approved the subgrade for compaction, trench compaction and geometric section and the City Engineer has received subgrade compaction and trench compaction certification from the Soil Engineer.

27.04 - Testing - Compaction tests shall be made by the Soil Engineer at all locations designated by the City Engineer and at such other locations as the Soil Engineer deems necessary to certify subgrade compaction. As a minimum, tests shall be made on each layer of material placed at intervals of not more than 152 meters (500 feet) and in no case shall fewer than 2 tests be made on any single street.

The following test methods shall be used in determining conformance with these specifications:

<u>Test</u>	<u>Designation</u>
Relative Compaction	Ca. #231 or #216
Rapid Sugar Method (% CaOH)	ASTM C25
Plasticity Index	Ca. #204
Sand Equivalent	Ca. #217
Resistance Value (R-Value and Expansion Pressure	Ca. #301
Compressive Strength of C.T.B.	Ca. #312

On private work, the Soil Engineer shall perform sufficient tests on the materials to be incorporated into the roadway section (subbase and base) to enable him to certify to the City Engineer that the materials used meet the requirements of the specifications.

27.05 - Measurement - Quantities of subbase and base will be measured by volume, mass or area, whichever is indicated in the bid schedule, in place, for the various thicknesses and types of materials involved. Measurement will be to the nearest whole unit of measure. No payment will be made for material placed outside the limits shown on the plans or in excess of the thickness called for unless directed by the City Engineer.

Section 28. Aggregate Subbase

28.01 - Description - This work consists of furnishing, spreading, shaping and compacting subbases as specified in these specifications and the special provisions.

28.02 - Materials - Aggregate subbase shall meet the requirements for “R-Value” stated in the

special provisions or in the soil report approved by the City Engineer. The material shall be clean and free from all vegetable matter and other deleterious substances and shall be of such a nature that it can be shaped and compacted readily under watering and rolling to form a stable base. It shall also meet the minimum requirements set forth below, both before and after being placed and compacted. No material shall be placed on grade until samples have been presented to the City Engineer or Soil Engineer and the material has been approved by the City Engineer or certified to the City Engineer by the Soil Engineer.

Gradation after compaction - The maximum size shall be 25 cm (1 inch) less than the compacted thickness of the layer in which it is placed. Between 40 and 90 percent by weight shall pass a 4.75 mm (number 4) sieve and no more than 25 percent shall pass a 75 micrometer (number 200) sieve.

Sand Equivalent - The Sand equivalent shall be no less than 20.

Plasticity Index - The plasticity index shall be no more than 15.

Expansion Pressure - The expansion pressure shall be no more than 2.4 MPa (50 pounds per square foot).

The City Engineer reserves the right to retest material after it has been placed on grade and compacted. Material that fails to pass a retest shall be removed, disposed of, and replaced at the Contractor's expense.

28.03 - Spreading - Aggregates for subbases shall be delivered to the roadbed as uniform mixtures and shall be spread in layers or windrows. Segregation by size shall be avoided and subbases and bases shall be free of pockets of coarse or fine materials.

Where the thickness of subbase is 150 mm (6 inches) or less, the material may be spread and compacted in one layer. Where the required thickness is greater, the material shall be spread and compacted in two or more uniform layers of equal thickness, none of which shall exceed 150 mm (6 inches) in thickness.

28.04 - Compacting and Tolerances - Each layer of subbase shall be compacted to a relative compaction of at least 95 percent, and to a point where no movement (pumping) or rutting can be observed under the load of normal construction equipment. The surface of the finished subbase at any point shall not vary more than 25 mm (1 inch) above or below design grade, and the completed thickness shall be no more than 25 mm (1 inch) thinner than design thickness at any point. Subbase that does not conform to these requirements shall be reworked as necessary.

28.05 - Payment - The price paid per unit of measure of aggregate subbase shall include full compensation for furnishing all plant, labor, materials (including water), tools, equipment and incidentals for doing all work involved in furnishing, hauling, constructing, and compacting imported subbase, complete in place, as specified.

Section 29. Aggregate Base

29.01 - Description - This work consists of furnishing, spreading and compacting aggregate base as specified in these specifications and the special provisions.

29.02 - Materials - Aggregate base material shall conform to Section 26-1.02A of the State Specifications for Class 2 Aggregate Base. At the option of the Contractor, either 37.5 mm (1 ½ inch) or 19 mm (¾ inch) maximum size aggregate grading may be used, except that once the grading is selected it shall not be changed without the City Engineer's approval.

29.03 - Adding Water or Drying - At the time aggregate base is spread it shall have a moisture content appropriate to obtain the required compaction. The moisture shall be uniformly distributed throughout the material.

29.04 - Spreading - Aggregates for base shall be delivered to the roadbed as uniform mixtures and shall be spread in layers or windrows. Segregation by size shall be avoided and subbases and bases shall be free of pockets of coarse or fine materials.

Where the thickness of subbase is 150 mm (6 inches) or less, the material may be spread and compacted in one layer. Where the required thickness is greater, the material shall be spread and compacted in two or more uniform layers of equal thickness, none of which shall exceed 150 mm (6 inches) in thickness.

29.05 - Compacting and Tolerances - Each layer of base shall be compacted to a relative compaction of at least 95 percent, and to a point where no movement (pumping) or rutting can be observed under the load of normal construction equipment. The surface of the finished base at any point shall not vary more than 15 mm (5/8 inch) above or below design grade, and the completed thickness shall be no more than 25 mm (1 inch) thinner than design thickness at any point. Base that does not conform to these requirements shall be reworked as necessary.

29.06 - Payment - The price paid per unit of measure of aggregate base shall include full compensation for furnishing all plant, labor, materials (including water), tools, equipment and incidentals for doing all work involved in furnishing, hauling, constructing, and compacting imported subbase, complete in place, as specified.

Section 30. Cement Treated Base

30.01 - Description - This work consists of furnishing, spreading, compacting and curing plant-mixed cement treated base as specified in these specifications and the special provisions.

30.02 - Materials - Cement treated base shall conform to Section 27-1.02 of the State Specifications. The nature of the aggregate and proportion of cement shall be adequate to produce a 7-day compressive strength of 5.2 MPa (750 pounds per square inch) when tested by California Test 312 with between 4 and 5 percent cement by dry weight. Only Class A cement treated base shall be used unless otherwise specified in the special provisions. Proportioning and mixing of plant-mixed cement treated base shall conform to Sections 27-1.05 through 27-1.05c of the State Specifications. Road-mixed cement treated base shall not be used.

The Contractor shall furnish the City Engineer a signed certificate of compliance from the supplier of the cement treated base material stating that it conforms to the requirements of these specifications. The Soil Engineer shall take such number of samples of the cement treated base

and conduct such number of tests for compressive strength as directed by The City Engineer.

No subsequent layer of material or surfacing shall be placed until the results of the compressive strength tests are approved by the City Engineer.

30.03 - Handling Cement Treated Base - Mixed materials shall be protected against moisture loss both while in transit to the job site and before placement and compaction. Trucks transporting cement treated base must be equipped with covers and the covers must be used. Uncovered loads will be rejected. As each load of cement treated base arrives at the site the City Engineer or his representative shall be given a copy of a tag showing the weight of CTB in the load, the cement content and the time water was first introduced to the mixture of aggregate and cement.

30.04 - Spreading, Compacting and Curing - Spreading, compacting, operational time requirements, construction joints and curing shall be performed in accordance with Sections 27-1.06 through 27-1.10 of the State Specifications.

30.05 - Defective Work or Materials - Cement treated base that fails to obtain a 7-day compressive strength of at least 5.2 MPa (750 pounds per square foot) as determined from core samples taken from the in-place material or that shows evidence of breaking up or pumping shall be considered defective. Defective areas shall be removed and replaced. The replacement or repair of defective areas shall be performed at the Contractor's expense and no extra compensation will be allowed therefore.

30.06 - Payment - The price paid per unit of measure of cement treated base shall include full compensation for furnishing all plant, labor, materials (including water), tools, equipment and incidentals for doing all work involved in furnishing, hauling, constructing, compacting and curing cement treated base, complete in place, as specified.

SURFACING AND PAVEMENTS

Section 36. Asphalt Concrete Construction

36.01 - Description - This work consists of furnishing and applying prime coat and tack coat, furnishing, spreading and compacting asphalt concrete, furnishing and applying seal coats, and performing all incidental work as specified in these specifications and the special provisions in applying asphalt concrete surfacing to unpaved bases.

36.02 - Requirements to be met before Constructing Asphalt Concrete Surfacing - No asphalt concrete surfacing shall be placed until all of the following requirements are met:

All utility lines within the area to be paved have been installed and tested to the satisfaction of the utility agencies involved, and the City Engineer has received written notice from each utility that this requirement has been met.

All curb and gutter forming edges of areas to be paved is in place, it has been inspected by the City Engineer and defective or damaged sections designated by him have been replaced.

All other edge restraints called for on the plans are in place and in a condition satisfactory to the City Engineer.

The City Engineer has been supplied with written results of compaction tests on all utility trenches within the area to be paved, and on subgrade, subbase and base material in place and has approved said results.

The City Engineer has inspected and approved the base course for proof of compaction (proof rolling), geometric section and prime coat.

36.03 - Penetration Treatment (Prime Coat) - Aggregate bases on new streets and street widenings shall be treated with a liquid asphalt prime coat. Immediately in advance of applying the prime coat, the surface of the base shall be cleaned of all dirt and loose material.

The liquid asphalt to be used shall be SC 70 conforming to the provisions of Section 93 of the State Specifications. It shall be applied at the approximate rate of 1.15 L per square meter (0.25 gallon per square yard), the exact rate to be determined by the City Engineer. Excess liquid asphalt that fails to penetrate the base shall be covered with fine sand. Liquid asphalt shall not be applied when the atmospheric temperature is below 10 degrees C (50 degrees F), and shall not be covered with paving for at least 48 hours.

Immediately in advance of paving, additional liquid asphalt shall be applied to areas where the prime coat has been damaged.

36.04 - Paint Binder (Tack Coat) - Wherever asphalt concrete is to be placed over or against an existing asphalt or Portland cement concrete surface, the surface against which it will be placed shall be treated with an asphaltic emulsion tack coat.

The asphalt emulsion to be used shall be RS-1, SS-1, CSS-1 or CSS-1h conforming to Section 94 of the State Specifications and applied at the rate of 0.10 to 0.45 L per square meter (0.02 to 0.10 gallons per square yard) as determined by the City Engineer. Asphalt emulsion shall not be applied when the atmospheric temperature is less than 4 degrees C (40 degrees F).

36.05 - Raising Manhole and Valve Castings - On new street construction, widening and reconstruction projects, valve risers, manhole and monument castings and similar structures that must be flush with the surface of the finished roadway surface shall be adjusted to grade either before or during paving. Concrete collars used to set castings shall be kept at least 45 mm (0.15 foot) below the finished surface and covered with asphalt concrete. The work of adjusting valve covers, castings and similar structures shall be considered a part of the other items of work, and no extra compensation shall be allowed therefore, unless provided for with a separate item in the bid schedule.

36.06 - Asphalt Concrete Materials - The asphalt concrete mix shall conform to the provisions of Sections 39 and 92 of the State Specifications. The liquid asphalt shall be AR 4000. Surface courses shall be constructed using 12.5 mm (½ inch) maximum Type B (medium) graded aggregate unless otherwise stated in the special provisions. Lower courses shall be constructed

using 19 mm (3/4 inch) maximum (medium) graded aggregate, except where the total area being paved is 100 square meters (120 square yards) or smaller, 12.5 mm (1/2 inch) aggregate may be used in lower courses.

Design of the asphalt mix and conformance testing of aggregates is to be performed by a laboratory hired by the contractor and acceptable to the City Engineer. The asphalt concrete mix shall be designed on the basis of optimum bitumen content as determined by California Test Method 367. Copies of the asphalt mix design and results of aggregate and asphalt testing performed by the Contractor's laboratory shall be delivered to the City Engineer at least 5 working days prior to paving and shall be approved by the City Engineer before constructing asphalt concrete surfacing.

Every load of asphalt concrete delivered to the job shall be accompanied by a weight tag that shows the asphalt content of the mix. For each job, the asphalt concrete supplier shall supply the City Engineer with a certificate stating The mix supplied conforms to the specifications and mix design for the job.

36.07 - Spreading Equipment - Asphalt concrete shall be placed by a self-propelled asphalt paver conforming to the requirements of Sections 39-5.01 and 39-5.02 of the State Specifications, except as provided below:

On small jobs where the total width to be paved is less than 3 meters (10 feet) or the total length of the area to be paved is less than 30 meters (98 feet), a spreader box, if the box itself is approved by the City Engineer, may be used for placing asphalt concrete.

On trench jobs where the width of trench is less than 1.2 meters (4 feet), asphalt concrete may be spread by any means that produces results conforming to the provisions of Section 39-6 of the State Specifications.

36.08 - Spreading - Where the total thickness of asphalt concrete to be placed is greater than 62.5 mm (2 1/2 inches) it shall be placed in layers of equal thickness, none of which shall exceed 62.5 mm (2 1/2 inches).

Asphalt concrete mix shall be spread at a temperature of not less than 120 degrees C (248 degrees F) and initial rolling or tamping shall be performed before the temperature of the mix falls below 93 degrees C (200 degrees F).

When the atmospheric temperature is lower than 20 degrees C (68 degrees F) or the plant where the material is mixed is more than 16 kilometers (10 miles) from the work site, all truck loads of asphalt concrete shall be covered with tarpaulins before leaving the plant and until the mix is to be spread on the roadbed.

Asphalt concrete shall be spread and compacted as set forth in Section 39-6.01 of the State Specifications. The mixture shall be spread evenly on the roadbed at a uniform rate that will provide the required compacted thickness without resorting to spotting, picking up, or otherwise shifting the mixture. Segregation shall be avoided, and the surfacing shall be free from pockets of course or fine material.

In advance of spreading asphalt concrete, if ordered by the City Engineer, surface course mixtures shall be spread as directed by him to level irregularities, dips, depressions, sags and excessive crown, and to provide a smooth base of uniform grade and cross section, in order that subsequent layers of asphalt concrete will be uniform in thickness.

Before placing the top layer of surfacing at cold construction joints or at locations adjoining existing surfacing, the existing surface shall be cut with a saw vertically along a straight line laid out by the City Engineer, and the old surfacing material stripped out to its base. The new surfacing shall overlay the older base and shall form a butt joint with the older surfacing.

Asphalt concrete shall be placed so the finished surface, after compaction, is 6.25 to 12.5 mm (1/4 to 1/2 inch) above the gutter lip where the gutter section carries storm runoff. Where the gutter section spills runoff, the finished surface of the compacted asphalt shall be flush with the gutter.

Longitudinal joints in the top course of asphalt concrete surfacing shall correspond with the edges of traffic lanes. Longitudinal joints in lower courses of asphalt concrete shall be offset at least 150 mm (6 inches) from surface joints. Longitudinal joints shall be trimmed to a vertical face and to a neat line where the edges of previously placed surfacing are, in the opinion of the City Engineer, in such a condition that the quality of the construction joint will be adversely affected.

36.09 - Compacting Equipment - When the area to be paved is smaller than 1800 square meters (2152 square yards) or when the quantity of asphalt concrete to be placed in one day is less than 350 tonne (386 tons) at least 1 steel wheel tandem roller weighing at least 7.25 tonne (8 tons) and not more than 9.1 tonne (10 tons) with rolling wheels 1 meter (39 inches) or more in diameter shall be used.

A minimum of two rollers shall be employed for each paver in compacting asphalt concrete when 351 to 1090 tonne (385 to 1200 tons) per day are placed. The second roller shall be the oscillating type pneumatic wheel roller and have a width of at least 1.2 meters (4 feet) with pneumatic tires of equal size and having treads satisfactory to the City Engineer. Wobble-wheel rollers will not be permitted. The tires shall be spaced so that the gaps between adjacent tires will be covered by following tires. Tires shall be inflated to 620 kPa (90 psi), or a lower pressure as designated by the City Engineer, and maintained so the air pressure will not vary more than 35 kPa (5 psi) from the designated pressure.

A minimum of 3 rollers will be required when the quantity of asphalt concrete to be placed in one day exceeds 1090 tonne (1200 tons). The third roller shall be a 2 -axle or 3-axle tandem or 3-wheel roller weighing not less than 11 tonne (12 tons).

All rolling equipment shall be self propelled, reversible and have separate operators. Rollers shall be equipped with pads and water systems that prevent sticking of asphalt mixtures to their wheels.

36.10 - Compacting and Tolerances - Initial breakdown rolling shall be performed with the heaviest steel wheel roller on the job. It shall consist of 3 complete coverages of the asphalt mat as soon as possible after it has been laid, and in no case after the temperature of the mixture has

fallen below 93 degrees C (200 degrees F). Joints and outside edges shall be rolled first, followed by rolling starting at the lower edge and progressing toward the highest portion. Under no circumstances shall the center be rolled first. The surface shall be checked after breakdown rolling and displaced areas shall be repaired with new hot asphalt concrete.

Breakdown rolling shall be followed immediately by additional rolling consisting of at least 3 complete coverages of the asphalt mat with a pneumatic tired roller while the temperature of the mixture is still at or above 66 degrees C (150 degrees F).

The final rolling of the uppermost layer of asphalt concrete to iron out roller marks shall be done with a 7.25 to 9.1 tonne (8 to 10 ton) steel wheel tandem roller.

Upon completion of rolling, if ordered by the City Engineer, the asphalt concrete shall be cooled by applying water.

Compaction of asphalt concrete surfacing in trenches less than 1.2 meters (4 feet) wide may be done with any steel wheel roller that delivers a compaction force of at least 5357 kg per meter (300 pounds per inch).

Rolling shall be performed in such a manner that cracking, shoving or displacement is avoided. The completed surface shall be thoroughly compacted, smooth, true to grade and cross section and free from ruts, humps, depressions and irregularities. When a straightedge 3.6 meters (12 feet long) is laid on the finished surface and parallel with the centerline, the surface shall not vary more than 6 mm (1/4 inch) from the lower edge of the straightedge. The transverse slope of the finished surface shall be uniform to a degree such that no depressions greater than 6 mm (1/4 inch) are present when tested with a 3.6 meter (12 foot) straightedge. The completed thickness shall be no more than 3 mm (1/8 inch) thinner than design thickness.

36.11 - Miscellaneous Areas - Asphalt concrete surfacing in median strips, islands, sidewalks, berms, gutters, gutter flares, spillways, aprons and other designated areas outside the traveled way shall conform to the provisions herein before specified as supplemented and amended as follows.

The aggregate shall be 9.5 mm (3/8 inch) maximum graded and the asphalt content shall be 1 percent by weight higher than called for road in surfacing.

Berms shall be shaped with an extrusion machine capable of shaping and compacting the material to the required cross section and density.

36.12 - Sand Seal - Patches in asphalt concrete, including trench repairs, and new surfacing constructed next to old in street widenings shall be finished with a light sand seal. The sand seal shall be constructed using asphaltic emulsion applied at a rate of from 0.5 to 1.0 L per square meter (0.1 to 0.2 gallon per square foot) and clean concrete sand conforming the provisions of Section 90-3.03 of the State Specifications. The application rate of the sand shall be sufficient to cover the emulsion and keep it from being tracked onto adjacent surfaces but low enough that it doesn't cause vehicles traveling at normal rates of speed to lose traction. Four working days after sand seal is applied, or at such other time ordered by the City Engineer, the Contractor shall remove all loose sand by sweeping.

36.13 - Measurement - Asphalt concrete surfacing will be measured by either mass (weight) or surface area in place, whichever is used in the bid schedule. Where measurement is based on mass (weight) it shall be made to the nearest whole tonne (ton). Where it is based on surface area it shall be to the nearest whole unit of measure. Asphalt concrete berms will be measured by length in the units used in the bid schedule.

36.14 - Payment - The prices paid for asphalt concrete surfacing and berms shall include full compensation for furnishing all plant, labor, materials, tools, equipment and incidentals for doing all work involved in constructing prime or tack coat, hauling, spreading, compacting and finishing asphalt concrete and applying sand seal where required complete in place to the thickness, lines and grades shown on the plans and in conformance with these specifications. No separate payment will be made for prime or tack coats, sand seal or for furnishing such flaggers, detour signs or warning devices as required by the City Engineer. Full compensation for all of the above items shall be included in the prices paid for asphalt concrete surfacing and berms.

Section 37. Asphalt Concrete Overlay

37.01 - Description - This work consists of furnishing and applying tack coat, furnishing spreading, and compacting asphalt concrete, applying seal coats, traffic control and all other incidental work as specified in these specifications and the special provisions for asphalt concrete overlay.

37.02 - Maintaining Traffic - Where traffic must be routed over a street to be overlaid, the overlay shall not be applied to more than one-half of the width of the traveled way at a time. The remaining width shall be kept free of obstructions and open for public use until the overlay first applied to the other half of the street is ready for use by traffic.

The Contractor shall provide for the passage of public traffic through the work in accordance with the applicable provisions of Section 12 of these specifications. When directed by the City Engineer, traffic shall be routed through the work under one-way control.

It shall be the Contractor's responsibility to protect new overlay work from damage by traffic until it is sufficiently cooled and compacted.

37.03 - Surface Preparation - Prior to application of the tack coat, the street surface shall be thoroughly cleaned by brooming or other means producing results comparable to those of careful hand brooming. Should the Contractor elect to clean a street surface by washing it with water, such washing shall be done well in advance of tack coat application, and the tack coat shall not be applied until the street surface is dry. If cleaning is done by washing, the Contractor shall provide traps at the entrances to drainage inlets to prevent silt, dirt or debris from entering the storm drainage system.

37.04 - Paint Binder (Tack Coat) - Prior to placing asphalt concrete overlay, the existing pavement shall be treated with a tack coat of SS-1, SS-1h, CSS-1 or CSS-1h conforming to Section 94 of the State Specifications and applied at the rate of 0.45 L per square meter (0.10 gallon per square yard). Asphalt emulsion shall not be applied when the atmospheric temperature is less than 4 degrees C (40 degrees F).

37.05 - Temperature and Surface Conditions - Asphalt concrete overlay shall not be placed when the atmospheric temperature is lower than 10 degrees C (50 degrees F) or when there is any evidence of moisture on the surface or in cracks in the surface to be overlaid.

37.06 - Raising Manhole and Valve Castings - Valve covers, manhole, cleanout, monument and other frames and castings in areas to be overlaid must be raised to be flush with the surface of areas being overlaid. Wherever possible such raising shall be accomplished with the use riser rings. Cutting out around valves and castings after constructing overlays will not be permitted without the consent of the City Engineer which must be sought and obtained prior to placing asphalt concrete overlay. Where cutting through newly placed asphalt concrete overlay is permitted, cuts must be made with an abrasive saw. Concrete collars around castings raised after constructing overlays shall be brought to and finished flush with the surface of the asphalt concrete and colored with 2 percent lampblack by weight of cement. The work of raising manhole and valve covers, castings and similar structures shall be considered a part of the other items of work, and no extra compensation shall be allowed therefore, unless provided for with a separate item in the bid schedule.

37.07 - Asphalt Concrete Materials - Asphalt concrete materials to be used for overlay shall conform to the provisions of Section 36.06 of these specifications except aggregate size and grading shall conform to the table below:

<u>Average Thickness</u>	<u>Aggregate Grading</u>
Greater than 25 mm (1 inch)	12.5 mm (1/2 inch) max. medium grading
25 to 12.5 mm (1 to 1/2 inch)	9.5 mm (3/8 inch) max.
Less than 12.5 mm (1/2 inch)	4.75 mm (number 4 sieve) max

37.08 - Spreading Equipment, Spreading, Compaction Equipment, Compaction and Tolerances - Spreading equipment, spreading, compaction equipment, compaction and tolerances shall conform to the provisions of Sections 36.07 through 36.10 of these specifications.

37.09 - Measurement - Asphalt concrete overlay will be measured either by mass (weight) or surface area in place, whichever is used in the bid schedule. Where measurement is based on mass (weight) it shall be made to the nearest whole tonne (ton). Where it is based on surface area it shall be to the nearest whole unit of measure.

37.10 - Payment - The prices paid for asphalt concrete overlay shall include full compensation for furnishing all plant, labor, materials, tools, equipment and incidentals for doing all work involved in preparing the surface to be overlaid, applying tack coat, hauling, spreading, compacting and finishing asphalt concrete and providing traffic control where required complete in place to the thickness, lines and grades shown on the plans and in conformance with these specifications. No separate payment will be made for tack coats or for furnishing such flaggers, detour signs or warning devices as required by the City Engineer. Full compensation for all of the above items shall be included in the prices paid for asphalt concrete overlay.

37.11 - Keycutting - At the locations shown on the plans, the Contractor shall perform keycutting along existing gutter edges or perpendicular to street center lines where overlays will end. The purpose of keycutting is to allow the overlay surface to match gutter edges and existing

pavements. Any extra raking or other effort required to achieve good matches shall be included in the unit price paid for asphalt concrete overlay and no extra compensation will be allowed therefore.

Keycutting shall be accomplished with the use of a cold planing machine having a cutter head at least 0.75 meters (30 inches) wide and operated in a manner that does not produce excessive fumes or smoke. Cuts shall be wedge shaped. The depth of cut at the gutter's edge or conform shall be no less than 38 mm (1 ½ inches) unless otherwise shown on the plans or called for in the special provisions.

Grindings generated by keycutting shall become the property of the Contractor and shall be removed from the work site. Fine residue left after keycutting is performed shall be removed by brooming in conformance with Section 37.03 of these specifications. Flushing will not be permitted where residue could be washed into storm drains, drainage channels or ponds.

If concrete gutter is chipped in the keycutting operation, it shall be epoxy patched in accordance with Section 46 of these specifications before placing asphalt concrete overlay.

37.12 - Measurement and Payment for Keycutting - Keycutting will be measured by length of cut in the unit indicated in the bid schedule. The quantity to be paid for will be the actual finished length of the cut regardless of the number of passes required to achieve the required depth at the gutter edge or conform line. The price paid for keycutting shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals for doing all work involved in cold planing asphalt concrete and disposing of the material removed as specified.

37.13 - Pavement Reinforcing Fabric - Where shown on the plans or called for in the special provisions pavement reinforcing fabric shall be placed on the existing pavement surface prior to placing asphalt concrete overlay or between layers of overlay.

Pavement reinforcing fabric shall conform to the provisions of Section 88-1.02 of the State Specifications. A certificate of compliance shall be provided by the manufacturer of the fabric, prior to its being placed on grade. Fabric shall be furnished in protective covers capable of protecting it from ultraviolet rays, abrasion and water.

In advance of placing fabric, large cracks, spalls, chuckholes and depressions shall be repaired or filled as directed by the City Engineer. Such repairs will be paid for as extra work as provided in Section 4.07 of these specifications, or as specified in the special provisions.

The surface on which pavement reinforcing fabric is to be placed shall be prepared in accordance with Section 37.03 of these specifications. Before placing the fabric, a binder of paving asphalt AR 4000 shall be applied to the surface receiving the fabric at the rate of 1.15 L per square meter (0.25 gallon per square yard). Binder shall be applied to a width equal to the width of the fabric plus 75 mm (3 inches) on each side.

The fabric shall be aligned and placed with no wrinkles that lap. The test for lapping shall be made by gathering together the fabric in a wrinkle. If the height of the doubled portion of extra fabric is 15 mm (5/8 inch) or more, the fabric shall be cut to remove the wrinkle, then lapped in

the direction of paving.

Pavement reinforcing fabric shall not be placed in areas of conform tapers where the thickness of the overlaying asphalt concrete is 30 mm (1 1/4 inches) or less.

Where manual laydown methods are used, the fabric shall be unrolled, aligned and placed in increments of approximately 9 meters (30 feet).

Adjacent borders of fabric shall be lapped 50 to 100 mm (2 to 4 inches) over the following roll in the direction of paving at ends of rolls or at any break. At fabric overlays, both the binder and the fabric shall overlap the previously placed fabric by the same amount.

Seating the fabric by rolling after placing will be permitted. Turning the paving machine and other vehicles and equipment shall be gradual and kept to a minimum to avoid damaging or moving the fabric. A small quantity of asphalt concrete may be spread over the fabric immediately in advance of placing asphalt concrete surfacing in order to prevent the fabric from being picked up by construction equipment only. Very limited public traffic will be allowed to cross the fabric under traffic control, and then only after the Contractor has placed a small quantity of asphalt concrete over the fabric.

Care shall be taken to avoid tracking binder material onto the pavement reinforcing fabric or distorting the fabric during seating of the fabric with rolling equipment. If necessary, exposed binder material shall be covered lightly with sand.

37.14 - Measurement and Payment for Pavement Reinforcing Fabric - Pavement reinforcing fabric will be measured in place and paid for by area in the units indicated in the bid schedule. The contract price paid per unit of area shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals and for doing all work involved in installing pavement reinforcing fabric as specified.

Section 38. Aggregate Seals

38.01 - Description - This work consists of application or applications of bituminous binder and cover of screenings, as specified herein. The type of seal coat and binder to be applied will be as shown on the plans or stated in the special provisions. The types of seal, together with rates of application of screenings and binder are listed in the table below:

Chip Seal Type	<u>RATE OF APPLICATION PER SQUARE METER (SQUARE YARD)</u>		
	Size of Screenings - mm	kg (pounds) Screenings	Bituminous Binder - L (gal.)
Fine	6.3 x 2.00 (1/4"x No.10)	6.5-10.9 (12-20)	0.7-1.4 (0.15-0.30)
Medium Fine	8.0 x 2.36 (5/16"x No.8)	8.7-13.6 (16-25)	1.1-1.6 (0.20-0.35)
Medium	9.5 x 3.35 (3/8"x No.6)	10.9-16.3 (20-30)	1.1-1.8 (0.20-0.40)
Coarse	12.5 x 4.75 (1/2"x No.4)	12.5-16.3 (23-30)	1.4-1.8 (0.30-0.40)
Double Coat			
1st Application	12.5 x 4.75 (1/2"x No.4)	12.5-16.3 (23-30)	0.9-1.6 (0.24-0.35)
2nd Application	6.3 x 2.00 (1/4"x No.10)	6.5-10.9 (12-20)	0.9-1.4 (0.24-0.30)

38.02 - Materials - Bituminous binder and screenings shall conform to the provisions of Sections 37, 93 and 94 of the State Specifications.

38.03 - Maintaining Traffic - At locations where public traffic is routed over the surface upon which aggregate seal is to be applied, the seal shall not be applied to more than one-half the width of the traveled way at a time, and the remaining width shall be kept free from obstructions and open for use by public traffic until the seal coat first applied is ready for use by traffic. The Contractor shall provide for the passage of public traffic through the work in accordance with the applicable provisions of Section 12 of these specifications and, when directed by the City Engineer, traffic shall be routed through the work under one-way control and/or with pilot cars.

38.04 - Preparation of Surface for Aggregate Seal - Immediately before applying the bituminous binder, the surface to be sealed shall be swept clean of all dirt and loose material.

38.05 - Applying Bituminous Binder - Bituminous binder shall not be spread on wet pavement or when the atmospheric temperature is below 16 degrees C (60 degrees F) or the temperature of the pavement surface is below 27 degrees C (80 degrees F). Binder shall not be applied until a sufficient quantity of screenings are on hand to immediately cover the binder.

Spreading bituminous binder shall be discontinued sufficiently early in the day to permit termination of traffic control prior to darkness. Bituminous binder shall not be spread over a greater area than can be immediately covered by screenings.

The cut off of bituminous binder shall be made on building paper or similar material placed over the surface of the pavement where the seal is to end. Paper shall also be placed over a sufficient area of adjacent pavement, at the beginning of a spread, that is not to receive aggregate seal so that spray nozzles are providing uniform coverage when the uncovered surface is reached. Building paper used for beginning and cutoff lines shall be removed and disposed of in a manner that conforms to all pollution control and hazardous material disposal regulations.

38.06 - Spreading Cover Material - Screenings shall be surface damp at the time of application, but excess water on the aggregate surface will not be permitted. When directed by the City Engineer, redampening of screenings in vehicles prior to delivery to the spreader will be required.

Asphalt emulsion binders shall be covered with screenings before setting or “breaking” of the binder occurs.

Screenings shall be spread immediately following the application of bituminous binder, by means of a chip spreader equipped with a mechanical device that will spread screenings at a uniform rate over the full width of a traffic lane in one application. The joint between adjacent applications of screenings shall coincide with the line between traffic lanes. The chip spreader shall be equipped with a device and so operated that coarse particles of the screenings shall be deposited on the bituminous binder before the finer particles. Operating the chip spreader at speeds that cause aggregate to roll after striking the bituminous surface will not be permitted.

38.07 - Rolling and Finishing - After screenings have been spread on the bituminous binder any

piles, ridges or uneven distribution shall be carefully removed to insure against permanent ridges, bumps or depressions in the completed surface. Additional screenings shall be spread in whatever quantities that may be required to prevent picking up by rollers or traffic, after which the surface shall be rolled.

A minimum of two pneumatic-tired rollers conforming to the provisions of Section 39-5.02 of the State Specifications shall be furnished. Initial rolling shall consist of one complete coverage and shall begin immediately behind the spreader. Spreading of binder and screenings more than 450 meters (1476 feet) ahead of completion of initial rolling will not be permitted. Secondary rolling shall begin immediately after the completion of initial rolling. The amount of rolling shall be sufficient to adequately seat the screenings, and in no case shall be less than two complete coverages.

On completion of rolling, traffic will be permitted to travel over seal coat. The traffic shall be controlled by pilot cars or other equally effective means at a speed not to exceed 24 kilometers per hour (15 mph) for a period of 2 to 4 hours. The exact length of time will be subject to approval by the City Engineer.

After the surface has been opened to public traffic, any excess of bituminous binder that comes to the surface shall immediately be covered with additional screenings or clean sand. The use of roadside material for cover will not be permitted. The completed surface shall present a uniform appearance and shall be thoroughly compacted and free from ruts, humps, depressions or irregularities due to an uneven distribution of binder or screenings.

After screenings are set in the bituminous binder, but not earlier than the day after they were spread, any loose screenings forming corrugations shall be redistributed over the surface. At the end of 4 days after they were applied excess screenings shall be removed by a sweeper in such a manner that the screenings set in the binder will not be displaced.

38.08 - Measurement - Quantities of aggregate seal will be measured by area in the units used in the bid schedule.

38.09 - Payment - The price paid for aggregate seal shall include full compensation for furnishing all plant, labor, materials, tools, equipment and incidentals for doing all work involved in constructing aggregate seal complete, in place and as specified.

Section 39. Slurry Seal

39.01 - Description - This work consists of mixing asphaltic emulsion, aggregate, set-control additives and water and spreading the mixture on pavements where shown on the plans, and as specified in these specifications and the special provisions.

39.02 - Materials - Emulsion and aggregate shall conform to the provisions of Section 37-2.202 of the State Specifications.

39.03 - Mix Design - Mix design shall be provided by the Contractor based on the work of a laboratory capable of performing the applicable International Slurry Seal Association (ISSA) tests, in accordance with Section 37-2.03 of the State Specifications. The design shall be

submitted to the City Engineer at least 7 working days before the start of slurry seal work. Once the materials and their proportions are approved, no substitutions will be allowed without a redesign and resubmittal for approval.

39.04 - Preparation of Surface for Slurry Seal - Immediately before applying slurry seal, the surface to be sealed shall be swept clean of all dirt and loose material.

39.05 - Proportioning, Spreading Equipment and Placing - Proportioning, spreading equipment and placing shall conform to the provisions of Sections 37-2.04 through 37-2.06 of the State Specifications.

39.06 - Measurement - Slurry seal will be measured by in-place area in the units used in the bid schedule.

39.07 - Payment - The price paid for slurry seal shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all work involved in constructing slurry seal, complete in place as specified.

Section 40. Portland Cement Concrete Pavement

This section will be added in a later edition.

Section 41. Interlocking Concrete Paver Surfacing

41.01 - Description - This work consists of constructing interlocking concrete paver sidewalks and street pavements, on prepared base or subgrade. It includes application of soil sterilizer, furnishing and placing or constructing paver edging, furnishing and placing filter fabric, furnishing and leveling sand base, furnishing, cutting to fit and placing concrete pavers, compacting pavers in place, filling joints with sand and cleaning up and removing surplus sand, cuttings and debris.

41.02 - Minimum Experience of Contractor or Subcontractor and Crew Chiefs - It is the Town's intent that interlocking paving stone surfacing in what is or will become public right-of-way or public property be installed by contractors or subcontractors that possess a significant amount of first hand experience doing the work. For such work, the contractor or subcontractor shall submit evidence satisfactory to the City Engineer that he has been regularly and continuously engaged in installing interlocking concrete paving stone surfacing for the last 5 years or, if he has less than 5 years of experience, that he has been responsible for directly overseeing and participating in the installation of at least 186,000 square meters (2,000,000 square feet) of interlocking paving stone surfacing. Experience gained as a job broker or by other means in which the contractor or subcontractor did not have direct responsibility for and control over the labor force involved in paver installation will not be counted toward fulfilling the minimum experience requirement.

Each crew laying pavers shall have working on that crew a crew chief who has been regularly and continuously engaged in installing interlocking concrete paving stone surfacing for at least the last 3 years or, if he has less than 3 years of experience, that he had directly participated in the installation of at least 93,000 square meters (1,000,000 square feet) of interlocking paving stone surfacing.

41.03 - Requirements to be Met Before Installing Interlocking Concrete Paver Surfacing -

No sand base nor interlocking concrete paver surfacing shall be placed until all of the following requirements are met:

Utility lines within the area to be paved have been installed and tested to the satisfaction of the utility agencies involved, and the City Engineer has received written notice from each utility that this requirement has been met.

The City Engineer has been supplied with written results of compaction tests on all utility trenches within the area to be paved, and on subgrade, subbase and base material in place and has approved said results.

All curb and gutter that will function as edge restraints for the area to be paved is in place, it has been inspected by the City Engineer, and any defective or damaged sections designated by him have been replaced.

All concrete collars around manhole, monument, valve and similar castings are in place and have been inspected and approved by the City Engineer.

All other edge restraints called for on the plans or in these specifications are in place and in a condition satisfactory to the City Engineer.

The City Engineer has inspected and approved the base course for proof of compaction (proof rolling) and geometric section.

All filter fabric called for on the details has been installed, inspected and approved.

41.04 - Edge Restraints -Edges of interlocking concrete paver surfacing shall be constrained by one of the edge restraints described below:

Pavers attached by approved adhesive to concrete edge strips as shown on the details.

Concrete curb or curb and gutter with a minimum cross section area of 0.045 square meter (72 square inches) and with at least half of its section below grade.

Concrete and concrete block retaining walls constructed as part of the project or existing walls where the plans indicate they can be used for paver edge.

Concrete manhole, monument, valve and similar casting collars as shown on the details.

Ac/paver joints constructed as shown on the details.

Concrete sidewalk, driveway approach, driveway or similar flatwork, at least 100 mm (4 inches) thick, that fills the space between the back of a concrete curb and a paver walk is acceptable as edge restraint. Concrete driveway, walk or other flatwork on the private property side of a paver walk is not acceptable as edge restraint and must be supplemented by another restraint.

Manufactured metal or PVC edging, designed for industrial or roadway use and installed per the manufacturer's recommendations, may be used in applications that are outside of the public right-of-way and not intended to carry or be crossed by regular vehicular traffic.

Curb, curb and gutter, retaining wall, manhole, valve and monument collar and ac/paver joints will be measured and paid for as separate items of work at the contract prices in the bid schedule. Payment for concrete edge strips to which pavers are attached with adhesive and manufactured metal or PVC edging will be included in the unit price paid for pavers and no extra compensation will be paid therefore.

41.05 - Concrete Paver Materials - Pavers for each project shall be manufactured at a single plant that is owned and operated by a member of the Interlocking Concrete Pavement Institute. They shall conform to the requirement set forth in ASTM C 936 specification for Interlocking Concrete Pavers. Pavers shall be selected at random by the City Engineer for testing to confirm they possess an average compressive strength of no less than 55 MPa (8000 psi) with no individual paver having a compressive strength of less than 50 MPa (7200 psi). Pavers shall also be measured to assure conformance with dimensional tolerance requirements of ASTM C936. On private projects such testing shall be arranged by the Contractor through a certified laboratory that is acceptable to the City Engineer.

Pavers used for construction of roads, nonresidential driveways, residential driveways serving six or more residential units and other areas shown on the plans or designated by the City Engineer shall be rectangular in shape and 100 mm (4 inches) wide, 200 mm (8 inches) long and at least 80 mm (3 1/8 inches) thick. The same size pavers shall be used for sidewalks and non-vehicular areas however their thickness may be reduced to 60 mm (2 3/8 inch), except at driveways that serve non-residential uses or residential properties with six or more units. Pavers shall have integral spacer bars to insure proper joint width between each paver.

Pavers shall be the color or colors called for in the special provisions. Where blended colors are specified, color shall be integrated throughout each paver. Unblended paver coloring may be achieved with either color throughout each paver or with a color containing topping mix that is at least 15 mm (5/8 inch) thick. Pigments used to color pavers shall conform to ASTM specification C 979. On Town projects, at least 75 pavers of each color, showing the full range of variations expected shall be delivered to and approved by the City Engineer before pavers are produced for the job. All pavers of the same color shall be manufactured at the same time to assure color consistency.

Pavers shall be delivered to the site in steel or plastic banded or plastic wrapped cubes that can be handled by fork lift or clamp lift. No more pavers shall be stored at the site than can be reasonably expected to be incorporated into the work within 5 working days of their delivery. Pavers shall be stored where they do not block drainage, interfere with traffic or block sight distances at intersections. Storage locations on public streets must be approved by the City Engineer who shall evaluate the Contractor's on-street storage proposal on the basis of the effect it may have on vehicular and pedestrian traffic safety.

While being handled and stored pavers shall be protected from physical damage. Damaged

pavers or whole cubes of pavers in which more than 5 percent are damaged may be rejected by the City Engineer. Loss of pavers by theft or disappearance shall be born by the Contractor.

41.06 - Sand - Bedding and joint sand shall be clean and sharp. It may be natural or manufactured.

Bedding sand shall conform to the following ASTM C 33 grading requirements:

<u>Sieve Size</u>	<u>Percent Passing</u>
9.5 mm (3/8 inch)	100
4.75 mm (No. 4)	95 - 100
2.36 mm (No. 8)	85 - 10
1.18 mm (No. 16)	50 - 85
600 micron (No. 30)	25 - 30
300 micron (No. 50)	10 - 30
150 micron (No. 100)	2 - 10

Joint sand shall conform to the following ASTM C 144 grading requirements:

<u>Sieve Size</u>	<u>Percent Passing Natural Sand</u>	<u>Percent Passing Manufactured Sand</u>
4.75 mm (No. 4)	100	100
2.36 mm (No. 8)	95 - 100	95 - 100
1.18 mm (No. 16)	70 - 100	70 - 100
600 micron (No. 30)	40 - 75	40 - 75
300 micron (No. 50)	10 - 35	20 - 40
150 micron (No. 100)	2 - 15	10 - 25
75 micron (No. 200)	0	0 - 10

The cost of furnishing and installing bedding and joint sand shall be included in the unit price paid for interlocking concrete paver surfacing and no extra compensation will be paid therefore.

41.07 - Other Materials and their Installation

Soil Sterilizer - Soil sterilizer shall be a, a, a-trifluoro-2,6-dinitro-N,N,-dipropyl-p-toluidine (44.5%) as manufactured by Monterey Chemical Company under the name of “Treflan E. C.” The rate of application shall be 37 liters per ha (4 gal/ac). All label directions shall be strictly followed. The cost of furnishing and applying soil sterilizer shall be included in the unit price paid for interlocking concrete paver surfacing and no extra compensation will be paid therefore.

Filter Fabric- Filter fabric shall be installed at the edges of interlocking concrete paver surfacing as shown in the details and wherever there is a possibility of bedding sand loss through joints in the edging. Filter fabric conform to the provisions of Section 88-1.03 of the State Specifications and the requirements for Edge Drains stated therein. The

Contractor's attention is directed to the requirement that any filter fabric that is exposed for more than 72 hours shall be removed and replaced unless it is treated for ultraviolet protection. The cost of furnishing and installing filter fabric shall be included in the unit price paid for interlocking concrete paver surfacing and no extra compensation will be paid therefore.

Adhesive - Adhesive for attaching pavers to concrete surfaces or to other pavers shall be either latex "Thin Set" that is suitable for heavy traffic, exterior use and extended exposure to water with "Latticrete" or "Kuracrete" additive, or equal or one of the following construction adhesives or their equals as approved by the City Engineer:

"Dap 4000," manufactured by Dap
"PL Premium," manufactured by Sonneborn
"Cap Seal," manufactured by Keystone

Where joints will be exposed, the "Thin Set" or construction adhesive shall be selected for having a color that does not contrast with the color of the pavers. "Thin Set" or construction adhesive shall be applied in accordance with its manufacturer's recommendations. Where "Thin Set" or construction adhesive is used to bond pavers stacked to form walls, exposed joints shall be pointed to remove the "Thin Set" or adhesive to a depth from the exposed surfaces of pavers equal to the thickness of the finished joint.

The cost of furnishing and applying adhesive shall be included in the unit price paid for interlocking concrete paver surfacing and no extra compensation will be paid therefore.

41.08 - Collars Around Manhole, Valve, Monument and other Frames - Reinforced concrete collars shall be constructed to the dimensions shown on the details around all manhole, valve, monument and similar frames that are located within areas to receive interlocking concrete paver surfacing. Collars shall be placed on subgrade compacted to at least 95 % relative compaction. They shall be aligned at the same angle with the base line as the paver pattern.

Collars will be measured and paid for on a unit basis for the sizes or types called for in the bid schedule. The price paid per collar shall include full compensation for furnishing all plant, labor, materials, tools, equipment and incidentals required for the construction of concrete collars.

41.09 - Ac/Paver Joints - Ac/paver joints are to be constructed where interlocking concrete paver surfacing abuts asphalt concrete surfacing. They consist of a two-lift-thick section of ac surfacing, with a steel angle at the edge that will be next to the concrete pavers, placed on a base of specified thickness. Unless otherwise shown on the plans, ac/paver joints are 1.2 meters (4 feet) wide and extend across the full width of the ac/paver interface.

Ac/paver joints will be measured by surface area in the units used in the bid schedule. Payment shall include full compensation for providing all plant, labor, materials, tools, equipment and incidentals necessary for saw cutting existing ac paving, excavating for the ac and base section, compacting subgrade, furnishing, placing and compacting base and asphalt concrete and furnishing and installing steel angle, complete and in place as shown on the plans and details.

Measurement of quantities of base and asphalt concrete surfacing adjacent to ac/paver joints will not duplicate the area of ac/paver joint paid for under this item.

41.10 - Subgrade and Base - Subgrade and base for interlocking concrete paver surfacing shall be constructed in accordance with Sections 23 and 29 of these specifications except as modified below:

Soil sterilizer shall be applied to the surface of dirt subgrade.

The finish surface of the pavement layer immediately below bedding sand shall not vary more than 12.5 mm (½ inch) above or below design grade. In addition, when a straightedge 3 meters (10 feet long) is laid on the finished surface, the surface of the layer immediately below bedding sand shall not vary more than 10 mm (3/8 inch) from the lower edge of the straightedge.

Where utility boxes are adjusted or otherwise moved, the backfill material around the boxes shall be carefully and thoroughly tamped to assure the 95 % relative compaction requirement is met. The City Engineer shall be informed of when box backfill and compaction work is to be performed and may request rescheduling of the work to facilitate continuous inspection while the work is being done.

41.11 - Layout Lines and Patterns - Paver patterns shall be laid out in alignment with the base line or base lines shown on the plans or delineated elsewhere in the contract documents. If no base lines are provided in the contract documents, the Contractor shall establish base lines as needed, subject to the approval by the City Engineer. Paver patterns shall be aligned accurately parallel or perpendicular to base lines or form the angle called by the pattern for with base lines. Where base lines pass through an intersection and have the same bearing on both sides of the intersection, lines of paver joints on both sides of the intersection shall be in continuous alignment. The pattern or patterns in which pavers are to be laid will be described on the plans, details or special provisions.

41.12 - Installation of Pavers - In general, paver installation shall begin at the low end of a section to be paved and proceed up grade. Where the grade of the paver surfacing exceeds 4 ½ percent installation shall begin at the low point and proceed up grade.

Bedding sand shall be spread and screeded to the thickness shown on the plans or details but in no event shall it be less than 25 mm (1 inch) or more than 38 mm (1 ½ inch) thick. The screed shall be set so the surface of the sand is 9.5 mm (3/8 inches) higher than the desired final elevation of paver bottoms to allow for settlement when the pavers are vibrated. Bedding sand shall not be used to fill depressions in the surface of the underlying base. The moisture content of the sand shall be uniform but the sand shall not be saturated. Its density is to remain loose and its surface not disturbed, after screeding, until pavers are set. Bedding sand shall not be placed farther in advance than will be covered with pavers the same day. Sand that becomes saturated by rain before pavers are set and compacted shall be removed, along with any pavers set in it, and replaced with unsaturated sand.

When blended colored pavers are used, pavers are to be selected from at least 5 cubes and set by hand to blend color and texture variations. Machine laying may be used for unblended color

pavers. Joint spaces are to be controlled by placing adjacent pavers tight against spacer bars. On cut faces, where there are no spacer bars, joint widths shall be a minimum of 1.6 mm (1/16 inch) and a maximum of 4.8 mm (3/16 inch). Spaces larger than 9.5 mm (3/8 inch) shall be filled with cut pieces. Care shall be taken in setting pavers to not disturb the sand base. Joint lines shall be straight in all directions, and enough string lines shall be used to keep the paver pattern straight and true to layout lines.

Gaps at paver edges shall be filled with cut pavers or edge units. Along edges subject to vehicular traffic, cut pieces shall be no smaller than 1/3 of a whole paver. Where trim courses are called for along the edges of sidewalks, minor variations in walk width shall be accommodated by laying out the interior pattern of the walk for its widest section and cutting pavers making up one or both of the trim courses so the width of the interior pattern remains constant. Where walks are less than 3.6 meters (12 feet) in width, the pattern of pavers shall be centered in the walk so lengths of cut pavers at the inside edge of trim courses (or if there are no trim courses, at the outside edges of the walk) are equal.

Pavers shall be cut with a saw through their entire depths. Cuts shall be vertical and free from fins or other obstructions that would interfere with tight paver joints or hinder the ability to fill joints with sand. Sawing areas shall be kept clean. New concrete and finished paver surfaces shall be kept free of dust and grit from sawing. The area(s) where sawing is done shall be cleaned at the end of each day's work. Sawing grit shall not be washed onto any new concrete or paver surfaces or into storm drains.

Compact pavers and fill joints with sand as soon as possible after laying pavers. Use low amplitude, high frequency plate vibrators with a minimum centrifugal compaction force of 13 kN (3000 pounds) for 60 mm thick pavers and 22 kN (5000 pounds) for thicker pavers. No vehicular traffic is to be allowed on pavers before they are compacted and their joints filled. Before ending each day's work, pavers placed that day shall be fully compacted and their joints filled with joint sand to within 0.9 meter (3 feet) of the laying face.

Compaction shall start with at least three complete coverages by a vibrating plate compactor before joint sand is spread. Spread dry joint sand immediately after vibrating the pavers into the bedding sand and repeatedly vibrate, brush more sand into joints and vibrate again until joints are completely filled. Remove surplus joint sand by the end of each day. The City Engineer may require additional repetitions of joint filling and compaction or appropriate remedial measures in areas of installed paver that show evidence of inadequate interlock or support from below.

Where traffic must be permitted to use an unfinished section of street, protect the laying face at the end of each day by covering it with minimum 1.2 meter (4 feet) wide and 12.5 mm (½ inch) thick steel plates, and construct ramps so cars can get from the base to steel plate surface without disturbing newly placed pavers. Areas of sand bedding and pavers covered with steel plates that appear to the City Engineer to be disturbed, displaced or otherwise unsuitable for incorporation into the completed interlocking concrete paver surfacing shall be removed and reinstalled at the start of the next day's work. Pavers that must be removed and reinstalled will be paid for only once.

The finished surface of installed and compacted pavers shall not vary more than 10 mm (3/8 inch) from the lower edge of a 3 meter (10 feet) long straightedge.

41.13 - Measurement - Interlocking concrete paver surfacing will be measured by surface area in the units used in the bid schedule for the various thicknesses of pavers that are required.

41.14 - Payment - The prices paid for interlocking concrete paver surfacing shall include full compensation for furnishing all plant, labor, materials, tools, equipment and incidentals for doing all work involved in constructing edge strips, manufactured edging, bedding sand, paver surfacing, compacting and joint filling, complete and in place as specified.

41.15 - Street Cuts and Patches in Interlocking Concrete Paver Surfacing - When interlocking concrete paver surfacing must be removed for underground utility or road base work, removal and reinstallation of pavers shall be performed only by persons with experience in paver installation.

The area of interlocking concrete paver surfacing shall be marked out with a non-staining marker such as lumber crayon. Paint shall not be used to make marks on paver surfaces. Except in the case of an emergency when the City Engineer can not be reached, the area marked for removal shall be inspected and approved by the City Engineer before any removal work is done. As part of his inspection the City Engineer shall ascertain that the Contractor is experienced in doing such work and has a sufficient quantity of suitable manufactured edge restraint at the job site to hold remaining pavers in place.

The first paver shall be removed by carefully prying it from its place. If the pavers are interlocked too tightly to pry one loose, **one** paver may be broken. All remaining paver removal shall be by prying. As pavers are removed their bottom and side surfaces shall be cleaned of all adhering sand. The removed pavers shall be carefully handled and set aside for reinstallation. As the hole in the paver surfacing is opened to the pre-approved limits, mechanical paver edging shall be installed to hold lines of paver edges in place.

Before starting to reinstall pavers, all of the bedding sand shall be removed. The base shall be compacted to 95 % relative compaction, brought to the same grade as the original base and finished to the tolerance called for in Section 41.10 of these specifications. New bedding sand shall be used. If the bedding sand along the edges of the hole in the paver surfacing has been disturbed, remove at least two courses of pavers so that undisturbed sand is exposed. Place the new sand and level it with a screed set 6 to 12 mm (1/4 to 1/2 inch) higher in the center than at the edges to put a slight crown in the finished patch.

Place and compact a small test area of pavers to determine the proper grade for the bedding sand. The elevation of reinstalled pavers should be no lower than and not more than 3 mm (1/8 inch) higher than undisturbed pavers. Layout, joint size, straightness of joints, cutting, compacting and filling joints with joint sand shall conform to these specifications for new installations.

CONCRETE WORK

Section 43. Curb, Gutter, Sidewalk, Driveway Approach, Valley Gutter and Miscellaneous Flatwork

43.01 - Description - This work consists of constructing concrete curbs, gutters, sidewalks,

driveway approaches, valley gutters and miscellaneous flatwork on a prepared subgrade, at the locations and to the lines, grades and dimensions shown on the plans and details.

43.02 - Concrete - The concrete to be used shall conform to the provisions of Section 90 of the State Specifications for Class II containing not less than 350 kg of cement per cubic meter (5 sacks per cubic yard) with 25 mm (1 inch) maximum aggregate. No color or other admixtures shall be added unless called for in the special provisions or approved in advance by the City Engineer. Unless otherwise specified in the special provisions, all cement used shall be "Type II Modified." The same brand of cement shall be used in the concrete mix for all elements with exposed surfaces. The maximum slump of concrete, at the time of placement, shall be 100 mm (4 inches) as determined by California Test Method 519 (slump cone) or California Test Method 529 (Kelly Ball).

At the time of delivery, each load of ready-mixed concrete shall be accompanied by a tag showing the weight of all dry materials in the batch, the volume of water in the batch, the cement content and brand and the time cement was added to the other dry materials. One copy of the tag shall be given to the City Engineer or his representative present at the job before each load of concrete is deposited in the forms. No water shall be added to the mix without the permission of the City Engineer. When an addition of water is permitted, satisfaction of compressive strength requirements shall remain the Contractor's responsibility.

43.03 - Utilities Facilities and Obstructions in Sidewalk Areas - No form approval will be granted until all underground utility lines passing under them are installed, their trenches backfilled and properly compacted and the City Engineer has received notice to this effect from the utilities involved and the Soil Engineer.

Utility and traffic signal access, valve and meter boxes will not be permitted in sidewalk areas unless shown on plans furnished or approved by the City Engineer. Fire hydrants, utility, street light and traffic signal poles and traffic signal controller box pedestals will not normally be permitted in sidewalk areas. Where they are, the sidewalk shall be wide enough to provide 1.2 meters (4 feet) of clear space between the obstruction and one edge of the sidewalk.

43.04 - Subgrade - Subgrade shall be prepared in accordance with the requirements of Section 23 of these specifications and the further requirements herein stated. Subgrade shall be constructed to true grade and cross section. It shall be watered or aerated as needed and compacted to at least 95 percent relative compaction for a depth of 150 mm (6 inches) below the bottom of the concrete section.

Compacted subgrade shall be reinspected for grade and cross section by using a curb section template moved along gutter and back of curb forms **before the face of curb form is installed**. Needed adjustments in subgrade shall be made before the face of curb form is installed. Where subgrade is 25mm (1 inch) or less low, it shall be left low and compensated for with a thickened concrete section. Where subgrade is more 25 mm (1 inch) low, forms shall be removed, the area filled, recompact and retested for compaction. Fill placed to correct low subgrade within curb and gutter form areas shall be extended and compacted a sufficient distance beyond the forms to support fill within the form area. All costs associated with compensating for or correcting low subgrade shall be born by the Contractor. When concrete curb is to be extruded or slip-formed, the subgrade shall be checked from the offset guide line or survey marks. Subgrade and forms

shall be wet immediately in advance of placing concrete.

43.05 - Expansive Subgrade - Concrete shall not be placed directly on subgrade made up of soil with an expansion pressure in excess of 2.4 MPa (50 pounds per square foot) as determined by California Test Method 301. When expansive subgrade is encountered on private projects, the project's Soil Engineer shall be consulted to determine the depth to which expansive subgrade must be replaced with less expansive material or to prescribe alternative treatment of in-place material. The Soil Engineer's determination or prescription must be approved by the City Engineer before it is acted upon by the Contractor. On Town projects, the plans and specifications will deal with known expansive soil conditions.

43.06 - Existing Curbs, Sidewalks and Flatwork - Where the plans call for joining, reconstructing or removing existing curbs, sidewalks and other concrete flatwork, the existing section shall be cut to a depth of at least 40 mm (1 9/16 inch) with an abrasive saw at the first score line at or beyond the planned joint or at the location marked by the City Engineer. The entire section to be reconstructed shall be removed. The portion of concrete removed shall be taken out in a manner that leaves an even edge, without chips or breaks in the remaining concrete. The use of hand or power actuated impact tools for cutting the line of removal will not be permitted. If, for any reason, the concrete does not break on the intended line, the Contractor shall cut it again along a new line established by the City Engineer.

43.07 - Joints and Score Lines - All sidewalk or other flatwork that is to be constructed adjacent to curb and gutter shall be formed and poured monolithic with the curb and gutter unless otherwise permitted by the City Engineer.

Premolded expansion joints shall be constructed in curbs and sidewalks, at right angles to the face of curb, at all return points, on both sides of curb ramps and driveway approaches, and elsewhere as directed by the City Engineer. Expansion joint material shall be 6.25 to 12.5 mm (1/4 to 1/2 inch) thick and conform to the requirements of ASTM Designation D1751. Expansion joints shall extend through the full thickness of the concrete section.

Weakened plane joints shall be constructed at right angles to the longitudinal direction of the curb or sidewalk, at approximately 6 meter (20 foot) intervals between expansion joints and on both sides of structures and other objects that are located in sidewalk or flatwork areas. Where sidewalk or flatwork is adjacent to a curb, weakened plane joints shall be continuous across both curb and sidewalk. Weakened plane joints shall be a minimum depth of 25 mm (1 inch) and constructed with a deep scoring tool while the concrete is being finished or they may be cut with an abrasive saw within 5 days after the concrete is placed.

Where concrete sidewalk or flatwork is poured monolithically with curb, there shall be a score line placed 150 mm (6 inches) in back of the face of curb, running parallel with the face of curb. Sidewalks 1.8 meters (6 feet) wide or less shall be scored perpendicular to the longitudinal direction of the walk or face of curb at uniform intervals approximately equal to the width of sidewalk. Sidewalks wider than 1.8 meters (6 feet) shall be scored with a line that is parallel to the face of curb and divides the sidewalk in half and with score lines perpendicular to the face of curb spaced uniformly at a distance equal to approximately half the width of the sidewalk. Score lines shall be constructed with a scoring tool producing a score line at least 6.25 mm (1/4 inch) deep.

43.08 - Reinforcement - Where steel reinforcement is shown on the plans or details it shall conform to the requirements of Section 52 of the State Specifications (excluding Sections 52-1.10 and 52-1.11) and shall be placed in accordance therewith. Full compensation for furnishing and placing reinforcement shall be included in the price paid for the concrete item in which the reinforcement is placed, and no additional compensation will be paid therefore.

43.09 - Fixed Form Construction - Forms shall be steel or 50 mm (2 inch) nominal lumber,

except where thinner lumber is required for forming curves. Where nominal dimension lumber is used, the Contractor must allow enough distance between the bottom of the form and subgrade or gutter flowline to obtain the full dimension in concrete shown on the plans and details. Forms shall be smooth on the side placed next to the concrete and have a true smooth upper edge.

Lumber that is warped, cracked or checked shall not be used.

Forms shall be carefully set to alignment and grade and shall be held rigidly in place by stakes. Clamps, spreaders and braces shall be used where required to ensure rigidity of the form. Premolded expansion joints shall be placed in correct position in the forms before concrete is placed. All forms shall be thoroughly cleaned and coated with form oil to prevent concrete from sticking to them. Form oil shall be a commercial quality form oil or other equivalent coating that will permit the ready release of the forms and will not discolor the concrete.

43.10 - Extruded or Slip-Formed Curb Construction - Any curb, except curb on structures and curb that will be an edge restraint for interlocking concrete pavers, may be placed by using and extrusion machine or slip-form paver, provided the finished curb is true to line, grade and section and the concrete is dense and of the required surface texture. The concrete mix shall be specially formulated to produce concrete that has well defined web marks of water on the surface, is free from surface pits larger than 5 mm (3/16 inch) and does not detectably sag from the extruded form. Equipment for slip-forming and its operation shall conform to the provisions of Section 73-1.05B of the State Specifications.

43.11 - Placing Concrete - No concrete shall be placed until the City Engineer has approved the subgrade, forms and steel. No concrete shall be placed unless a representative of the City Engineer is present at the site. At times when it is not possible for the representative to be present during a specific pour, he shall so inform the Contractor and approve pouring in his absence. Concrete placed without the representative's presence or his waiver will be rejected and the Contractor will be required to remove and replace it at his own expense.

No concrete shall be placed if the ambient temperature is at or below freezing or predicted to fall below freezing within 72 hours after placing. Any concrete that is allowed to cool to freezing or a lower temperature within 72 hours after being placed shall be removed and replaced at the Contractor's expense.

When each load of concrete first arrives at the job site the City Engineer or his representative shall be given a copy of a tag showing the information required by Section 43.02 of these

specifications. Each load shall be discharged within 90 minutes of the time the cement was introduced to the aggregates or before 250 revolutions of the truck mixer drum or blades, whichever occurs first. When the temperature of the concrete mixture in the truck is 29 degrees C (85 degrees F) or above, the City Engineer may impose a shorter time limit on discharging concrete.

In depositing concrete against forms, care shall be taken to work the fine portions of the aggregate to the surface to leave said surface in a uniform and smooth condition. The concrete shall be tamped or worked with a flat spade or similar tool to produce a dense mass. Holes or pockets appearing in unexposed concrete surfaces after removing forms shall be filled with mortar composed of 1 part Portland cement to 2 parts sand.

43.12 - Finishing - Exposed concrete surfaces shall be floated to give a smooth plane surface free of local humps and depressions. Gutters and valley gutters with a flowline grade of less than 1 percent shall be water tested during the finishing operation and all high or low spots that cause water to pond shall be eliminated.

Exposed corners shall be rounded with a steel tool with a 12.5 mm (½ inch) radius, except corners of edges that will act as edge restraints for interlocking pavers shall be rounded with a 6.25 mm (¼ inch) radius tool. Curb ramp borders and centers shall be marked with shallow score lines as shown on the details. All exposed surfaces shall be broom finished. Curb and gutter shall be broomed parallel to the direction of the curb. Sidewalk shall be broomed perpendicular to the direction of the curb. Valley gutters shall be broomed parallel to the direction of the flowline.

The face of curb form shall not be removed in less than 1 or more than 6 hours from the time concrete is placed. In no event shall it be removed when the concrete is still plastic enough to slump. Side, back and edge forms for concrete curbs, sidewalks and flatwork shall not be removed sooner than 12 hours after the concrete is placed.

The top and face of finished curb shall be true and straight and the top surface of curbs shall be uniform in width and free from humps, sags or other irregularities. When a straightedge 3 meters (10 feet) in length is laid on the curb or gutter, the surface shall not vary more than 6 mm (¼ inch) from the edge of the straightedge except at grade changes or curves.

43.13 - Curing and Backfilling - Concrete shall be cured in accordance with Section 90-7 of the State Specifications. The back of curb and edges of sidewalk and other flatwork shall be backfilled within 3 working days after placing concrete.

43.14 - Measurement - Quantities of curb and gutter will be measured by length, along the face of curb, in the units used in the bid schedule. Depressed curb in front of curb ramps and driveway approaches and curb returns adjacent to valley gutter aprons will be measured and included in the total length of curb.

Quantities of driveway approach and curb ramp will be measured by area in the units used in the bid schedule. Where driveway approaches and curb ramps are in line with sidewalk, the entire area between expansion joints will be included in the measured area of the driveway approach or curb ramp.

Quantities of sidewalk, valley gutter and other flatwork will be measured by area in the units used in the bid schedule exclusive of areas included in curb, driveway approach and curb ramp measurements and described above and exclusive of the areas of utility boxes, precast curb inlet tops, street light bases and other protrusions and blocked out areas.

43.15 - Payment - The prices paid per unit length or area for concrete curbs, gutters, sidewalks, driveway approaches, valley gutters, curb ramps and other flatwork shall include full compensation for furnishing all plant, labor, materials, tools, equipment and incidentals required for the construction of the above on a prepared subgrade in conformance with the plans details and these specifications. The cost of joints, reinforcement, curing and protection shall be included in the prices paid for the various items involved and no extra compensation will be paid therefore.

Section 44. Retaining Walls and Drainage Structures

44.01 - Description - This work consists of constructing concrete retaining walls and drainage structures including but not limited to manholes, catch basins, curb inlets ,drop inlets, turning structures, end walls, head walls, curb outlets, sidewalk under drains, blind connections and collars at the locations and to the dimensions, lines and grades shown on the plans and drawings.

44.02 - Concrete - The concrete to be used shall conform to the provisions of Section 90 of the State Specifications for Class I containing not less than 400 kg of cement per cubic meter (6 sacks per cubic yard) with 25 mm (1 inch) maximum aggregate, except that Class II containing not less than 350 kg per cubic meter (5 sacks per cubic yard) may be used for minor drainage structures such as catch basins and turning structures not exceeding 1.2 meters (4 feet) in the greatest horizontal dimension. No color or other admixtures shall be added unless called for in the special provisions or approved in advance by the City Engineer. Unless otherwise specified in the special provisions, all cement used shall be "Type II Modified." The same brand of cement shall be used in the concrete mix for all elements with exposed surfaces and shall be the same brand as used in adjacent curb, gutter, sidewalk and flatwork. The maximum slump of concrete, at the time of placement, shall be 100 mm (4 inches) as determined by California Test Method 519 (slump cone) or California Test Method 529 (Kelly Ball).

At the time of delivery, each load of ready-mixed concrete shall be accompanied by a tag showing the weight of all dry materials in the batch, the volume of water in the batch, the cement content, the brand name of the cement used and the time cement was added to the other dry materials. One copy of the tag shall be given to the City Engineer or his representative present at the job before each load of concrete is deposited in the forms.

44.03 - Precast and Block-Built Substitutions - When approved in advance by the City Engineer, drainage structures may be furnished and installed as precast units or combination precast and poured in place structures provided the structures and their installation substantially conform to the dimensions and quality standards prescribed in the plans, drawings and these specifications.

When approved in advance by the City Engineer, concrete block construction may be substituted for plain or reinforced construction. Such construction shall conform to any and all additional requirements imposed by the City Engineer at the time of his approval and the following requirements:

Concrete block shall conform to ASTM Specification C 90 for Grade N-1 units.

Cement mortar shall be made using 1 part by volume of Portland cement to 2 parts by volume of sand to which 1/4 to 1/2 part hydrated lime or lime putty has been added, mixed dry and thoroughly. After mixing, just enough water shall be added to provide a plastic workable mix. No mortar shall be placed after 1 hour has elapsed since the time of adding water, and no mortar shall be retempered. Mortar shall attain a minimum compressive strength of 12.42 MPa (1800 pounds per square inch) in 28 days.

Sand for mortar shall conform to the provisions of Section 90-2.02 B of the State Specifications and be free from deleterious coatings, clay balls, roots, bark, stitches, rags and other extraneous material and shall be thoroughly washed.

44.05 - Reinforced Concrete Pipe and Taper Sections - When precast concrete elements are used for manholes they shall be manufactured to comply with the requirements of AASHTO

Designation D199. Portland cement and aggregate shall conform to section 90-2 of the State Specifications. No "D-Load" test will be required. The bottom pipe section shall be embedded at least 25 mm (1 inch) into the poured concrete base of the manhole by means of setting the first pipe section into the concrete while it is still plastic or by using a form to produce a pipe joint ring in the wet concrete. Subsequent pipe sections and taper sections shall be set in concrete mortar or other joint sealing material approved by the City Engineer.

44.05 - Reinforcement - Steel bar reinforcement, dowels, and wire mesh reinforcement shall conform to the requirements of Section 52 of the State Specifications and shall be placed in accordance therewith. Steel shall be placed at all locations shown on the plans and drawings, and at all other locations designated by the City Engineer. No concrete shall be placed until the City Engineer has checked and approved the steel.

No splices in vertical or transverse bars will be allowed except as shown on the plans. Splices will be allowed in longitudinal bars approximately midway between expansion joints where the distance between the joints is greater than 9 meters (30 feet) and shall be made by lapping the bars a length of 35 diameters.

Full compensation for furnishing and placing steel reinforcement in conformance with these specifications shall be included in the prices paid for the concrete structures in which it is placed.

44.06 - Iron and Steel - All iron castings shall be made of good quality grey iron, free from blow or sand holes or other defects and conforming to ASTM Designation A48, Class 30B. Covers and frames shall be machined to fit accurately so that covers do not rock. Castings shall be thoroughly cleaned and then coated with coal tar pitch heated to 93 degrees C (200 degrees F). All other iron and steel shall conform to ASTM Designations listed in Section 75-1.02 of the State Specifications.

All steel gratings, frames and manhole and drainage structure steps shall be galvanized in accordance with Section 75-1.05 of the State Specifications after machine work, die work, punching, shearing, bending, welding and finish grinding has been completed. Straightening of members will not be allowed after galvanizing. All members, bolts and nuts shall be galvanized

before the structural unit is assembled. Uncoated spots due to poor workmanship, rough handling or any other reason shall be cause for rejection.

44.07 - Forms and Falsework - All forms shall be built without warps or irregularities and shall be rigid and unyielding during the placing and tamping of concrete. They shall be carefully erected so as to be easily removed without scaring of concrete and all joints must be close enough to prevent leakage of grout and offsets in exposed finished concrete surfaces. Planking or plywood used in the forms controlling exposed surfaces of concrete shall be smooth and free from knot holes or other imperfections affecting surfaces so exposed. Forms shall be built to sizes that permit the finished concrete structure to conform to the dimensions and contours shown on the plans and drawings. Lumber once used in forms shall be cleaned before being used again.

Forms for exposed surfaces shall be constructed with triangular fillets not less than 19 mm by 19 mm (3/4 inch by 3/4 inch) attached so as to prevent mortar runs and to produce smooth straight chamfers at all sharp edges of concrete.

Form fasteners consisting of form bolts, clamps or other devices shall be used as necessary to prevent spreading of the forms during concrete placement. The use of ties consisting of twisted wire loops to hold forms in position will not be permitted.

The inside surfaces of forms shall be cleaned of all dirt, mortar and foreign material. Forms that will later be removed shall be thoroughly coated with form oil or other equivalent coating prior to use. Form oil shall be a commercial quality form oil or other equivalent coating that will permit the ready release of the forms and will not discolor the concrete.

Concrete shall not be deposited in the forms until all work connected with constructing the forms has been completed, all materials required to be embedded in the concrete have been placed and the City Engineer has inspected the forms and materials.

The following pre-molded fiberglass forms, manufactured by Santa Rosa Cast Products Company, with the manufacturer's optional cast iron frame and access cover, optional guard rod and optional gutter radius, or their equivalents may be used in lieu of Contractor-built forms for the following structures:

<u>Structure</u>	<u>Fiberglass Form</u>
0.75 meter (30 inch) Curb Inlet	Pelican Model 2 ½ A
0.90 meter (36 inch) Curb Inlet	Pelican Model 3 AJ
1.20 meter (48 inch) Curb Inlet	Pelican Model 4 AC
1.95 meter (78 inch) Curb Inlet Gallery	Pelican Model 6 Y

44.08 - Placing Concrete - Before placing concrete, the forms shall be thoroughly cleaned and all dirt, sawdust and chips removed; all temporary bracing and cleats shall be taken out; all openings for pipes shall be properly boxed; all forms shall be properly secured in their correct position and made tight, and all reinforcement secured and any rust or scale shall be removed from steel. No concrete shall be placed in water. Should water collect in the excavation or forms, the Contractor shall remove same before placing concrete.

No concrete shall be placed unless a representative of the City Engineer is present at the site. At times when it is not possible for the representative to be present during a specific pour, he shall so inform the Contractor and approve pouring in his absence. Concrete placed without the representative's presence or his waiver will be rejected and the Contractor will be required to remove and replace it at his own expense.

No concrete shall be placed if the ambient temperature is at or below freezing or predicted to fall below freezing within 72 hours after placing. Any concrete that is allowed to cool to freezing or a lower temperature within 72 hours after being placed shall be removed and replaced at the Contractor's expense.

When each load of concrete first arrives at the job site the City Engineer or his representative shall be given a copy of a tag showing the information required by Section 43.02 of these specifications. Each load shall be discharged within 90 minutes of the time the cement was introduced to the aggregates or before 250 revolutions of the truck mixer drum or blades, whichever occurs first. When the temperature of the concrete mixture in the truck is 29 degrees C (85 degrees F) or above, the City Engineer may impose a shorter time limit on discharging concrete.

Concrete shall be deposited in forms without segregation of its ingredients and shall be consolidated with internal vibrators in layers until it is thoroughly compacted, all voids are filled, and free mortar appears on the surface. Concrete shall be placed as nearly as possible in its final position and the use of vibrators for extensive shifting of the mass of fresh concrete will not be allowed. Fresh concrete shall not be permitted to fall from a height greater than 1.8 meters (6 feet) without the use of adjustable lengths of pipes or "elephant trunks." The use of chutes for conveying or depositing concrete will be allowed only at the discretion of the City Engineer, and wherever they are used they shall be laid at such an inclination that will permit the flow of concrete without adding water to increase its slump to more than 100 mm (4 inches). Where necessary to prevent separation, chutes shall be provided with baffle boards or a reversed section at the outlet.

All concrete shall be compacted by means of high frequency internal vibrators of a type and size approved by the City Engineer. The number of vibrators employed shall be ample to consolidate the incoming concrete to a proper degree within 15 minutes after it is deposited in the forms. In all cases, at least two vibrators shall be available at the site of structures to contain more than 6 cubic meters (8 cubic yards) of concrete. Vibrators shall not be attached to or held against forms or reinforcing steel. The location, manner and duration of the application of vibrators shall be such as to secure maximum consolidation of the concrete, free from voids and with proper texture of exposed surfaces when the forms are removed. Fresh concrete shall be spread in horizontal layers insofar as practical and the thickness of layers shall not be greater than can be satisfactorily consolidated with vibrators. Spades or wedge-shaped tampers shall be provided and used if necessary to secure a smooth and even texture of concrete surfaces that will be exposed.

Concrete in each integral part of retaining walls shall be placed continuously without stopping work for more than 20 minutes. The Contractor shall not commence work on any such part until all forms and steel are in place and approved and unless he has an adequate force on site to complete the part without interruption.

The tops of curb inlets, catch basins, curb outlets and any other structure within concrete curb, sidewalk or flatwork area shall be poured at the same time and monolithic with the adjacent curb, sidewalk or flatwork.

44.09 - Weep holes and Filter Material - Weepholes or drains shall be constructed as shown on the plans and details and at the locations specified by the City Engineer. Continuous filter material shall be placed at the back of weepholes as shown on the plans and details and shall consist of 37.7 mm (1 ½ inch) maximum coarse concrete aggregate conforming to the provisions of Section 90-3.04 of the State Specifications. Filter fabric shall also be installed where shown on the plans and details.

44.10 - Construction Joints - When joining new concrete with concrete already set, the surface of the already set concrete shall be cleaned, roughened and watered. All laitance, loose pieces, chips and dust shall be thoroughly removed to sound concrete before depositing new concrete.

Construction joints shall be mechanically bonded by means of keys cast into the surfaces in contact if so shown on the plans, or if required by the City Engineer. The area of keys shall be at least 25 percent of the cross-sectional area of the section. Keys shall be formed by beveled strips or boards laid longitudinally and shall be at least 37.5 mm (1 ½ inches) in depth.

44.11 - Finish - A Class I Surface Finish as described in Section 51-1.18B of the State Specifications shall be applied to all exposed surfaces. Ordinary Surface Finish as described in Section 51-1.18B of the State Specifications shall be applied to all other interior and exterior surfaces except those that are to be backfilled.

44.12 - Curing and Backfill - Concrete shall be cured in conformance with the provisions of Section 90-7 of the State Specifications. All structures shall be backfilled in accordance with Section 19-3.06 of the State Specifications within 3 working days of stripping forms from surfaces to be backfilled.

44.13 - Measurement - Drainage structures will be measured and paid for on the basis of a lump sum price for each of the various structures listed in the bid schedule. Retaining walls will be measured and paid for on a lump sum basis or they will be measured by length along the base of the exposed face, for the various heights stated in the bid schedule. No separate payment will be made for drains or filter material required and used behind walls and structures unless there is an item or items for same in the bid schedule.

44.14 - Payment - The prices paid for drainage structures and retaining walls shall include full compensation for furnishing all plant, labor, materials, tools, equipment and incidentals required for the construction of each structure in conformance with the plans details and specifications. Payment for excavation, backfill, furnishing and installing reinforcing steel, grates and castings, and drains and filter material shall be included in the unit or lump sum prices paid for each structure or wall and no extra compensation will be allowed therefore.

Section 45. Concrete Ditches, Aprons and Slope Protection

45.01 - Description - This work consists of constructing concrete lined ditches and concrete or

rubble aprons and slope protection at the locations and to the dimensions shown on the plans and details.

45.02 - Materials

Poured in Place Concrete shall conform to the requirements of Section 44.02 of the specifications except that Class II with 350 kg of cement per cubic meter (5 sacks per cubic yard) may be used.

Air Blown Mortar (Gunnite) shall conform to the requirements of Section 53 of the State Specifications.

Pumped Concrete shall be made using 9.5 mm (3/8 inch) aggregate with 450 kg of cement per cubic meter (6 ½ sacks per cubic yard). Poxility shall be added at the ratio of 1 part poxility to 5 parts cement by weight. Only enough water shall be used to enable the mixture to be pumped.

Rubble shall consist of broken concrete or stone, each piece having minimum dimensions of 300 mm in length, 200 mm in width and 100 mm in thickness (12 x 8 x 4 inches), except for smaller pieces used to chink interstices. The broken concrete or stone shall meet minimum requirements specified for stone in Section 72 of the State Specifications.

45.03 - Concrete Lined Ditches - Concrete lined ditches may be constructed using poured in place or pumped concrete or air blown mortar. Ditches shall conform to the dimensions, lines and grades shown on the plans and details.

Ditches may be formed against the ground, but the sides of ditches must be formed by fixed forms to the dimensions shown on the plans and details. Where ditches are placed in areas of cut, all rocks, roots or other obstructions and deleterious material appearing in the earth surface that will form the bottom of the ditch shall be removed and the resulting voids filled with suitable material and compacted. Where ditches are placed in areas of fill, ditches shall not be formed until the Soil Engineer certifies the compaction of the fill to the City Engineer. Ground on which concrete is to be placed shall be thoroughly moistened and compacted immediately prior to placing concrete. No concrete is to be placed prior to form and subgrade inspection by the City Engineer.

Concrete ditch surfaces shall be lightly broom finished and free from irregularities that inhibit the flow of water. Concrete shall be cured in conformance with the provisions of Section 90-7 of the State Specifications.

Concrete ditches shall be backfilled within 3 working days after pouring.

45.04 - Rubble Aprons and Slope Protection - Rubble structures may be constructed from either stone or broken concrete. Concrete may be substituted for rubble if approved by the City Engineer. Rocks and broken concrete shall be thoroughly wetted before placement, and shall be laid in a full bed of mortar or covered with Class III concrete containing 300 kg of cement per 1 cubic meter (4 sacks per cubic yard).

45.05 - Measurement - Quantities of concrete lined ditch will be measured by length along the centerline of the ditch. Quantities of rubble slope protection and aprons shall be measured by exposed surface area. No payment will be made for rubble placed outside the lines shown on the plans unless directed by the City Engineer.

45.06 - Payment - The prices paid for concrete lined ditch and rubble slope protection and aprons shall include full compensation for furnishing all plant, materials, tools, equipment and incidentals for doing all work involved in constructing same in accordance with the plans, details and these specifications.

Section 46. Removing and Patching Concrete

46.01 - Description - This work consists of removing sections of concrete surface improvements to facilitate the construction of new improvements, and the patching or building up of concrete surfaces to cover nicks and chips and to change grades. Removal of subsurface improvements is covered by Section 21 of these specifications, Clearing and Grubbing.

46.02 - Removal - Concrete removal shall be accomplished in conformance with the provisions of Sections 15-3.01 and 15-3.02 of the State Specifications and to the lines and grades shown on the plans or as directed by the City Engineer. Removal operations shall be performed without damage to concrete that is to remain in place. All damage to existing concrete that is to remain shall be repaired to a condition equal to that existing prior to beginning removal operations. The cost of repairing existing concrete damaged by the Contractor's operation shall be at the Contractor's expense.

Existing reinforcement that is to be incorporated in new work shall be protected from damage and shall be thoroughly cleaned of all adhering material before being embedded in new concrete.

46.03 - Patching - Only those portions of curb, gutter sidewalk, curb ramps, valley gutter and other concrete flatwork that the City Engineer designates as repairable will be patched. All other damaged concrete shall be removed and replaced. Where patching is permitted the following procedures shall be used:

1. All areas to be patched shall be cleaned with a stiff wire brush and all loose pieces and cracked pieces shall be removed.
2. The areas to be patched shall be etched with muriatic acid. This etching shall be done no more than 2 hours in advance of patching.
3. Immediately prior to the application of the patching material, the area to be patched shall be blown free of all dust with air supplied by a compressor.
4. The area to be patched shall be painted with an epoxy adhesive used in accordance with the manufacturer's directions.
5. The patching mix shall be mixed with an epoxy binding agent in conformance with the manufacturer's directions.

6. Patched areas shall be sacked with Portland cement to obtain a color and finish that matches the adjacent concrete's color and finish.
7. Patched areas shall be protected from rapid drying by sealing with plastic or covering burlap or rugs and keeping them damp for a period of at least 48 hours.

The epoxy adhesive and binding agent shall be approved by the City Engineer before its use.

Completed patches must match adjacent concrete finishes in both color and texture. Any concrete patch that "stand out" will be removed, and the concrete section they were in replaced at no cost to the Town.

No patching work shall be done unless a representative of the City Engineer is present.

46.04 - Measurement and Payment - Concrete removal or patching work will normally be done only to facilitate the construction of new improvements or to repair defective or damaged work. No separate payment will be made therefore, unless otherwise stated in the special provisions.

UNDERGROUND FACILITIES

Section 50. General Requirements

50.01 - Description and Applicability - This work consists of furnishing and installing pipes, conduits, boxes, structures and appurtenances in the construction of storm drains, sanitary sewers, water, irrigation, wire utility or similar systems, underground, in any public street, drainage, sanitary sewer or public utility right-of-way or easement, without regard to who the work is performed by or for. All work shall conform to the provisions of the appropriate sections of these specifications. In addition, each underground facility shall be installed in conformance with the applicable requirements of the agency or utility company having jurisdiction over the particular facility or utility. Where the requirements of that agency or company, differ from these specifications, the more stringent requirements shall be met. Full compensation for satisfying the requirements of these specifications and the requirements of the ultimate owner agency/utility company shall be included in the prices paid for the pipe, conduit, boxes and other appurtenances to be installed.

50.02 - Minimum Cover - Storm and sanitary sewers shall be constructed at the grades shown on the plans. Where grades or elevations are not shown on the plans or specified in the special provisions the following minimum cover requirements shall apply in street rights-of-way and easements:

<u>Type of Facility</u>	<u>Minimum Cover from</u>	
	<u>Finished Grade</u>	<u>Subgrade</u>
Sanitary sewer mains	0.9 meter (3 feet)	0.6 meter (2 feet)
Sanitary sewer laterals	0.75 meter (2 ½ feet)	0.45 meter (1 ½ feet)
Water and wire utility mains	0.9 meter (3 feet)	0.45 meter (1 ½ feet)
Gas mains, water & wire utility laterals	0.6 meter (2 feet)	0.45 meter (1 ½ feet)

50.03 - Extent of trench to be opened - The Contractor's attention is directed to Section 10.14 which limits the length of trench that can be opened (a trench in any street bicycle or pedestrian right-of-way is considered open until it is backfilled and covered with at least 25 mm (1 inch) of temporary pavement). In addition, no more trench shall be opened than can be backfilled in the same day. Should it be necessary for a Contractor to work past normal quitting time in order to comply with this requirement, he shall do so. In the event of his failure to comply with this requirement, the City Engineer may take whatever steps he deems appropriate under the provisions of Sections 12.08 (Public Safety) and 10.16 (Stop Work Order) of these specifications.

The Contractor will be permitted to leave a short section of open trench at the end of each day's work to facilitate resumption of work the following day, provided adequate facilities are provided to insure pedestrian and vehicular convenience and safety.

50.04 - Excavations and Trenches - Removal of surface improvements, excavation for underground facilities, backfilling and compacting same and restoration of surface improvements is considered part of the work of installing the underground facility that goes in the excavation and no extra compensation will be allowed therefore unless provided for with specific items in the bid schedule.

The Contractor's attention is directed to Sections 4.05 (Trench Shoring), 6.09 (Utility and Non-Highway Facilities) and 13 (Underground Obstructions and Facilities) of these specifications.

Before excavation is undertaken in fill areas, the fill shall be completed to an elevation of at least 0.9 meter (3 feet) over the top of the proposed pipe or to final grade or subgrade, whichever is lower.

Where rock is encountered in an excavation, it shall be removed to a depth of at least 150 mm, (6 inches) below normal trench bottom elevation and the over-excavated area shall be backfilled with suitable material and compacted to a least 90 percent relative compaction. No extra payment shall be made for this work and its cost shall be included in the price paid for the pipe or structure that goes in the excavation.

Trenches shall be dewatered before placing pipe. Where the trench bottom is soft, wet or spongy, the City Engineer shall specify the depth to which the trench is to be over-excavated and the over-excavated area filled with well graded crushed rock. The rock shall be compacted to provide a firm subgrade upon which to lay pipe or conduit. Payment for over-excavating, filling and compacting fill in trench bottoms shall be based on the contract price to be paid for trench stabilization. If there is no item for trench stabilization, it shall be paid for by force account in accord with Section 4.07 of these specifications. No payment will be made for trench stabilization when, in the opinion of the City Engineer, the trench bottom was made wet, soft or spongy by action or inaction of the Contractor and that with reasonable care on his part the condition could have been avoided or where the trench is in fill placed under the same contract..

50.05 - Trench Depth and Width - Trenches shall be cut to the widths given in the table below unless otherwise shown on the plans or specified in the special provisions. No pipe or conduit shall be laid in a trench that is narrower than the minimum width called for. If a trench is cut to a width that exceeds the maximum called for, the City Engineer may require that the Contractor use a pipe or conduit with greater strength or that it be supported by means of a concrete cradle or encasement to withstand the increased trench backfill load.

<u>Pipe or Conduit Size (nominal)</u>	<u>Minimum Width</u>	<u>Maximum Width</u>
Less than 150 mm (6 inches)	0.3 meter (1 foot)	As permitted by utility. 0.6 meter (2 feet) for sewer laterals
0.15 to 0.6 meter (6 to 24 inches)	O.D. + 0.6 meter (O.D. + 2 feet)	O.D. + 0.9 meter (O.D. + 3 feet)
0.6 to 1.5 meters (2 to 5 feet)	O.D. + 0.9 meter (O.D. + 3 feet)	O.D. + 0.9 meter (O.D. + 3 feet)
Over 1.5 meters (5 feet)	O.D. + 1.2 meters (O.D. + 4 feet)	O.D. + 1.2 meters (O.D. + 4 feet)

Where two or more pipes or conduits are to be laid in the same trench, the distance between them shall be at least half the outside diameter of the largest pipe, and in no case shall be less than 0.3 meter (1 foot) except as trench details on the plans for wire utility conduits show different minimum clearances.

Trench depths shall be adequate to achieve the grades shown on the plans or minimum of cover specified in Section 50.03. Some utility agencies may require additional depth of excavation to provide for bedding.

50.06 - Pipe Laying - Pipe shall be laid to conform to the prescribed line and grade shown on the plans. Each pipe length in a gravity system shall be checked for line and grade as it is laid. This shall be accomplished by means of a string or laser line set from grade stakes and established before any pipe is laid in the trench.

Gravity lines shall be laid starting at the lowest end and laying in the direction of uphill. If the pipe is of the bell and spigot type crosscuts must be made in the trench to accommodate bells and the pipe must rest firmly on the full length of its barrel between bell joints. Pipes shall be laid with their bell or groove ends facing uphill.

Pipes with elliptical reinforcement shall be placed with the minor axis of the reinforcement in a vertical position as indicated by pipe markings painted at the factory.

50.07 - Trench Backfill - No pipe or conduit shall be backfilled until it has been inspected by the City Engineer and, if the ultimate owner will be another agency or utility company, by a representative of that agency or utility company.

Trench backfill shall consist of the following courses:

Initial backfill shall be placed and compacted to a depth of at least $\frac{2}{3}$ the outside diameter of the pipe in trenches with a single pipe. In trenches with more than one pipe or conduit initial backfill shall be placed and compacted in layers around each level of pipe or conduit and shall extend to 150 mm (6 inches) over the highest pipe or conduit. Initial backfill material shall conform to any special requirements of the agency or utility company that will become the owner of the facility in the trench and shall also meet the requirements that at least 90% passes a 19 mm (3/4 inch) sieve, not more than 15 % passes a 75 micrometer (No. 200) sieve and that it has a sand equivalent of at least 30. Initial backfill material may be compacted by jetting where approved by the City Engineer or by tamping in lifts not exceeding 150 mm (6 inches) in depth. At least 95% relative compaction must be achieved.

Intermediate backfill consists of the layer between initial backfill and aggregate base that makes up the bottom layer of surface or pavement restoration. Where no surface or pavement restoration is called for, intermediate backfill extends to the surface. Intermediate backfill may be any suitable native or imported material with which the required compaction can be achieved. The required compaction is 95%. Compaction may be achieved by means of jetting where approved by the City Engineer and done in accordance with the special requirements stated below, by vibrating in lifts of not more than 0.9 meters (3 feet) where pea gravel is used, or by bringing up backfill in 150 mm

6 inch) lifts and compacting with power operated equipment. Where highly permeable material is used, the City Engineer may require installation of under drains conforming to the provisions of Section 50.10 of these specifications.

Jetting will be permitted only with the advance approval of the City Engineer and such approval shall not relieve the Contractor of responsibility for meeting the minimum compaction requirements stated above. When jetting is approved, the following special requirements for jetting shall apply:

- A. The material to be jetted shall contain no earth clods or lumps larger than 75 mm (3 inches).
- B. No more than 0.9 meter (3 feet) of material, as measured before compaction shall be jetted in each lift.
- C. The jetting pipe must be at least 1.2 meters (4 feet) long and have an inside diameter of at least 32 mm (1 1/4 inches).
- D. The water supply shall be continuous and have a pressure of at least 276 kPa (40 psi).
- E. Jetting shall be accomplished by rapidly lowering and slowly raising the outlet end of the jetting pipe through the entire depth of the layer being compacted at staggered points along the trench no more than 0.9 meters (3 feet) apart. The City Engineer may require closer spacing when jetting certain material. Jetting and subsequent ponding shall be sufficient to thoroughly and uniformly wet each layer.
- F. When the Contractor employs jetting as a means of compacting trench backfill, under drains described in section 50.10 of these specifications shall be installed at the Contractor's expense.

50.08 - Inspection and Reports - No backfilling is to be done without the knowledge of the Soil Engineer who will be ultimately required to certify its compliance with his own and these specifications. The Contractor shall be responsible for keeping the Soil Engineer informed of his backfilling operations.

The tests used to determine compliance with these specifications shall be those stated in the latest edition of the Caltrans Materials Manual, unless otherwise specified in the special provisions. The Soil Engineer shall report test results to the City Engineer at the approximate same time as they are reported to the Contractor and/or owner and provide the City Engineer with 2 copies of all written reports regarding the work within a reasonable time, as defined by the City Engineer.

When the Soil Engineer is hired and paid by the Contractor or project owner, the Contractor or project owner shall instruct the Soil Engineer, in writing, with a copy to the City Engineer, to keep the City Engineer informed and to provide him with copies of all written reports as specified above. Failure to keep the City Engineer so informed shall be reason for the City Engineer to issue a Stop Work Order for the entire work.

50.09 - Surface Restoration - Surface restoration consists of replacing surface improvements over trenches. Temporary restoration is to be placed at the end of each days work where areas will be opened to vehicular or pedestrian traffic. Permanent restoration of surface improvements shall not proceed until the Soil Engineer has approved the compaction of backfill in the area of trench and certified same to the City Engineer.

Temporary surface restoration in areas subject to repeated vehicular traffic shall include a top layer of at least 50mm (2 inches) of "Granitepatch," available from Granite Rock in Redwood City. In pedestrian and parking areas, temporary surface restoration shall include at least 25mm (1 inch) of Granitepatch. Temporary surface restoration and underlying supporting trench backfill materials and backfill shall be maintained to provide a level surface until it is replaced by permanent surface restoration.

For permanent surface restoration , the minimum thicknesses of street pavement materials shall be the greater of the thicknesses of pavement layers in adjacent pavement or 0.75 mm (3 inches) of asphalt concrete - placed in two or more layers - over 0.3 meters (1 foot) of Class II Aggregate Base. The aggregate base is to be compacted in at least 2 layers to a relative compaction of 95%. Where the pavement section cut includes cement or lime treated base, the base material shall be replaced with asphalt concrete of equal depth, placed in lifts not exceeding 62.5 mm (2 ½ inches). Where sidewalk or other concrete flatwork is cut, restoration shall consist of concrete of the same thickness as that cut (but not less than 100 mm (4 inches) over 150 mm (6 inches) of Class II Aggregate Base. For requirements for surface restoration in Portland cement concrete and interlocking concrete paver surfacing see Sections 40 and 41 of these specifications.

Where surface restoration involves replacing existing asphalt or concrete surfacing, the original surfacing shall be cut to a depth of at least 50 mm (2 inches) in straight lines on both sides of the trench, at least 150 mm (6 inches) beyond the lines of the trench below. Broken, damaged or ragged edges of remaining surfacing shall be cut back farther to form straight edges of patches as directed by the City Engineer.

50.10 - Under drains - Where glandular trench backfill material is used in a trench with a slope of 5% or more or when backfill is compacted by means of jetting, the Contractor shall provide under drains or other permanent means, subject to the City Engineer's approval, to relieve water that accumulates in the trench. Such drains shall discharge only into storm drainage facilities. No connection to sanitary sewers will be permitted. The cost of providing under drains or other trench drainage relief shall be included in the price paid for the facility in the trench to be drained and no extra compensation will be paid therefore.

50.11 - Removal or Abandonment of Existing Drainage, Sewer and Utility Lines - Where shown on the plans storm drain, sanitary sewer and utility lines and structures shall be removed or abandoned as specified below:

Corrugated metal pipes shall be completely removed, and not left in place. The resulting void shall be backfilled in accord with Sections 50.07 through 50.09 of these specifications.

Storm drain sanitary sewer and water lines, other than corrugated metal, to be abandoned may be removed or, at the Contractor's option, they may be securely closed at all pipe

openings by watertight plugs of concrete or brick and cement mortar at least 2 feet thick and left in place.

Asbestos cement pipe to be removed must be wrapped in minimum 6-mil thick polyethylene before it can be transported from the site. The wrap must be taped to each piece of pipe to ensure complete encasement of broken ends. Broken asbestos cement couplings and small pieces of pipe are to be encased in polyethylene wrap in the same manner as pipe. An asbestos warning label must be placed in a visible location on each package of encased material. Removed asbestos cement pipe must be transported to disposed of at a suitable location that has all required approvals for accepting it.

Substructures to be abandoned shall have all openings, inlets and outlets sealed off as set forth above and the structure shall be removed to a point at least 3 feet below proposed finished grade. The remaining lower portion shall be filled with compacted backfill material.

50.12 - Measurement - Quantities of pipes, conduits and joint trenches will be measured and paid for by length. Lengths will be measured through structures when the pipes is actually laid through them. No payment will be made for lengths of pipe or conduit in excess of those staked in the field unless directed by the City Engineer.

Trench stabilization will be measured and paid for by mass or weight of filler material used in the units indicated in the bid schedule.

Removal or abandonment of sewer, drainage and utility pipes and will be measured and paid for by lump sum or by length measured in the units used in the bid schedule. Where there is no bid item for abandonment of sewer or drainage facilities, and the work is shown on the plans or it is incidental to the rest of the work, payment shall be considered to be included in the other items of work and no extra compensation will be paid.

50.13 - Payment - The prices paid for the various types and sizes of pipes, conduits and joint trenches shall include full compensation for furnishing all plant, labor, tools, equipment, materials and incidentals required to remove surface improvements and excavate for, furnish, install and backfill pipes and conduits, to install trench under drains where required and to restore surface improvements complete and in place as shown on the plans and required by these specifications.

The price paid for trench stabilization shall include full compensation for over-excavating the bottom to the trench, disposing of the excavated material, and furnishing, placing and compacting the filler material.

The prices paid for removal or abandonment of sewer, drainage and utility facilities shall include full compensation for furnishing all plant, labor, tools, equipment, materials and incidentals required to remove surface improvements and excavate for, remove or plug, dispose of materials removed, backfill and to restore surface improvements complete and in place as shown on the plans and required by these specifications.

Section 51. Sanitary Sewers

51.01 - Description - This work consists of constructing sanitary sewer mains, laterals and structures and includes excavation, furnishing and installing pipes, building structures, making connections, backfilling and compacting trenches and testing pipes and manholes as required herein and by related sections of these specifications.

51.02 - Pipe Materials - Pipe materials shall be as called for on the plans and shall conform to the appropriate sections of these specifications for such pipe materials.

51.03 - Maintenance of Existing Service - It shall be the Contractor's responsibility to maintain sewerage service at all times during the prosecution of the work. The Contractor shall take all necessary steps, including but not limited to, temporary pumping and the installation of temporary sewers, to insure that no interruption of sewerage service occurs. Approved intercepting devices shall be installed in existing sewers, downstream from the work, to insure that no rock or other debris is allowed to enter the sewer system. These devices shall be maintained throughout the construction period. Pumping into storm drains is strictly prohibited.

51.04 - Pipe Laying - All sewer mains shall be laid with a minimum of 0.3 m (12 inches) clearance from all other improvements and utilities. For curved sewers, the deflection in the joint between two successive pipe sections shall not exceed 80% of the maximum deflection as recommended by the pipe manufacturer.

As the work progresses, the interior of the sewer shall be cleared of all dirt and debris. Where clearing after laying is difficult because of small pipe size, a suitable swab or squeegee shall be kept in the pipe and pulled forward past each joint immediately after jointing has been completed.

Sewer pipes, branches, stubs or other open ends that are not to be immediately connected shall be plugged or capped with a standard water-tight plug or cap as designed and approved for such use. Open pipe ends on which rodding inlets, flushing inlets, etc. are to be constructed shall be plugged at all times until the structure is completed and the cover is in place.

All sewer line connections to manholes, trunk sewers, main sewers or building sewers shall be left uncovered until inspection and approval by the City Engineer.

51.05 - Precast Manholes - All new manholes shall be precast concrete unless otherwise shown on the plans or specified in the special provisions. Precast manholes shall conform to AASHTO Designation D199 except that Type II modified cement shall be used. Manholes shall be watertight structures.

Where sewer lines pass through manholes, pipe shall be used as a form for the channel if the proper positioning of joints can be maintained. Whether pipe or channel forms are used, after the manhole base concrete has taken set, the channel shall be carefully shaped and mortared to obtain a smooth pipe-shaped channel with smooth shelves on both sides sloping into the channel.

An approved form ring conforming to the dimensions of the precast barrel section joint shall be

used to form a joint groove in the manhole base prior to setting the first barrel section. Prefomed plastic sealing gaskets conforming to General Specification SS-S-00210 shall be used in setting subsequent barrel sections.

51.06 - Connections to Existing Systems - Where wyes, tees or other building sewer stubs were previously installed on the sewer main, building sewers shall be connected to same. Where no such provision has been made either a standard wye or tee fitting shall be “cut-in” to the main sewer using approved couplings and fittings of the same material as the main sewer. As an alternative, the wall of the existing main may be saw-cut and an approved flexible compression fitting installed. Saddle connections will not be permitted.

51.07 - Building Sewer (Lateral) Laying and Testing - Building sewers within the public right-of-way shall conform to all the requirements for public sewers including air testing. Air testing shall be conducted after at least 0.3 m (1 foot) of backfill material has been placed over the pipe and compacted. Any leaks shall be repaired by the Contractor at his own expense. Test fittings shall be wye branches or tees of the same type, size and quality as that of the building sewer pipe and shall be installed where required by the City Engineer. The branch of each test fitting shall be laid in an upright position.

After the test is completed and the test plug has been removed, an approved water tight cap or stopper shall be placed in the branch tee fitting as directed by the City Engineer. The location of each building sewer connection to the main shall be noted on the as-built drawing maintained by the Contractor or, in the case of tie-ins of new buildings to existing sewers, on a copy of the site plan for the building, and delivered to the City Engineer at the end of the job. The end of each building sewer that is provided for future use shall be marked by a durable stake acceptable to the City Engineer.

51.08 - Connecting Existing Building Sewers to New Mains - The approximate locations of existing building sewers are shown on the plans. It shall be the Contractor’s responsibility to locate the building sewers and to reconnect them to the main sewer being constructed. Connections shall be made through wye branches. After the main sewer has been laid, backfilled and tested, and all downstream portions completed, building sewers shall be connected. The main sewer shall not be cleaned until all building sewers have been connected or shall be cleaned again after all building sewers have been connected.

Prior to connecting any existing building sewer to a new main sewer the building sewer shall be smoke tested. Smoke testing shall be accomplished by forcing smoke up the building sewer under pressure until smoke appears at building vents. The locations of all smoke leaks shall be recorded and marked. Where leaks appear within the public right-of way the segment of building sewer within the public right-of-way shall be replaced. On public work, building sewer smoke testing and replacement shall be paid for at the prices provided in the bid schedule. The location of each building sewer connection to the main shall be noted on the as-built drawing maintained by the Contractor and delivered to the City Engineer at the end of the job.

51.09 - Sewer Line Testing - All sewer mains and building sewers shall pass a low pressure air test. Each section of main shall be tested between successive manholes in the presence of the City Engineer. The Contractor shall supply all plugs, fittings and gages required for the air test as well as the source of air. Tests shall be conducted in the manner described below after the

sewer has been backfilled to a depth of at least 0.3 meter (1 foot) over the top of the pipe:

A compressed air supply shall be attached to an air fitting on the main and the air pressure within the line increased to 27.6 kPa (4 psi). After the air supply is securely turned off or disconnected, there shall be a two minute waiting period before the actual test period begins. In no case shall the air pressure within the line be less than 24.1 kPa (3 ½ psi) at the beginning of the test. Refer to the chart below for the length of the test period. The minimum length of test is two minutes. The allowable air pressure loss during the test period shall be 6.9 kPa (1 psi).

<u>Nominal Pipe Size</u>	<u>Length of Line</u>	<u>Test Time</u>
100 mm (4 inches)	All	2 minutes
150 mm (6 inches)	0 to 91 m (0 to 300 feet)	2 minutes
150 mm (6 inches)	91 to 113 m (300 to 370 feet)	2 ½ minutes
150 mm (6 inches)	over 113 m (370 feet)	3 minutes
200 mm (8 inches)	0 to 52 m (0 to 170 feet)	2 minutes
200 mm (8 inches)	52 to 64 m (170 to 210 feet)	2 ½ minutes
200 mm (8 inches)	64 to 76 m (210 to 250 feet)	3 minutes
200 mm (8 inches)	76 to 88 m (250 to 290 feet)	3 ½ minutes
200 mm (8 inches)	Over 88 m (290 feet)	3 ¾ minutes
TP-48		
250 mm (10 inches)	0 to 34 m (0 to 110 feet)	2 minutes
250 mm (10 inches)	34 to 50 m (110 to 165 feet)	3 minutes
250 mm (10 inches)	50 to 66 m (165 to 215 feet)	4 minutes
250 mm (10 inches)	Over 66 m (215 feet)	4 ¾ minutes

After completion of a test, the air pressure shall be released slowly through a valve that is incorporated in the test equipment. Air test plugs shall not be loosened or removed until the air pressure in the pipe is no longer measurable.

51.10 - Leakage Testing of Manholes - Where the City Engineer has had adequate opportunity to observe the grouting of manhole barrel and throat joints and is satisfied with the quality of workmanship and materials observed, no testing for water tightness will be required. Where there exists, in the opinion of the City Engineer, a reasonable doubt as to the water tightness of a manhole, the manhole shall be water tested by plugging inlet and outlet pipes and filling the manhole with water for a period of at least two hours. After that time the leakage shall be measured and, if any leakage exists, the Contractor shall determine the cause and remedy it before the manhole is accepted.

51.11 - Backflow Protection Device - Where a building sewer is to serve any fixture with a rim elevation less than 0.3 m (1 foot) above the rim elevation of the nearest upstream manhole on the main, a backwater protection device acceptable to the City Engineer shall be installed on the building sewer.

51.12 - Measurement and Payment for Manholes, Rodholes, Cleanouts and Backflow Protection Devices - Manholes, rodholes, cleanouts and backflow protection devices shall be measured and paid for on a unit basis. Payment shall include full compensation for furnishing all

plant, labor, tools, equipment, materials, including frames and covers, and incidentals required to construct and backfill the item, complete and in place as specified.

Section 52. Underground Wire Utility Systems

52.01 - Description - This work consists of furnishing and installing conduit, boxes and vaults of various types and sizes and appurtenances for underground electrical, telephone, cable TV and street light systems. All work is to conform to these specifications and to the applicable standards and requirements of P. G. & E., Pacific Bell Telephone and TCI Cable T. V. Where a conflict is found between the requirements of these specifications and those of the utility companies named above, the more stringent shall govern.

52.02 - Conduits - All conduits shall be of the type and size called for on the plans and details and specified in the specifications. Electrical conduits shall conform to P. G. & E. Engineering Standard Documents 063927 and 063928. Telephone conduits 100 mm (4 inches) in diameter shall be Type "C" Plastic (PTS 77). Telephone conduits 50 mm (2 inches) in diameter shall conform to PTS 66. Cable T. V. and street light conduits shall be Schedule 40 PVC.

All conduits shall be mandrel tested by the Contractor in accordance with the requirements of the respective utility companies.

Electric lines shall contain polyester pull tape conforming to Mechanical Code 561271. The tape shall be connected to conduit plugs and caps.

Telephone and cable T. V. conduits shall contain 9.4 mm (3/8 inch) polypropylene pull ropes with ends at least 1.5 meters (5 feet) long left inside boxes and vaults or tied to opposite sides of boxes and vaults.

All conduit ends shall have temporary plugs or caps installed. All stubs shall be marked by stakes acceptable to the City Engineer.

Measurement for conduit or joint trench containing more than one conduit shall be by length. Payment shall include full compensation for furnishing all plant, labor, tools, equipment, materials and incidentals for the construction of pipes, conduits and joint trenches for underground wire utilities, complete and in place as shown on the plans and specified herein and in referenced requirements.

52.03 - Boxes and Vaults - Boxes and vaults shall be precast concrete, composite or fiberglass conforming to the requirements of the various utility companies. Sizes shown on the plans refer to inside dimensions. Locations shown are approximate. Exact locations shall be as directed in the field.

The lid of each box or vault shall be marked with the name of the utility or utility company as required by each utility company. Street light boxes shall be marked with raised letters at least 25 mm (1 inch) high spelling out "STREET LIGHT." Electric boxes and vaults shall also conform to the requirements of P. G. & E. Engineering Standard Documents 062000 and 028028.

Lids for boxes and vaults not in regular vehicle traffic areas shall be designed to support a single wheel load of 3629 kg (8000 pounds) over a 250 mm x 250 mm (10 inch x 10 inch) area. Lids for boxes and vaults in vehicular traffic areas shall be designed and constructed to meet ASTM C 851 standards.

Shop drawings will be required for all boxes, vaults and their lids. The City Engineer must approve same before their delivery and installation. Broken or damaged boxes, vaults and lids shall not be used. Boxes and vaults that become damaged in the course of the work shall be replaced at the Contractor's expense prior to completion of the work.

Boxes, vaults and lids shall be equipped with ground rods, racking, pull irons and cable racks as required by the respective utility company. Where ground rods are required they shall conform to P. G. & E. Engineering Standard Document 013109.

Boxes and vaults shall be set to grade to match existing or designed future adjacent surfaces and shall be true and square to curb and sidewalk alignments. Their interiors shall be free of mud, debris, dirt and other foreign material.

Boxes and vaults shall not be placed in sidewalk areas unless there is no other place for them and then only with the advance approval of the City Engineer.

All electric conduits entering boxes and vaults shall have bell ends secured to the box or vault by concrete (outside wall) and grouting (inside wall). Grout shall be standard 2:1 mix, and concrete shall be class II 350 kg per cubic meter (5 sack) mix. Telephone and cable T. V. conduits shall be cut flush with the inside of each box.

The various types and sizes of boxes and vaults will be measured and paid for at the contract price bid per each. Payment shall include full compensation furnishing all plant, labor, tools, equipment, materials and incidentals for installing boxes and vaults including excavation, shoring where required, backfill and compaction, ground rods, racks, frames and incidentals, complete, in place and as specified or required by utility agencies or companies.

Section 53. Subsurface Drains

53.01 - Description - This work consists of constructing subsurface drains for the collection and control of subsurface water and includes excavation, furnishing and installing pipe, filter material and filter fabric, backfilling and compacting as shown on the plans or in accord with the designs supplied by the Soil Engineer and approved by the City Engineer.

53.02 - Materials - Pipe used for subsurface drains may, at the Contractor's option, be clay, concrete or plastic conforming to the provisions of Sections 68-1.02 of the State Specifications.

Permeable material or filter material shall conform to the provisions of 68-1.025 of the State Specifications per class and type as specified in the special provisions or shown on the plans. When the class and type are not specified, Class 2 material shall be used.

Filter fabric shall conform to the provisions of Section 88-1.03 of the State Specifications and be installed in accordance with the details shown on the plans and as specified in Section 68-1.03 of the State Specifications.

53.03 - Installation - Subsurface drains shall be of the size and type and installed to the lines and grades shown on the plans or as directed by the Soil Engineer or City Engineer. Joints of but-end clay or concrete drain tile shall be covered with filter fabric or other approved material to prevent infiltration of fine material. Bell and spigot and tongue and groove clay or concrete pipe shall be laid without mortar in joints and pipe sections shall be pressed firmly together to prevent infiltration of fine material. Perforated pipe shall be laid with the perforations facing down.

Subsurface drains shall be connected to drainage facilities only. Connection to sanitary sewers will not be allowed.

53.04 - Inspection - No pipe shall be placed until the trench has been inspected and approved by the Soil Engineer or City Engineer. No filter material shall be placed until the pipe is inspected by the City Engineer. No backfill material shall be placed until the filter material and filter fabric has been inspected by the City Engineer.

53.05 - Measurement and Payment - Subsurface drains will be measured and paid for by the length of pipe installed. The price paid per unit length shall include full compensation for furnishing all plant, labor, tools, equipment, materials and incidentals necessary for installing subdrains, filter material and filter fabric complete, in place, and as specified and shown on the plans.

Section 55. Pipe Materials and Special Requirements

55.01 - Reinforced Concrete Pipe (RCP) - Reinforced concrete pipe materials shall conform to the provisions of Sections 65-1.02A through 65-1.02C, exclusive of Section 65-102A(2) of the State Specifications and shall be of the class shown on the plans or specified in the special provisions.

Cement mortar shall be composed of one part Portland cement and two parts sand by volume. Sand shall be well graded and of such size that all will pass a 2.36 mm (Number 8) sieve. Admixtures of hydrated lime, fire clay, diatomaceous earth or other approved inert material may be used in the mortar to facilitate workability. All mortar shall be used within 30 minutes after mixing water has been added. Adding more water to older mortar to extend its working time will not be permitted.

Pipe shall be supplied in lengths of 0.9 meters (3 feet) or longer with the ends of each section constructed so that tongue and groove, bell and spigot or rubber gasket joints can be made. The "Class" of the pipe shall be clearly marked in waterproof paint on each joint of pipe.

Pipe to be installed by jacking shall have 2 concentric cages of reinforcing steel in lieu of elliptical reinforcement so the pipe will meet load testing requirements when rotated to any position for testing.

No pipe shall be laid that is cracked, checked, spalled or damaged and all such sections that are rejected by the City Engineer shall be promptly removed from the site.

Pipes with elliptical reinforcement shall be placed with the minor axis of the reinforcement in a vertical position. Deflection in joints will not be permitted unless shown on the plans. Where

deflection is shown, the plans will indicate the length of pipe joints to be used and the uniform deflection to be achieved at each joint.

Care shall be taken to assure that no foreign material gets into the bell or groove end of the pipe when pipe is being joined. Any excess mortar, dirt or other superfluous material of any description shall be removed from the pipe as pipe laying progresses.

Bell and spigot and tongue and groove pipe shall be laid with the bell or groove end facing uphill. Pipe joints shall be completely and compactly filled with cement mortar so as to make a strong and watertight joint. All joints shall be finished smooth on the inside of the pipe with cement mortar. In pipes that are 0.9 meter (3 feet) or smaller, inside recesses shall be wetted and buttered with cement mortar prior to closure of the joint. After the closure is made, the inside surface of the joint shall be pointed and excess mortar removed by means of a swab or squeegee. Inside joints of larger diameter pipe shall be mortared from the inside and after at least 3 successive joints of pipe have been laid. The outside of tongue and groove joints shall be banded all around the pipe with cement mortar. All pipe joints must be inspected and approved by the City Engineer before backfilling.

Rubber gasket joints shall be made by placing the rubber gaskets in the grooves on the ends of the pipes and then drawing the sections of the pipes tightly together. In double rubber gasket joints, cement mortar shall be used to completely seal the inside and outside joint recesses between abutting pipe sections.

55.02 - Cast In Place Concrete Pipe (CIPCP) - This section will be added in a later edition.

55.03 - Corrugated Metal Pipe (CMP) - Corrugated metal pipe shall be either corrugated aluminum or corrugated steel as shown on the plans or designated in the bid schedule. Dimensions and thickness shall conform to the provisions of AASHTO designation M 36/M 36M for steel and AASHTO M196/M 196M for aluminum. Nominal thicknesses shall be equal to or greater to that shown on the plans or stated in the bid schedule. Pipe fabrication and end finish shall conform to the provisions of Section 66-2 of the State Specifications for corrugated aluminum pipe and to Section 66-3 for corrugated steel pipe.

When called for on the plans, special provisions or bid schedule, pipes shall be protected with bituminous coating, bituminous lining or shall have the invert paved with bituminous material. All pipes to be laid on a grade of 10% or greater shall have paved inverts whether called for in the plans or bid schedule or not. All such coatings shall conform to the provisions of Section 66-1.03 of the State Specifications. Coated pipes and their bands shall be shipped and handled in such a manner as to prevent bruising, scaling, or breaking of the protective coating.

Both annular and helical pipe shall be laid in the trench with the separate sections not more than 40 mm (1 ½ inches) apart and then firmly joined by band couplers with the coupler's corrugations in alignment with those of both sections of pipe. Couplers shall be tightened to fit as firmly as possible. All pipe joints must be inspected by the City Engineer before backfilling.

55.04 - Corrugated Plastic Pipe (CPC) - Pipe shall be either Type C corrugated polyethylene pipe or Type S corrugated polyethylene pipe, ribbed profile wall polyethylene pipe, or ribbed polyvinyl chloride drain pipe. Where designated on the plans as corrugated interior wall type,

plastic pipe shall be Type C corrugated polyethylene. Where designated on the plans as smooth interior wall type, plastic pipe shall be, at the option of the Contractor, either Type S corrugated polyethylene pipe, ribbed profile wall polyethylene pipe or ribbed polyvinyl chloride drain pipe. Where the type of plastic pipe is not designated on the plans, plastic pipe shall be, at the option of the Contractor, either corrugated or smooth interior wall. All pipe materials shall conform to the provisions of Sections 64-1.02 and 64-1.03 of the State Specifications.

55.05 - Polyvinyl Chloride Pipe (PVC) - Pipe and fittings shall be made from all new, rigid unplasticized polyvinyl chloride and conform to the provisions of ASTM Specification D3034, with a wall thickness of at least SDR 35. Joints shall be bell and spigot assembly with elastomeric sealing gaskets. Sealing gaskets shall meet the requirements of ASTM Specification D 1869. Solvent cement joints conforming to the provisions of ASTM D 2564 may be used for pipes 150 mm (6 inches) and smaller in nominal diameter. The use of band compression couplings on PVC pipe will not be permitted.

Where used in sanitary sewers and in other applications where called for on the plans or in the special provisions, pipe entering or leaving a concrete structure shall have a rubber water stop gasket attached to it. The water stop gasket shall conform to the pipe manufacturer's specifications. The water stop gasket shall be seated firmly around the pipe exterior and be cast into the concrete structure.

After it is installed and its trench backfilled and compacted, PVC pipe shall be tested for deflection by pulling by hand a go/no-go mandrel through the pipe. The mandrel shall have a minimum length equal to its diameter and shall be constructed with at least 9 ribs fabricated parallel to its longitudinal axis. The mandrel diameter shall be 95% of the pipe's average inside diameter as defined by ASTM Specification D3034.

55.06 - High Density Polyethylene Solid Wall Pipe (HDPE) and Liner - HDPE pipe materials shall be very high molecular weight pipe resin PE3408 and shall conform to the provisions of ASTM Specifications D3350-84 345434C. Pipe for pressure lines shall also have the pressure rating shown on the plans or stated in the special provisions or bid schedule.

HDPE shall be handled and stored in a manner that will avoid physical damage. Sections of pipe with cuts or gouges in excess of 10% of the pipe wall thickness shall be cut out and removed.

HDPE fittings shall be standard commercial products manufactured by injection molding or by extrusion and machining or shall be fabricated from HDPE pipe. Fittings shall be pressure rated to provide a working pressure equal to that of the pipe with a 2:1 safety factor. Mechanical couplers may be used to connect sewer laterals to HDPE lines. Other fittings requiring mechanical connections shall be accomplished by use of mechanical flanges welded onto HDPE material.

Sections of HDPE shall be joined into continuous lengths on the job site above the ground by butt fusion performed in strict conformance with the pipe manufacturer's recommendations. The butt fusion equipment used shall be capable of meeting all conditions recommended by the pipe manufacturer including temperature requirements of 204 degrees C (400 degrees F), alignment and 517 kPa (75 psi) interfacial fusion pressure. Butt fusion shall be 100% efficient in offering a joint weld strength equal to or greater than the tensile strength of the pipe. Socket fusion shall not be used.

Pipe terminations at manholes and other structures shall provide both a hydraulic seal and axial restraint of the HDPE. Where the termination detail is not provided, one of the details recommended by the pipe manufacturer shall be used.

55.06 - Vitrified Clay Pipe (VCP) - Pipe and fittings shall be extra strength, unglazed, bell and spigot conforming to ASTM Specification C700 for extra strength clay pipe. Joints shall be bell and spigot assembly with factory installed flexible compression type gaskets made of plasticized polyvinyl or polyurethane conforming to ASTM Specification C425. Band type couplings will not be allowed except where approved by the City Engineer and then only for replacing short sections of existing lines. Where band type couplings are permitted they shall conform to ASTM Specification C594.

55.07 - Cast Iron Pipe (CIP) - Pipe 100 mm (4 inches) and smaller in nominal diameter shall be Class 51 and all other pipe shall be Class 50 ductile iron conforming to the provisions of ANSI Specifications A21.51. Fittings shall conform to ANSI Specification A21.10. Joints shall be push-on or mechanical type conforming to ANSI Specification A21.11. Rubber gaskets for push-on joints shall be in accordance with ANSI specifications.

Pipe and fittings shall have a bituminous exterior coating conforming to the provisions of ASTM Specification A746-82. Where interior coating is called for on the plans, it shall be 1.5 mm (1/16 inch) thick cement mortar with an asphaltic seal coat.

LANDSCAPING AND EROSION CONTROL

Section 71. Hydroseeding

71.01 - Description - This work consists of planting banks, slopes and disturbed areas with grass or other seed for the purpose of erosion control.

71.02 - Surface Finishing and Approval - Areas to be hydroseeded shall be shaped to a reasonably smooth surface finish so that runoff water will not be channelized and to provide sufficient slope so that there are no depressions where water will stand. The Contractor shall notify the City Engineer and request inspection at least one full working day in advance of hydroseeding. Hydroseeding shall not be done until the City Engineer has approved the ground surface and condition. Such approval shall not relieve the Contractor of the responsibility to restore any damage to the grade until the planted area is accepted.

71.03 - Materials and Equipment - Materials and equipment for Hydroseeding shall conform to the provisions of Section 20-3.01 of the State Specifications. The materials to be mixed, their proportions and rates of application shall be as specified in the special provisions or specifications prepared by the project's Landscape Architect or erosion control expert and approved by the City Engineer, in which case no substitutions shall be made without the consent of the Landscape Architect or erosion control expert and the reapproval of the City Engineer. The mulch used shall have a green color to enable the Contractor and City Engineer to determine that all areas have been covered.

71.04 - Watering and Erosion - Where the City Engineer, Landscape Architect or erosion control expert determine the moisture content of the ground to be hydroseeded is too low to

support seed germination, water shall be applied immediately following hydroseeding in sufficient quantity to moisten the soil. Watering shall be continued in such manner, quantity and frequency to insure proper germination and growth. Watering equipment shall be of a type that does not damage the planted area or cause erosion. Areas eroded more than 75 mm (3 inches) deep or 150 mm (6 inches) wide, whether by watering or rain, shall be refinished and replanted.

71.05 - Maintenance - The Contractor shall be responsible for establishing plant cover. He shall protect, maintain, water, fertilize and repair plantings as necessary for a period of 45 days after seeding or until a uniform and healthy stand of the seeded plant is present, whichever is later. Any areas showing evidence of being skipped or on which the plant cover appears to be thin shall be reseeded. Reseeding shall be with the seed specified in the initial sowing and shall be applied in a manner that will cause minimum disturbance to adjacent growing areas.

71.06 - Measurement - Hydroseeding will be paid for by area in the units used in the bid schedule. All measurements will be made in the plane of planting rather than in a horizontal plane.

71.07 - Payment - The price paid for unit area of hydroseeding shall include full compensation for furnishing all plant, labor, material, tools, equipment, and incidentals for doing all work involved in preparing the ground to be planted, applying, watering, repairing and maintaining hydroseeded areas in conformance with the provisions of these specifications and any special provisions or Landscape Architect's or erosion control expert's specifications.

Section 72. Tree and Shrub Planting

72.01 - Description - This work consists of furnishing and planting trees and individual plants of the species indicated, at the locations designated, and in conformance with the plans, details, specifications and special provisions.

72.02 - Plant Materials - Trees and plants shall be the variety and size shown and specified. In each shipment of trees or plants a typical tree or plant of each species, variety or cultivar shall be clearly labeled with its proper botanical name in accordance with the standard practice recommended by the America Association of Nurserymen. Determination of species or variety will be made by the Landscape Architect or City Engineer and such determination shall be final. All plant material shall be uniform and have a habit of growth that is normal for the species. It shall be sound, healthy, vigorous and free from insect pests, plant diseases and injuries. Plants shall have normal, well-developed branch systems, together with vigorous root systems. All materials shall be equal in size or exceed the measurements specified on the plans, in the special provisions or in the Landscape Architect's specifications. Basic pruning for newly installed trees, in accordance with good nursery practice, shall be done at the time of planting. Certain plant materials identified in the special provisions may be furnished by the Town.

Roots shall show no evidence of having been restricted or deformed at any time. Root condition of trees and plants furnished by the Contractor in containers will be determined by removal of earth from the roots of not fewer than 2 trees or plants or more than 2 percent of the total number of each species or variety, except when container grown trees or plants are from several sources, the roots of not fewer than 2 of each species from each source will be inspected. The Town reserves the right to reject the entire lot or lots represented by defective samples. Any tree or

plant rendered unsuitable for planting because of this inspection will be considered as a sample and will not be paid for.

Trees and plants shall comply with Federal and State laws requiring inspection for diseases and infestations. Inspection certificates required by law shall accompany each shipment, and certificates shall be delivered to the City Engineer. The Contractor shall obtain clearance from the County Agricultural Commissioner, as required, before planting trees or plants delivered from outside San Mateo County. Evidence that such clearance has been obtained shall be filed with the City Engineer.

72.03 - Tree and Plant Holes - Trees and plants shall be planted in holes two times the diameter of the container the plant is delivered in to the site, unless larger holes are called for on the plans or in the special provisions. Tree and plant holes shall have vertical sides and flat bottoms. Where rock or other hard material is encountered in or at the bottom of a hole, it shall be removed to a depth of at least 0.3 meter (1 foot) below the normal depth of the hole. The resulting void shall be filled with native soil placed to the proper depth and compacted as required to raise the grade of the bottom of the hole to the appropriate level to receive the tree or plant. Holes may be excavated by hand digging or by drilling. If holes are drilled, their sides shall be broken with hand tools to eliminate any slick surface resulting from drilling.

72.04 - Planting - Trees and plants shall be removed from their containers in such a manner that the ball of earth surrounding the roots is not broken. Containers shall be promptly removed from the site to prevent injury to people on the site. Trees and plants shall be planted and watered as herein specified immediately after removal from their containers. Their containers shall not be cut prior to delivery of plants to the planting area. Roots of trees and plants not in containers shall be kept moist and covered until they are planted.

Trees and plants shall be set in the center of holes, plumb and straight and at such a level that after settlement, the crown of the plant will be 50 mm (2 inches) above surrounding finish grade. When trees and plants are set, tamp the backfill around their bases to fill all voids. All backfill shall be placed by hand, and care shall be taken to assure no air pockets are left under or around root balls and that roots are not restricted or distorted.

After approximately half of the backfill has been placed the starter fertilizer called for in the special provisions shall be placed alongside the root ball in the quantity specified and in accordance with the manufacturer's recommendations. After holes have been filled to approximately 2/3 of their depth, the backfill shall be watered thoroughly before placing the remaining fill.

If the backfill material settles below the top of the root ball after planting and watering, additional soil shall be added to bring the backfill even with the top of the root ball. Any trees or plants that settle deeper than shown on the plan or below the elevation of surrounding ground shall be raised back to the required level or replaced.

Planting that is done in soil that is too wet or too dry or not properly conditioned or in a condition not generally accepted as satisfactory for planting from an agricultural standpoint will not be accepted. No payment will be made for such planting and any further planting work will be suspended until the Contractor has complied in every way with the specifications.

72.05 Staking - Trees and plants shall be staked at the time of planting as specified herein or as shown on the plans or details or called for in the special provisions. Two plant stakes shall be installed on opposite sides of each tree or plant in a transverse direction to the prevailing wind and outside of the root ball of the plant to a minimum depth of 150 mm (6 inches) below the bottom of the planting hole. Stakes shall be 50 mm (2 inch) nominal diameter round stakes and shall be long enough to support each plant in an upright position. Stake tops shall be kept below branching.

Each tree and plant requiring stakes shall be tied with one tie to each stake. Ties shall be 12 gauge pliable galvanized steel wire encased in reinforced rubber or plastic hose or approved commercial ties. The ties shall be installed at the lowest position which will support the tree or plant in an upright position. They should provide trunk flexibility but not allow the trunk to rub against the stakes and shall be large enough to allow for at least 2 years growth. Each tie shall form a figure eight by crossing the tie between the plant and stake and shall be bolted or nailed securely to the stake to which it is attached.

72.06 - Watering - A shallow trough shall be formed directly over the root ball and slightly smaller than the root ball to facilitate watering. Trees and plants shall be watered immediately after planting. Water shall be applied until the backfill soil around and below the roots or ball of earth around the roots of each tree or plant is thoroughly saturated. Water shall be applied as often

and in sufficient amounts as conditions may require to keep trees and plants in a healthy, growing condition until the end of the plant establishment period.

72.07 - Maintenance and Replacement - Trees and plants shall be protected, watered, their basins kept free of weeds and generally cared for the entire length of the plant maintenance period shown below:

<u>Kind of Project</u>	<u>Plan Maintenance Period</u>
Town Projects	Time period stated in the special provisions
Subdivisions	Until final acceptance but not fewer than 45 days after completion of planting
All other private projects	60 days completion of planting

To start the plant maintenance period, the Contractor shall inform the City Engineer when all landscape and irrigation improvement work has been completed. Upon the City Engineer's verification of completion of landscape and irrigation work and his findings that all plant material is in healthy condition and weed free, that all irrigation, staking and other related work is complete and that no general construction items of work that are likely to affect landscaping remain to be performed, he will inform the Contractor in writing of the starting date for the maintenance period.

During the plant maintenance period trees and plants showing signs of failure to grow at any time, or that are so injured or damaged as to render them unsuitable for the purpose intended, as determined by the City Engineer, shall be removed and replaced. Unless otherwise permitted by

the City Engineer, the Contractor shall replace any tree or plant ordered replaced within 7 days after being so ordered by the City Engineer. Replacements shall be the same species and size as specified for the tree or plant being replaced.

72.08 - Measurement - Measurement will be made by the unit or units indicated in the bid schedule.

72.09 - Payment - The price paid for planting trees and plants shall include full compensation for furnishing all plant, labor, material, tools, equipment, and incidentals for doing all work involved required by these specifications and any special provisions or Landscape Architect's or referenced specifications. Maintaining trees and plants through the plant establishment period and replacing plants as required shall be considered included in the prices paid for planting and no additional compensation will be paid therefore.

Section 73. Tree Trimming

73.01 - Description - This work consists of lifting, shaping and safety pruning trees within or overhanging the public right-of-way or within private projects.

73.02 - General Requirements - The following general requirements apply to all tree trimming:

- A. All cuts are to be made sufficiently close to the parent system so that healing can start readily under normal conditions, but not so close to remove the branch bark ridge and collar at the base of the branch.
- B. All limbs over 50 mm (2 inches) in diameter shall be removed by precutting to prevent splitting. Any branches that would injure the tree by falling or that might damage surrounding property shall be lowered from trees by ropes.
- C. When trees known to be diseased are pruned and there is danger of transmitting the disease on tools, the tools shall be disinfected after each cut and between trees with alcohol.
- D. Any structural weakness, decayed trunks, or branches, split crotches or branches must be reported upon discovery to the City Engineer.
- E. Unless otherwise specified by the City Engineer, all old stubs where branches have previously broken off shall be cut back to the next lateral branch.

73.03 - Lifting and Shaping - Lifting consists of the removal of all branches lower than 3 meters (10 feet) above finish grade. In lifting bottom branches for underclearance, care should be taken to leave the tree with a natural appearance. Shaping consists of removing lower branches of lifted trees in order to retain the tree's symmetrical appearance. All trees that are lifted shall be shaped.

73.04 - Safety Pruning - Safety pruning consists of removing all dead, diseased or weak branches larger than 50 mm (2 inches) in diameter. Safety work shall be balanced by additional pruning as needed to render the tree both visually and physically balanced.

73.05 - Measurement and Payment - Unless otherwise stated in the special provisions, all work described in this section shall be considered part of clearing and grubbing and no additional compensation will be paid therefore.