

**** WARNING ** WARNING ** WARNING ** WARNING ****

This document is intended for informational purposes only.

Users are cautioned that California Department of Transportation (Department) does not assume any liability or responsibility based on these electronic files or for any defective or incomplete copying, excerpting, scanning, faxing or downloading of the contract documents. As always, for the official paper versions of the bidders packages and non-bidder packages, including addenda write to the California Department of Transportation, Plans and Bid Documents, Room 0200, P.O. Box 942874, Sacramento, CA 94272-0001, telephone (916) 654-4490 or fax (916) 654-7028. Office hours are 7:30 a.m. to 4:15 p.m. When ordering bidder or non-bidder packages it is important that you include a telephone number and fax number, P.O. Box and street address so that you can receive addenda.



STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

**NOTICE TO CONTRACTORS
INSTRUCTIONS TO BIDDERS
GENERAL CONDITIONS
AND
SPECIAL PROVISIONS
FOR BUILDING CONSTRUCTION IN
SACRAMENTO AT THE MATERIALS TESTING LAB AT 5900 FOLSOM BOULEVARD**

CONTRACT NO. 03-1C3904
03-Sac-5501

Bids Open: March 19, 2002
Dated: February 19, 2002

OSD

IMPORTANT SPECIAL NOTICES

- Attention is directed to the Notice to Contractors regarding references to the District and District Director's Office. The Office of the District Director for the Northern Region is located at Marysville.
- **Payment Bonds**
Attention is directed to Section 2-1.03, "Contract Bonds," of the Instructions to Bidders, regarding contract bonds. The payment bond shall be in a sum not less than one hundred percent of the total amount payable by the terms of the contract.

TABLE OF CONTENTS

NOTICE TO CONTRACTORS	1
SPECIAL PROVISIONS	44
DIVISION 0 BIDDING AND CONTRACT REQUIREMENTS	44
0.01 INSTRUCTIONS TO BIDDERS AND GENERAL CONDITIONS	44
0.02 PROPOSAL REQUIREMENTS AND CONDITIONS	44
0.024 DISABLED VETERAN BUSINESS ENTERPRISE (DVBE)	44
0.025 DVBE GOAL FOR THIS PROJECT	45
0.026 SUBMISSION OF DVBE INFORMATION	45
0.027 SMALL BUSINESS PREFERENCE	46
0.028 CALIFORNIA COMPANY PREFERENCE	47
0.03 AWARD AND EXECUTION OF CONTRACT	47
0.04 BEGINNING OF WORK, TIME OF COMPLETION AND LIQUIDATED DAMAGES	48
0.05 (BLANK)	48
0.052 DIFFERING SITE CONDITIONS	48
0.053 INTEREST ON PAYMENTS	48
0.054 FINAL PAYMENT AND CLAIMS	49
0.055 REMOVAL OF ASBESTOS AND HAZARDOUS SUBSTANCES	49
0.06 (BLANK)	49
0.067 YEAR 2000 COMPLIANCE	49
0.07 SUBCONTRACTOR AND DVBE RECORDS	50
0.075 PERFORMANCE OF DVBE SUBCONTRACTORS AND SUPPLIERS	50
0.077 SUBCONTRACTING	50
0.082 PROMPT PROGRESS PAYMENT TO SUBCONTRACTORS	51
DIVISION 1. GENERAL REQUIREMENTS	51
1.01 SCOPE	51
1.02 ORDER OF WORK	51
1.03 NOTIFICATION	51
1.04 SPECIAL PROJECT PROCEDURES	51
1.05 STATE-FURNISHED MATERIALS	51
1.06 AREAS FOR CONTRACTOR'S USE	52
1.07 COOPERATION	52
1.08 MEASUREMENT AND PAYMENT	52
1.09 SUBMITTALS	52
1.10 OBSTRUCTIONS	52
1.11 TEMPORARY FENCE	53
1.12 PRESERVATION OF PROPERTY	53
1.13 WATER POLLUTION CONTROL	54
1.14 UTILITY CONNECTION	56
1.15 TEMPORARY UTILITIES	57
1.16 SANITARY FACILITIES	57
1.17 REFERENCES	57
1.18 PROJECT RECORD DRAWINGS	57
1.19 FIELD ENGINEERING	57
1.20 SUBSTITUTION OF NON-METRIC MATERIALS AND PRODUCTS	58
DIVISION 2. SITEWORK	69
2.01 DEMOLITION	69
2.02 REMOVING PORTIONS OF EXISTING FACILITIES	69
2.03 RELOCATING MATERIALS AND EQUIPMENT	70
2.04 REMOVAL AND DISPOSAL OF ASBESTOS	71
2.05 LEAD ABATEMENT.--	72
2.06 CLEARING AND GRUBBING	75
2.07 BORING FOR CONDUIT	75

2.08 EARTHWORK FOR BUILDING WORK.....	76
2.09 STRUCTURE EXCAVATION (CONTAMINATED)	78
2.10 AGGREGATE BASE	80
2.11 FREE DRAINING GRANULAR MATERIAL	81
2.12 CAST-IN-DRILLED-HOLE CONCRETE PILES	81
2.13 ASPHALT CONCRETE.....	82
2.14 RETAINING WALL DRAIN.....	83
2.15 CHAIN LINK FENCING	84
2.16 GUARD POSTS.....	87
DIVISION 3. CONCRETE AND REINFORCEMENT.....	88
3.01 CAST-IN-PLACE CONCRETE.....	88
3.02 COMPRESSIVE STRENGTH CONCRETE	93
3.03 PRECAST CONCRETE TILT-UP PANELS	95
DIVISION 4. (BLANK).....	97
DIVISION 5. METALS	97
5.01 STRUCTURAL STEEL FOR BUILDINGS	97
5.02 METAL DECK.....	100
5.03 BUILDING MISCELLANEOUS METAL	101
DIVISION 6. (BLANK).....	103
DIVISION 7. THERMAL AND MOISTURE PROTECTION.....	103
7.01 INSULATION (GENERAL)	103
7.02 RIGID ROOF INSULATION.....	104
7.03 BUILT-UP ASPHALT ROOFING SYSTEM	105
7.04 SHEET METAL FLASHING.....	110
7.05 COMPRESSION SEALS.....	111
7.06 SEALANTS AND CAULKING.....	112
DIVISION 8. DOORS AND WINDOWS	113
8.01 HINGED DOORS.....	113
8.02 FINISH HARDWARE.....	114
DIVISION 9. FINISHES.....	116
9.01 ACOUSTICAL INSULATION PANEL	116
9.02 PAINTING.....	117
DIVISION 10. SPECIALTIES.....	121
10.01 LOUVERS	121
10.02 FIRE EXTINGUISHERS.....	122
DIVISIONS 11 THRU 14. (BLANK).....	123
DIVISION 15. MECHANICAL.....	123
15.01 MECHANICAL WORK.....	123
15.02 PIPE, FITTINGS AND VALVES	124
15.03 MECHANICAL INSULATION.....	133
15.04 VENTILATING AND AIR CONDITIONING EQUIPMENT AND MECHANICAL SYSTEMS.....	135
DIVISION 16. ELECTRICAL.....	138
16.01 ELECTRICAL WORK.....	138
16.02 BASIC MATERIALS AND METHODS	138
16.03 SERVICE AND DISTRIBUTION	144
16.04 ELECTRICAL EQUIPMENT	145
16.05 LIGHTING.....	149

STANDARD PLANS LIST

The Standard Plan sheets applicable to this contract include, but are not limited to those indicated below. The Revised Standard Plans (RSP) and New Standard Plans (NSP) which apply to this contract are included as individual sheets of the project plans.

B0-3 Bridge Details
B3-11 Retaining Wall Type 6 - 1826 mm Maximum

General Condition State 01-17-02.doc

DEPARTMENT OF TRANSPORTATION

NOTICE TO CONTRACTORS

CONTRACT NO. 03-1C3904

03-Sac-5501

Sealed proposals for the work shown on the plans entitled:

STATE OF CALIFORNIA; DEPARTMENT OF TRANSPORTATION; PROJECT PLANS FOR BUILDING CONSTRUCTION IN SACRAMENTO AT THE MATERIALS TESTING LAB AT 5900 FOLSOM BOULEVARD

will be received at the Department of Transportation, 1120 N Street, Room 0200, MS #26, Sacramento, CA 95814, until 2 o'clock p.m. on March 19, 2002, at which time they will be publicly opened and read in Room 0100 at the same address.

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

STATE OF CALIFORNIA; DEPARTMENT OF TRANSPORTATION; PROPOSAL AND CONTRACT FOR BUILDING CONSTRUCTION IN SACRAMENTO AT THE MATERIALS TESTING LAB AT 5900 FOLSOM BOULEVARD

General work description: Materials testing lab hydraulic pump building addition.

This project has a goal of 3 percent disabled veteran business enterprise (DVBE) participation.

No prebid meeting is scheduled for this project.

Bids are required for the entire work described herein.

The Contractor must also be properly licensed at the time the bid is submitted, except that on a joint venture bid a joint venture license may be obtained by a combination of licenses after bid opening but before award in conformance with Business and Professions Code, Section 7029.1.

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

Preference will be granted to bidders properly certified as a "Small Business" as determined by the Department of General Services, Office of Small Business Certification and Resources at the time of bid opening in conformance with the provisions in Division 0.027, "Small Business Preference," of the special provisions, and Section 1896 et seq, Title 2,

Contract No. 03-1C3904

California Code of Regulations. A form for requesting a "Small Business" preference is included with the bid documents. Applications for status as a "Small Business" must be submitted to the Department of General Services, Office of Small Business Certification and Resources, 1531 "I" Street, Second Floor, Sacramento, CA 95814, Telephone No. (916) 322-5060.

A reciprocal preference will be granted to "California company" bidders in conformance with Section 6107 of the Public Contract Code. (See Divisions 2 and 3 of the special provisions.) A form for indicating whether bidders are or are not a "California company" is included in the bid documents and is to be filled in and signed by all bidders.

The District in which the work for this project is located has been incorporated into the Department's Northern Region. References in the Instruction to Bidders or the General Conditions or in the special provisions to the district shall be deemed to mean the Northern Region. The office of the District Director for the Northern Region is located at Marysville.

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

Cross sections for this project are not available.

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

Pursuant to Section 1773 of the Labor Code, the general prevailing wage rates in the county, or counties, in which the work is to be done have been determined by the Director of the California Department of Industrial Relations. These wages are set forth in the General Prevailing Wage Rates for this project, available at the Labor Compliance Office at the offices of the District Director of Transportation for the district in which the work is situated, and available from the California Department of Industrial Relations' Internet Web Site at: <http://www.dir.ca.gov>. Future effective general prevailing wage rates which have been predetermined and are on file with the Department of Industrial Relations are referenced but not printed in the general prevailing wage rates.

DEPARTMENT OF TRANSPORTATION

Deputy Director Transportation Engineering

Dated February 19, 2002

BH

STATE OF CALIFORNIA

DEPARTMENT OF TRANSPORTATION

**INSTRUCTIONS TO BIDDERS
AND
GENERAL CONDITIONS
FOR
BUILDING CONSTRUCTION**

JANUARY 2002

Issued by

DEPARTMENT OF TRANSPORTATION



INSTRUCTIONS TO BIDDERS

SECTION 1

PROPOSAL REQUIREMENTS AND CONDITIONS

1-1.01 GENERAL

- The bidder shall carefully examine the instructions contained herein and shall be satisfied as to the conditions with which the bidder must comply prior to bid and to the conditions affecting the award of contract.
- These instructions form a part of the contract documents.
- Attention is directed to Section 1-1.01, "General," of the General Conditions regarding the use of masculine gender pronouns in these Instructions to Bidders.

1-1.02 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 conformance 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 requirements in Public Contract Code Section 10164. In all projects where Federal funds are involved, the Contractor shall be properly licensed at the time the contract is awarded.

1-1.03 EXAMINATION OF PLANS, SPECIAL PROVISIONS AND SITE OF THE WORK

- The bidder shall examine carefully the site of the work contemplated, the plans and special provisions and these instructions to bidders and contract forms therefor. The submission of a bid shall be conclusive evidence that the bidder has investigated and is satisfied as to the conditions to be encountered, as to the character, quality, and scope of work to be performed, the quantities of materials to be furnished, and as to the requirements of these instructions to bidders, plans, special provisions, and the contract.
- Where the Department has made investigations of site conditions, including subsurface conditions in areas where work is to be performed under the contract, bidders or Contractors may, upon written request, inspect the records of the Department as to those investigations subject to and upon the conditions hereinafter set forth.
- Where there has been prior construction by the Department or other public agencies within the project limits, records of the prior construction that are currently in the possession of the Department and which have been used by, or are known to, the designers and administrators of the project will be made available for inspection by bidders or Contractors, upon written request, subject to the conditions hereinafter set forth. Those records may include, but are not limited to, as-built drawings, design calculations, foundation and site studies, project reports and other data assembled in connection with the investigation, design, construction and maintenance of those prior projects.
- Inspection of those records of investigations and project records may be made at the office of the district in which the work is situated, or in the case of records of investigations related to structure work, at the Transportation Laboratory, Sacramento, California. The records of investigations and project records are not a part of the contract and are available solely for the convenience of the bidder or contractor. It is expressly understood and agreed that the Department assumes no responsibility whatsoever in respect to the sufficiency or accuracy of the investigations thus made, the records thereof, or of project records, or of the interpretations set forth therein or made by the Department in its use thereof and there is no warranty or guaranty, either express or implied, that the conditions indicated by the investigations or records are representative of those existing in or throughout those areas, or any part thereof, or that unlooked-for developments may not occur, or that materials other than, or in proportions different from those indicated, may not be encountered.
- No information derived from the inspection of investigations or compilation thereof made by the Department or from the Engineer, or his assistants, will in any way relieve the bidder or contractor from any risk or from properly fulfilling the terms of the contract.

1-1.04 PROPOSAL FORMS

- The Department will furnish to each bidder a standard proposal form, which, when filled out and executed may be submitted as that bidder's bid. Bids not presented on forms so furnished, and copies or facsimiles of the bidder's completed and executed proposal forms submitted as a bid will be rejected.
- The proposal form is bound together with the contract in a book entitled "Proposal and Contract." The proposal shall set forth the bid price, in clearly legible figures, in the space provided, and shall be signed by the bidder, who shall fill out all blanks in the proposal form as therein required.
- The proposal shall be submitted as directed in the "Notice to Contractors" under sealed cover plainly marked as a proposal, and identifying the project to which the proposal relates and the date of the bid opening therefor. Proposals which are not properly marked may be disregarded.

- All proposal forms other than for “District Opening” projects shall be obtained from the Department of Transportation, Plans and Bid Documents, Room 0200, Transportation Building, 1120 N Street, California 95814, or as otherwise designated in the “Notice to Contractor.”
- Proposals for “District Opening” projects shall be made on forms obtained from the District Director of Transportation in whose district the work is to be performed, but in all other respects the provisions in this Section 1-1.04 shall apply.

1-1.05 REQUIRED LISTING OF PROPOSED SUBCONTRACTORS

- Each proposal shall have listed therein the name and address of each subcontractor to whom the bidder proposes to subcontract portions of the work in an amount in excess of one-half of one percent of the total bid, in conformance with the Subletting and Subcontracting Fair Practices Act, commencing with Section 4100 of the Public Contract Code. The bidder’s attention is invited to other provisions of the Act related to the imposition of penalties for a failure to observe its provisions by using unauthorized subcontractors or by making unauthorized substitutions.
- A sheet for listing the subcontractors, as required herein, is included in the “Proposal and Contract” book.

1-1.055 STATE EMPLOYEES AND DESIGN ENGINEERS MAY NOT BID ON CONSTRUCTION CONTRACTS

- No employee of the State shall be eligible to submit a proposal for, nor to subcontract for any portion of, nor to supply any materials for any contract administered by the Department.
- No engineering or architectural firm which has provided design services for a project shall be eligible to submit a proposal for the contract to construct the project nor to subcontract for any portion of the work. The ineligible firms include the prime contractor for design, subcontractors of portions of the design, and affiliates of either. An affiliate is a firm which is subject to the control of the same persons, through joint ownership or otherwise.

1-1.06 PREVIOUS DISQUALIFICATION, REMOVAL OR OTHER PREVENTION OF BIDDING

- Pursuant to Section 10162 of the Public Contract Code the bidder shall complete, under penalty of perjury, the questionnaire in the Proposal relating to previous disqualification, removal or other prevention of bidding of the bidder, or officers or employees of the bidder because of violation of law or a safety regulation.
- A bid may be rejected on the basis of a bidder, any officer of the bidder, or any employee of the bidder who has a proprietary interest in the bidder, having been disqualified, removed, or otherwise prevented from bidding on, or completing a Federal, State, or local project because of a violation of law or a safety regulation.

1-1.07 PROPOSAL GUARANTY

- All bids shall be presented under sealed cover and accompanied by one of the following forms of bidder’s security:

Cash, a cashier’s check, a certified check, or a bidder’s bond executed by an admitted surety insurer, made payable to the Director of Transportation.

- The security shall be in an amount equal to at least 10 percent of the amount bid. A bid will not be considered unless one of the forms of bidder’s security is enclosed with it.
- The bidder’s bond shall conform to the bond form in the book entitled “Proposal and Contract” for the project and shall be properly filled out and executed. The bidder’s bond form included in that book may be used. Upon request, “Bidder’s Bond” forms may be obtained from the Department of Transportation.

1-1.08 COMPLIANCE WITH ORDERS OF THE NATIONAL LABOR RELATIONS BOARD

- Pursuant to Public Contract Code Section 10232, the Contractor shall swear by a statement, under penalty of perjury, that no more than one final, unappealable finding of contempt of court by a Federal court has been issued against the Contractor within the immediately preceding 2-year period because of the Contractor’s failure to comply with an order of a Federal court which orders the Contractor to comply with an order of the National Labor Relations Board. For purposes of Section 10232 a finding of contempt does not include any finding which has been vacated, dismissed, or otherwise removed by the court because the Contractor has complied with the order which was the basis for the finding. The State may rescind any contract in which the Contractor falsely swears to the truth of the statement required by Section 10232.
- The statement required by Public Contract Code Section 10232 is on the page preceding the signature page of the Proposal.

1-1.09 WITHDRAWAL OF PROPOSALS

- Any bid may be withdrawn at any time prior to the date and time fixed for the opening of bids only by written request for the withdrawal of the bid filed at the location at which the bid was received by the Department. The request shall be executed by the bidder or the bidder’s duly authorized representative. The withdrawal of a bid does not prejudice the right of the bidder to file a new bid. Whether or not bids are opened exactly at the time fixed for opening bids, a bid will not be received after that time, nor may any bid be withdrawn after the time fixed for the opening of bids.

1-1.10 PUBLIC OPENING OF PROPOSALS

Proposals will be opened and read publicly at the time and place indicated in the Notice to Contractors. Bidders or their authorized agents are invited to be present.

1-1.11 REJECTION OF PROPOSALS

Proposals may be rejected if they have been transferred to another bidder, or if they show any alterations of form, additions not called for, conditional bids, incomplete bids, erasures, or irregularities of any kind.

When proposals are signed by an agent, other than the officer or officers of a corporation authorized to sign contracts on its behalf or a member of a partnership, a "Power of Attorney" must be on file with the Department prior to opening bids or shall be submitted with the proposal; otherwise, the proposal may be rejected as irregular and unauthorized.

1-1.12 COMPETITIVE BIDDING

If more than one proposal be offered by any individual, firm, copartnership, corporation, association, or any combination thereof, under the same or different names, all of those proposals may be rejected. A party who has quoted prices on materials or work to a bidder is not thereby disqualified from quoting prices to other bidders, or from submitting a bid directly for the materials or work.

All bidders are put on notice that any collusive agreement to control or affect the awarding of this contract is in violation of the competitive bidding requirements of the State Contract Act and the Business and Professions Code and may render void any contract let under those circumstances.

1-1.13 RELIEF OF BIDDERS

Attention is directed to the provisions of Public Contract Code Sections 5100 to 5107, inclusive, concerning relief of bidders and in particular to the requirement therein, that if the bidder claims a mistake was made in the bid presented, the bidder shall give the Department written notice within 5 days after the opening of the bids of the alleged mistake, specifying in the notice in detail how the mistake occurred.

1-1.14 INELIGIBILITY TO CONTRACT

Public Contract Code Section 10285.1 provides as follows:

Any State agency may suspend, for a period of up to three years from the date of conviction, any person from bidding upon, or being awarded, a public works or services contract with the agency under this part or from being a subcontractor at any tier upon the contract, if that person, or any partner, member, officer, director, responsible managing officer, or responsible managing employee thereof, has been convicted by a court of competent jurisdiction of any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of any State or Federal antitrust law in connection with the bidding upon, award of, or performance of, any public works contract, as defined in Section 1101, with any public entity, as defined in Section 1100, including, for the purposes of this article, the Regents of the University of California or the Trustees of the California State University. A State agency may determine the eligibility of any person to enter into a contract under this article by requiring the person to submit a statement under penalty of perjury declaring that neither the person nor any subcontractor to be engaged by the person has been convicted of any of the offenses referred to in this section within the preceding three years.

A form for the statement required by Section 10285.1 is included in the Proposal.

SECTION 2

AWARD AND EXECUTION OF CONTRACT

2-1.01 AWARD OF CONTRACT

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

2-1.02 RETURN OF PROPOSAL GUARANTIES

· The proposal guaranties accompanying the proposals of the first, second and third lowest responsible bidders will be retained until the contract has been finally executed, after which all those proposal guaranties, except bidders' bonds and any guaranties which have been forfeited, will be returned to the respective bidders whose proposals they accompany. The proposal guaranties, other than bidder's bonds, submitted by all other unsuccessful bidders will be returned upon determination, by the Department, of the first, second and third lowest responsible bidders.

2-1.03 CONTRACT BONDS

· The successful bidder shall furnish the 2 bonds required by the State Contract Act. One bond shall secure the payment of the claims of laborers, mechanics or materialmen employed on the work under the contract and the other bond shall guarantee the faithful performance of the contract. The bond forms will be furnished to the successful bidder by the Department.

· Except as otherwise provided in Section 3248 of the Civil Code and Section 30154 of the Streets and Highways Code, the payment bond shall be in a sum equal to the contract price and the performance bond shall be in a sum equal to at least one-half of the contract price.

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

2-1.04 EXECUTION OF CONTRACT

· The contract shall be signed by the successful bidder and returned, together with the contract bonds, within 8 days, not including Saturdays, Sundays and legal holidays, after the bidder has received the contract for execution.

2-1.05 FAILURE TO EXECUTE CONTRACT

· Failure of the lowest responsible bidder, the second lowest responsible bidder, or the third lowest responsible bidder to execute the contract and file acceptable bonds as provided herein within 8 days, not including Saturdays, Sundays and legal holidays, after that bidder has received the contract for execution shall be just cause for the forfeiture of the bidder's security. The successful bidder may file with the Department a written notice, signed by the bidder or the bidder's authorized representative, specifying that the bidder will refuse to execute the contract if it is presented. The filing of this notice shall have the same force and effect as the failure of the bidder to execute the contract and furnish acceptable bonds within the time hereinbefore prescribed.

GENERAL CONDITIONS
SECTION 1
DEFINITIONS AND TERMS

1-1.01 GENERAL

- Unless the context otherwise requires, wherever in the specifications and other contract documents the following abbreviations and terms, or pronouns in place of them, appear in the contract documents, the intent and meaning shall be interpreted as provided in this Section 1.
- Working titles having a masculine gender, such as "workman" and "journeyman" and pronouns, such as "he" and "himself", are utilized in these General Conditions, the Instructions to Bidders and the special provisions for the sake of brevity, and are intended to refer to persons of either gender.

1-1.02 ACCEPTANCE

- The formal written acceptance by the Director of Transportation of an entire contract which has been completed in all respects in conformance with the contract documents and any modifications thereof previously approved.

1-1.03 ADDENDUM

- A document or written communication issued by the Department during the bidding period which modifies, supersedes, or supplements the original contract documents.

1-1.04 BIDDER

- Any individual, firm, partnership, corporation, or combination thereof, submitting a proposal for the work contemplated, acting directly, or through a duly authorized representative.

1-1.05 CONTRACT

- The written agreement covering the performance of the work and the furnishing of labor, materials, tools and equipment in the construction of the work. The contract shall include the notice to contractors, Instructions to Bidders, proposal, plans, General Conditions, special provisions and contract bonds; also any and all supplemental agreements amending or extending the work contemplated and which may be required to complete the work in a substantial and acceptable manner. Supplementary agreements are written agreements covering alterations, amendments, or extensions to the contract and include contract change orders.

1-1.06 CONTRACTOR

- The person or persons, firm, partnership, corporation, or combination thereof, private or municipal, who have entered into a contract with the Department of Transportation, as party or parties of the second part or their legal representatives.

1-1.07 DAYS

- Unless otherwise designated, days as used in the contract documents will be understood to mean calendar days.

1-1.08 DEPARTMENT

- The Department of Transportation of the State of California, as created by law.

1-1.09 DIRECTOR

- The executive officer of the Department of Transportation, as created by law.

1-1.10 ENGINEER

- The Chief Engineer, Department of Transportation, acting either directly or through properly authorized agents, the agents acting within the scope of the particular duties delegated to them.

1-1.11 GENERAL NOTES

- The written instructions, provisions, conditions or other requirements appearing on the plans, and so identified thereon, which pertain to the performance of the work.

1-1.12 LABORATORY

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

1-1.13 LEGAL HOLIDAYS

- Those days designated as State holidays in the Government Code.

1-1.14 LIQUIDATED DAMAGES

· The amount prescribed in the special provisions, pursuant to the authority of Public Contract Code Section 10226, to be paid to the State or to be deducted from any payments due or to become due the Contractor for each day's delay in completing the whole or any specified portion of the work beyond the time allowed in the special provisions.

1-1.15 PLANS

· The official drawings including plans, elevations, sections, detail drawings, diagrams, plates, general notes, information and schedules thereon, or exact reproductions thereof, approved by the Engineer, which show the location, character, dimensions and details of the work to be performed. The plans include any drawings or plates bound within the special provisions.

1-1.16 PREMISES

· The area of State-owned property which surrounds the work site, limited by the property lines thereof. In some cases the premises may coincide with the work site.

1-1.17 PROPOSAL

· The offer of the bidder for the work when made out and submitted on the prescribed proposal form, properly signed and guaranteed.

1-1.18 PROPOSAL FORM

· The approved form upon which the Department of Transportation requires formal bids be prepared and submitted for the work.

1-1.19 PROPOSAL GUARANTY

· The cash, cashier's check, certified check, or bidder's bond accompanying the proposal submitted by the bidder, as a guaranty that the bidder will enter into a contract with the Department of Transportation for the performance of the work if the contract is awarded to the bidder.

1-1.20 SPECIAL PROVISIONS

· The special provisions are specific clauses setting forth conditions or requirements of the work and supplementary to these General Conditions and the Instructions to Bidders. The Department of Transportation publication entitled Labor Surcharge And Equipment Rental Rates is to be considered as a part of the special provisions.

1-1.21 STATE

· The State of California.

1-1.22 STATE CONTRACT ACT

· An act to regulate contracts for the erection, construction, alteration, repair or improvement of any state structure, building, road, or other State improvements of any kind, to be found in Chapter 1, Division 2 of the Public Contract Code.

1-1.23 WORK

· The furnishing of all labor, and the furnishing and installing of all materials, articles, supplies and equipment as specified, designated, or required by the contract.

1-1.24 WORKING DAY

· Every day except Saturdays, Sundays, legal holidays, and those days not charged as working days pursuant to Section 6-1.07, "Time of Completion," of these General Conditions.

1-1.25 WORK SITE

· The area of actual construction and the areas immediately adjacent thereto.

1-1.26 ABBREVIATIONS

AAMA	Architectural Aluminum Manufacturers' Association
AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGA	American Gas Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Movement and Control Association
ANSI	American National Standards Institute
APA	American Plywood Association
APHA	American Public Health Association

API	American Petroleum Institute.
AREA	American Railway Engineering Association
ARI	American Refrigeration Institute
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWG	American Wire Gage
AWPA	American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
CBC	California Building Code
CEC	California Electrical Code
CS	Commercial Standards (US Department of Commerce)
EIA	Electronic Industries Association
ESO	Electrical Safety Orders
FGMA	Flat Glass Marketing Association
FM	Factory Mutual
FS	Federal Specification
IEEE	Institute of Electrical and Electronics Engineers
ICBO	International Conference of Building Officials
NAAMM	National Association of Architectural Metal Manufacturers
NBFU	National Board Fire Underwriters
NEC	National Electrical Code
NEMA	National Electrical Manufacturers' Association
NFPA	National Fire Protection Association
PEI	Porcelain Enamel Institute
PS	Product Standard (US Department of Commerce)
RIS	Redwood Inspection Service
SCPI	Structural Clay Products Institute
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
TCA	Tile Council of America
TPI	Truss Plate Institute
UBC	Uniform Building Code
UL	Underwriters' Laboratory
UPC	Uniform Plumbing Code
WCLB	Grade Stamp for WCLIB
WCLIB	West Coast Lumber Inspection Bureau (Grade Stamped WCLB)
WIC	Woodwork Institute of California
WWPA	Western Wood Products' Association

Units of Measurement

Some of the symbols for units of measurement used in the specifications are defined as follows. The symbols for other units of measurement used in the specifications are as defined in ASTM Designation: E-380, or in the various specifications and test referenced in the specifications.

Symbols as used
in the Specifications

Definitions

A	amperes
g	gram
kg	kilogram
ha	hectare (10 000 m ²)
h	hour
J	joule
L	liter
m	meter
km	kilometer
mm	millimeter
μm	micrometer
nm	nanometer
m ²	square meter
m ³	cubic meter
N	newton
N·m	newton meter
	ohm
Pa	pascal
kPa	kilopascal
MPa	megapascal
s	second
tonne	metric ton (1000 kg)
W	watt
V	volt

SECTION 2

CONTROL AND SCOPE OF THE WORK

2-1.01 AUTHORITY OF ENGINEER

· The Engineer shall decide all questions which may arise as to the quality or acceptability of materials furnished and work performed and as to the manner of performance and rate of progress of the work; all questions which may arise as to the interpretation of the plans and special provisions; all questions as to the acceptable fulfillment of the contract on the part of the Contractor; and all questions as to compensation. The Engineer's decision shall be final, and the Engineer shall have authority to enforce and make effective those decisions and orders which the Contractor fails to carry out promptly.

2-1.02 INTENT OF PLANS AND SPECIAL PROVISIONS

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

2-1.03 COORDINATION AND INTERPRETATION OF CONTRACT DOCUMENTS

· These General Conditions, the plans, special provisions, contract change orders, and all supplementary documents are essential parts of the contract, and a requirement occurring in one is as binding as though occurring in all. They are intended to be complementary, and to describe and provide for a complete work.

· Plans shall govern over these General Conditions; the special provisions shall govern over both these General Conditions and the plans.

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

· 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 and general notes shall prevail over drawings.

2-1.04 SHOP DRAWINGS, DESCRIPTIVE DATA, SAMPLES, AND ALTERNATIVES

· It shall be the Contractor's responsibility to submit, so as to cause no delay in the work, all shop drawings, descriptive data, samples for the various trades as required by the special provisions, and offers of alternatives, if any. The submittals shall be checked and coordinated by the Contractor with the work of other trades involved before they are submitted to the Engineer for examination.

· Submittals shall be delivered to the locations indicated in the special provisions.

· Work requiring the submittal of shop drawings, descriptive data or samples shall not begin prior to approval of that submittal by the Engineer. Fifteen working days shall be allowed for approval or return for correction of each submittal or resubmittal. Approval of submittals 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, materials and equipment may be rejected notwithstanding the approval of that submittal. Should the Engineer fail to complete his review within the time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in review, an extension of time commensurate with the delay in completion of the work thus caused will be granted pursuant to the provisions in Section 6-1.08, "Liquidated Damages," of these General Conditions, and no additional compensation will be allowed for the delay.

· Submittals shall be made by a letter of transmittal which shall contain a list of all matter submitted and identification of all variations from the plans and special provisions contained in the submittal. The letter and all items accompanying the same shall be fully identified as to project name and location, Contractor's name, district, county, and contract number, with ample cross references to the contract documents, to facilitate identification of items and their location in the work. Additional specific requirements shall be as follows:

Shop Drawings

· The Contractor shall submit at least 5 copies of all shop drawings required by the special provisions. Two copies will be returned to the Contractor either approved for use or returned for correction and resubmittal. Shop drawings include any drawing which requires execution by a draftsman as distinguished from printed matter. The size of shop drawings shall be 559 mm x 864 mm or 279 mm x 432 mm in size.

Descriptive Data

· The Contractor shall submit 5 copies of each set of manufacturer's brochures or other data required by the special provisions. The State will examine the submittals and return 2 copies either approved for use or returned for correction and resubmittal.

Samples

· The Contractor shall submit samples of articles, materials or equipment as required by the special provisions. The work shall be in conformance with the approved samples. Samples shall be removed from State property when directed or may be incorporated in the work if approved by the Engineer. Samples not removed by the Contractor will become the property of the State or, at the State's option, will be removed or disposed of by the State at the Contractor's expense.

Alternatives

· For convenience in designation on the plans or in the special provisions, certain materials, articles, or equipment may be designated by a brand or a trade name or the name of the manufacturer together with catalog designation or other identifying information, hereinafter referred to generically as "designated by brand name". An alternative material, article, or equipment which is of equal quality and of the required characteristics for the purpose intended may be proposed for use provided the Contractor complies with the following requirements:

- 1 The Contractor shall submit his proposal for an alternative in writing. The request shall be made in ample time to permit approval without delaying the work, but need not be made in less than 35 days after award of the contract.
- 2 No proposal will be considered unless accompanied by complete information and descriptive data, necessary to determine the equality of the offered materials, articles, or equipment. Samples shall be provided when requested by the Engineer. The Contractor shall satisfy the Engineer as to the comparative quality, suitability, or performance of the offered materials, articles, or equipment. In the event that the Engineer rejects the use of the alternative materials, articles, or equipment, then one of the particular products designated by brand name shall be furnished.

· Approval of submittals by the Engineer shall not relieve the Contractor from responsibility for the successful completion of the work, nor shall it relieve the Contractor from responsibility for errors in the submittals. A failure by the Contractor to identify in the letter of transmittal, material deviations from the plans or specifications shall void the submittal and any action taken thereon by the Engineer. When specifically requested by the Engineer, the Contractor shall resubmit the shop drawings, descriptive data and samples as may be required.

· If any mechanical, electrical, structural, or other changes are required for the proper installation and fit of alternative materials, articles, or equipment, or because of deviations from the contract plans and special provisions, the changes shall not be made without the approval of the Engineer and shall be made without additional cost to the State.

2-1.045 DIFFERING SITE CONDITIONS

· During the progress of the work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the contract or if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract, are encountered at the site, the party discovering those conditions shall promptly notify the other party in writing of the specific differing conditions before they are disturbed and before the affected work is performed.

· Upon written notification, the Engineer will investigate the conditions, and if the Engineer determines that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the contract, an adjustment, excluding loss of anticipated profits, will be made and the contract modified in writing accordingly. The Engineer will notify the Contractor of his determination whether or not an adjustment of the contract is warranted.

· No contract adjustment which results in a benefit to the Contractor will be allowed unless the Contractor has provided the required written notice.

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

· Any contract adjustment warranted due to differing site conditions will be made in conformance with the provisions in Section 3-1.01, "Changes," of these General Conditions, except as otherwise provided.

2-1.05 PRESERVATION AND CLEANING

· The Contractor shall clean up the work at frequent intervals and at other times when directed by the Engineer. While finish work is being accomplished, floors shall be kept clean, free of dust, construction debris and trash. Upon completion of the work, the Contractor shall remove from the premises the Contractor's construction equipment and any waste materials not previously disposed of, leaving the premises thoroughly clean and ready for final inspection.

2-1.06 LIMITATIONS ON WORK SITE AND PREMISES

· The Contractor shall limit the Contractor's construction operations to the work site unless otherwise shown on the plans or specified. The Contractor shall perform no operations of any nature over or on the premises except those operations as are authorized by the plans or special provisions, or as authorized by the Engineer.

2-1.07 SUPERINTENDENCE

· The Contractor shall designate in writing before starting work, an authorized representative who shall have the authority to represent and act for the Contractor.

· When the Contractor is comprised of 2 or more persons, firms, partnerships, or corporations functioning on a joint venture basis, the Contractor shall designate in writing before starting work, the name of one authorized representative who shall have the authority to represent and act for the Contractor.

· The authorized representative shall be present at the site of the work at all times while work is actually in progress on the contract. When work is not in progress and during periods when work is suspended, arrangements acceptable to the Engineer shall be made for any emergency work which may be required.

· Whenever the Contractor or the Contractor's authorized representative is not present on any particular part of the work where it may be desired to give direction, orders will be given by the Engineer, which shall be received and obeyed by the superintendent or foreman who may have charge of the particular work in reference to which the orders are given.

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

2-1.08 CHARACTER OF WORKMEN

· If any subcontractor or person employed by the Contractor shall appear to the Engineer to be incompetent or to act in a disorderly or improper manner, they shall be discharged immediately on the request of the Engineer, and that person shall not again be employed on the work.

2-1.09 INSPECTION

· The Contractor shall at all times permit the Engineer and the Engineer's authorized agents to inspect the work or any part thereof. The Contractor shall maintain proper facilities and provide safe access for inspection by the Engineer to all parts of the work, and to the shops where the work is in preparation. Work shall not be covered up until authorized by the Engineer and the Contractor shall be solely responsible for notifying the Engineer where and when the work is in readiness for inspection and testing. Should any work be covered without authorization, it shall, if so ordered, be uncovered at the Contractor's expense.

· Whenever the Contractor intends to perform work on Saturday, Sunday, or a legal holiday, the Contractor shall give notice to the Engineer of the Contractor's intention 48 hours prior to performing that work, or a longer period as may be specified so that the Engineer may make necessary arrangements.

2-1.10 REMOVAL OF REJECTED AND UNAUTHORIZED WORK

· All work which has been rejected shall be remedied, or removed and replaced by the Contractor in a manner acceptable to the Engineer and no compensation will be allowed to the Contractor for the removal, replacement, or remedial work.

· Any work done beyond the lines shown on the plans or established by the Engineer, or any work done without written authority will be considered as unauthorized work and will not be paid for. Upon order of the Engineer, unauthorized work shall be remedied, removed, or replaced at the Contractor's expense.

· Upon failure of the Contractor to comply promptly with any order of the Engineer made under this Section 2-1.10, the Department may cause rejected or unauthorized work to be remedied, removed, or replaced, and the costs thereof will be deducted from any moneys due or to become due the Contractor.

2-1.11 COST REDUCTION INCENTIVE

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

· Prior to preparing a cost reduction proposal, the Contractor shall request a meeting with the Engineer to discuss the proposal in concept and to determine the merit of the cost reduction proposal. Items of discussion will also include permit issues, impact on other projects, impact on the project schedule, peer reviews, and review times required by the Department and other agencies.

· Cost reduction proposals shall contain the following information:

1. A description of both the existing contract requirements for performing the work and the proposed changes.
2. An itemization of the contract requirements that must be changed if the proposal is adopted.

3. A detailed estimate of the cost of performing the work under the existing contract and under the proposed change. The estimates of cost shall be determined in the same manner as if the work were to be paid for as a change in the work as provided in Section 3, "Changes in the Work," of these General Conditions.
4. A statement of the time within which the Engineer must make a decision thereon.
5. The contract work affected by the proposed changes, including any quantity variation attributable thereto.

· The provisions of this Section 2-1.11 shall not be construed to require the Engineer to consider any cost reduction proposal which may be submitted hereunder; proposed changes in basic design will not be considered as an acceptable cost reduction proposal; and the Department will not be liable to the Contractor for failure to accept or act upon any cost reduction proposal submitted pursuant to this section nor for any delays to the work attributable to any cost reduction proposal. If a cost reduction proposal is similar to a change in the plans or special provisions, under consideration by the Department for the project, at the time the proposal is submitted or if the proposal is based upon or similar to standard special provisions adopted by the Department after the advertisement for the contract, the Engineer will not accept the proposal, and the Department reserves the right to make the changes without compensation to the Contractor under the provisions of this section.

· The Contractor shall continue to perform the work in conformance with the requirements of the contract until an executed change order, incorporating the cost reduction proposal has been issued. If an executed change order has not been issued by the date upon which the Contractor's cost reduction proposal specifies that a decision thereon should be made, or such other date as the Contractor may subsequently have specified in writing, the cost reduction proposal shall be deemed rejected.

· The Engineer shall be the sole judge of the acceptability of a cost reduction proposal and of the estimated net savings in construction costs from the adoption of all or any part of the proposal. In determining the estimated net savings, the right is reserved to disregard the schedules of values if, in the judgment of the Engineer, the schedule does not represent a fair measure of the value of work to be performed or to be deleted.

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

· If the Contractor's cost reduction proposal is accepted in whole or in part the acceptance will be by a contract change order, which shall specifically state that it is executed pursuant to this Section 2-1.11. The change order shall incorporate the changes in the plans and special provisions which are necessary to permit the cost reduction proposal or that part of it as has been accepted to be put into effect, and shall include any conditions upon which the Department's approval thereof is based if the approval of the Department is conditional. The change order shall also set forth the estimated net savings in construction costs attributable to the cost reduction proposal effectuated by the change order, and shall further provide that the Contractor be paid 50 percent of that estimated net savings amount. The Contractor's cost of preparing the cost reduction incentive proposal and the Department's costs of investigating a cost reduction incentive proposal, including any portion thereof paid by the Contractor, shall be excluded from consideration in determining the estimated net savings in construction costs.

· Acceptance of the cost reduction proposal and performance of the work thereunder shall not extend the time of completion of the contract unless specifically provided for in the contract change order authorizing the use of the cost reduction proposal.

· The amount specified to be paid to the Contractor in the change order which effectuates a cost reduction proposal shall constitute full compensation to the Contractor for the cost reduction proposal and the performance of the work thereof pursuant to the change order.

· The Department expressly reserves the right to adopt a cost reduction proposal for general use on contracts administered by the Department when it determines that the proposal is suitable for application to other contracts. When an accepted cost reduction proposal is adopted for general use, only the Contractor who first submitted that proposal will be eligible for compensation pursuant to this section, and in that case, only as to those contracts awarded to that Contractor prior to submission of the accepted cost reduction proposal and as to which the cost reduction proposal is also submitted and accepted. Cost reduction proposals identical or similar to previously submitted proposals will be eligible for consideration and compensation under the provisions of this Section 2-1.11 if the identical or similar previously submitted proposals were not adopted for general application to other contracts administered by the Department. Subject to the provisions contained herein, the State or any other public agency shall have the right to use all or any part of any submitted cost reduction proposal without obligation or compensation of any kind to the Contractor.

· This Section 2-1.11 shall apply only to contracts awarded to the lowest bidder pursuant to competitive bidding.

SECTION 3
CHANGES IN THE WORK

3-1.01 CHANGES

- The Department reserves the right to order changes in the contract at any time prior to the acceptance of the work by the Director, and the Contractor shall comply with the ordered changes. Changes or deviations from the contract shall not be made without authority in writing from the Engineer, and changes to the work without the Engineer's written approval will be considered unauthorized work and will not be paid for.
- On the basis set forth in this Section 3, the contract lump sum price will be adjusted for any ordered change which results in a change in the cost of the work.
- When ordered by the Engineer, the Contractor shall halt work in the area affected by a proposed change. Whenever it appears to the Contractor that a change is necessary, the Contractor shall immediately notify the Engineer of the reasons for that change; however, work in the area affected shall not be discontinued unless ordered by the Engineer.
- For any approved change in the work, the Contractor shall be entitled to an adjustment in time equal to the number of working days which completion of the entire work is delayed due to the changed work, and the State will be entitled to an adjustment in time equal to the number of working days which completion of the entire work is advanced due to the changed work. For ordinary changes, the Contractor's cost estimate for the changed work shall state the amount of extra time, if any, that the Contractor considers should be allowed for making the requested change. Failure to request additional time when submitting the estimate, or failure to submit the estimate, shall constitute a waiver of the right to later claim any adjustment in time based upon changed work. For ordinary changes which decrease the amount of work and for indeterminate type changes, an adjustment in time commensurate with the changed work will be determined by the Engineer. Disagreement as to time adjustments shall not affect contract price adjustments, nor shall it be cause for not proceeding with the changed work when ordered by the Engineer. The Contractor shall have the right, however, to further pursue a time adjustment in the event agreement is not reached.

3-1.01A Ordinary Changes

- The Engineer will notify the Contractor in writing of any proposed changes and describe the intended change. Within 15 days after receipt of a written request, the Contractor shall submit his proposed price to be added or deducted from the contract price due to the change. The Contractor's proposed price to be added to or deducted from the contract price shall be supported by detailed estimates of cost prepared by the Contractor. The Contractor shall also provide information to support any request for an adjustment in contract time which is directly attributable to the changed work. The Contractor shall, upon request by the Engineer, permit inspection of his original contract estimate, subcontract agreements or purchase orders relating to the change.
- If agreement is reached on the adjustment in compensation as provided in Section 3-1.01C, "Agreed Cost for Changes," of these General Conditions, the Contractor shall proceed with the work at the agreed price.
- If the Contractor and the Engineer fail to agree as to the adjustment in compensation for the performance of the changed work, the Contractor, upon written order from the Engineer, shall proceed immediately with the changed work and the contract price will be adjusted in conformance with the provisions in Section 3-1.01D, "Failure to Agree to the Cost of Changes," of these General Conditions.
- If the Contractor fails to submit his cost estimate within the specified 15 day period, the specified period may be extended in writing by the Engineer. If the Engineer does not so extend the specified period, or if the Contractor fails to submit his cost estimate within the extended time period, the Contractor shall commence the work immediately upon receipt of written order from the Engineer and the contract price will be adjusted in conformance with the provisions in Section 3-1.01D, "Failure to Agree to the Cost of Changes," of these General Conditions.

3-1.01B Indeterminate Type Changes

- Changes in the work of a kind where the cost of the work cannot be determined until completed, may be authorized by the Engineer in writing. The written order shall state that it is issued pursuant to this Section 3-1.01B. Upon receipt of a written order from the Engineer, the Contractor shall proceed with the ordered work and the contract price will be adjusted in conformance with the provisions in Section 3-1.01D, "Failure to Agree to the Cost of Changes," of these General Conditions.

3-1.01C Agreed Cost For Changes

- If the Engineer and the Contractor agree as to the adjustment in compensation for the performance of changed work on the basis of the Contractor's proposed cost estimate of the work, the contract lump sum price will be adjusted accordingly. The adjustment in compensation shall be agreed to in writing and executed by both parties.

3-1.01D Failure To Agree To The Cost Of Changes

- When a proposed change order decreases the cost of the work and the Engineer and the Contractor fail to agree upon the decreased cost thereof, the Engineer's estimated decrease in cost will be deducted from the contract price. The Contractor will be allowed 15 days after receipt of a contract change order approved by the Engineer, in which to file a written protest

setting forth in what respects the Contractor differs from the Engineer's estimate of decreased cost, otherwise the decision of the Engineer to deduct the Engineer's estimate of decreased cost shall be deemed to have been accepted by the Contractor as correct.

· In the event the Engineer and the Contractor fail to agree on the cost of a change order which increases the cost of the work, the Engineer will maintain a daily job record containing a detailed summary of all labor, materials and equipment required by the ordered change. At the end of each day's work, the Contractor shall review the Engineer's daily job record comparing with the Contractor's own records, and after agreement is reached, the daily job record shall be signed by both the Engineer and the Contractor and shall become the basis for payment for the changed work. Upon completion of the work under the change order, the Contractor shall submit an invoice listing only those items of labor, materials and equipment that were agreed to by both the Engineer and the Contractor to be in addition to the requirements of the contract, together with allowable markups.

· When there is a failure to agree as to cost, no payment for the changed work will be made to the Contractor until all work called for in the change order has been completed, except that progress payments may be made on those portions of the changed work which the Contractor and the Engineer agree as to cost.

3-1.01E Allowable Costs For Changes

· The only costs which will be allowed because of changed work and the manner in which these costs shall be computed are set forth in Sections 3-1.01E(1) through 3-1.01E(5) of these General Conditions. Where the term "actual cost" is used in the aforesaid sections, it shall be deemed to mean "estimated cost" where the adjustment in compensation is of a necessity based upon estimated costs.

3-1.01E(1) Labor

· The Contractor will be paid an amount based on the actual cost for labor and supervision directly required for the performance of the changed work, including payments, assessment of benefits required by lawful labor union collective bargaining agreements; compensation insurance payments; contributions made to the State pursuant to the Unemployment Insurance Code, and for taxes paid to the Federal Government pursuant to the Social Security Act of August 14, 1935, as amended. No labor cost will be recognized at a rate in excess of the wages prevailing in the locality at the time the work is performed, nor will the use of a labor classification which would increase the cost be permitted unless the Contractor establishes to the complete satisfaction of the Engineer the necessity for payment at a higher rate.

3-1.01E(2) Materials

· The Contractor will be paid an amount based on the actual cost of the materials directly required for the performance of the changed work. The cost of materials may include the costs of procurement, transportation and delivery if necessarily incurred. If a cash or trade discount by the actual supplier is available to the Contractor, it shall be credited to the State. If the materials are obtained from a supply or source owned wholly or in part by the Contractor, payment therefor will not exceed the current wholesale price for the materials. If, in the opinion of the Engineer, the cost of materials is excessive, or if the Contractor fails to furnish satisfactory evidence of the cost to the Engineer from the actual supplier, the cost of the materials shall be deemed to be the lowest current wholesale price at which similar materials are available in the quantities required. The Department reserves the right to furnish the materials required by the change order as it deems advisable, and the Contractor shall have no claim for cost or markups on material furnished by the Department.

3-1.01E(3) Equipment

· The Contractor will be paid an amount based on the actual cost for the use of equipment directly required and approved by the Engineer in the performance of the changed work. No payment will be made for time while equipment is inoperative due to breakdowns or on days when no work is performed. In addition, the rental time shall include the time required to move the equipment to the work from the nearest available source of the required equipment, and to return it to the source. If the equipment is not moved by its own power, then loading and transportation costs will be paid. Moving time, loading and transportation costs will only be paid if the equipment is used exclusively on the changed work during the time between move in and move out. Individual pieces of equipment having a replacement value of \$500 or less shall be considered to be tools or small equipment, and no payment will be made therefor. For equipment owned, furnished, or rented by the Contractor, no cost therefor shall be recognized in excess of the rental rates established by distributors or equipment rental agencies in the locality where the work is performed.

3-1.01E(4) Markups

· When a change order increases the cost of the work, the Contractor may add the following maximum markups to the actual costs of labor, materials, or equipment rental:

- 33 percent for labor;
- 15 percent for materials; and
- 15 percent for equipment rental.

- The above markups include full compensation for bonds, profit and overhead.
- When a change order decreases the cost of the work, the reduction in cost shall include a 5 percent markup on the estimated cost for furnishing the labor, materials and equipment which would have been used on the work had the change order not been issued.
- When a change order involves both added work and deleted work, the markup or markups to be used shall be as follows:

The actual costs of labor, materials, and equipment rental for added and deleted work shall be calculated separately without adding markups. If the difference between the calculated costs for labor results in an increased cost, a markup of 33 percent shall be applied to the increased cost. If the difference between the calculated costs of materials or equipment rental results in an increased cost, a markup of 15 percent shall be applied to the increased costs of materials or equipment rental, as the case may be. If the difference between the calculated costs for labor, materials or equipment rental results in a decreased cost, a markup of 5 percent shall be applied to the decreased costs of labor, materials or equipment rental, as the case may be.

- When added or deleted work is performed by an authorized subcontractor, approved in conformance with the provisions in Section 1-1.05, "Required Listing of Proposed Subcontractors," of the Instructions to Bidders, an additional 5 percent will be added to the total cost of the work including all markups specified in this Section 3-1.01E(4). The additional 5 percent markup shall reimburse the Contractor for additional administrative costs, and no other additional payment will be made by reason of performance of the work by a subcontractor.

3-1.01E(5) General Limitation

- In no event shall any actual cost for added work be recognized in excess of market values prevailing at the time of the change, unless the Contractor can establish to the satisfaction of the Engineer that the Contractor investigated all possible means of obtaining the added work at prevailing market values and that the excess cost could not be avoided by the Contractor. The Engineer will determine the necessity for incurring the costs enumerated above, and as to whether they are directly required for the performance of the changed work. Lump sum quotations may be accepted at the option of the Engineer. When a change order deletes work from the contract, the computation of the cost thereof shall be the values which prevailed at the time bids for the work were opened.

- When work under this Section 3 is performed by forces other than the Contractor's organization, no additional payment will be made by the State by reason of the performance of the work by a subcontractor or other forces, except as provided elsewhere in this Section 3.

SECTION 4
CONTROL OF MATERIALS

4-1.01 MATERIALS

- The Contractor shall furnish all materials required to complete the work, except materials that are designated in the special provisions to be furnished by the State and materials furnished by the State in conformance with Section 3, "Changes in the Work," of these General Conditions.
- Unless otherwise specified in the special provisions, materials furnished by the Contractor for incorporation into the work shall be new. When the quality or kind of materials, articles, or equipment is not specifically indicated, then the quality or kind thereof shall be similar to those which are indicated.
- Articles or materials to be incorporated in the work shall be stored in such a manner as to insure the preservation of their quality and fitness for the work, and to facilitate inspection.
- All materials which do not conform to the requirements of the plans and special provisions, as determined by the Engineer, will be rejected whether in place or not. Rejected material shall be removed immediately from the site of the work, unless otherwise permitted by the Engineer. No rejected material, the defects of which have been subsequently corrected, shall be used in the work, unless approval in writing has been given by the Engineer. Upon failure of the Contractor to comply promptly with any order of the Engineer made under these provisions, the Engineer shall have authority to cause the removal and replacement of rejected material and to deduct the cost thereof from any moneys due or to become due the Contractor.
- Manufacturers' warranties, guaranties, instruction sheets and parts lists, which are furnished with certain materials incorporated in the work, shall be delivered to the Engineer before acceptance of the contract.
- Unless otherwise designated in the special provisions, materials furnished by the State will be delivered to the job site. Materials furnished by the State that are designated in the special provisions as available at locations other than the job site shall be hauled to the site of the work by the Contractor at his expense, including any necessary loading and unloading that may be involved.
- The Contractor will be held responsible for all materials furnished to him, and he shall pay all demurrage and storage charges. State-furnished materials lost or damaged from any cause whatsoever shall be replaced by the Contractor. The Contractor will be liable to the Department for the cost of replacing State-furnished material and those costs may be deducted from any moneys due or to become due the Contractor.

4-1.02 PRODUCT AND REFERENCE STANDARDS

- When descriptive catalog designations, including manufacturer's name, product brand name, or model number are referred to in the contract documents, those designations shall be considered as being those found in industry publications in effect on the day the Notice to Contractors for the work is dated.
- When standards or test designations are referred to in the contract documents by specific date of issue, they shall be considered a part of the contract. When those references do not bear a date of issue, the edition in effect on the day the Notice to Contractors for the work is dated shall be considered as part of the contract.

4-1.03 SAMPLING AND TESTING OF MATERIALS

- Unless otherwise specified, all tests shall be performed in conformance with the methods used by the Department of Transportation and shall be made by the Engineer or his designated representative.
- The Department has developed methods for testing the quality of materials and work. These methods are identified by number and are referred to as California Test. Up to five copies of individual California Tests are available at the Division of New Technology, Materials and Research, located at 5900 Folsom Boulevard, (P.O. Box 19128), Sacramento, CA 95819, and will be furnished to interested persons upon request. If a complete set of California Test Methods is desired, it can be purchased from the Department's Office of Business Management, Materiel Operations Branch, 1900 Royal Oaks Drive, Sacramento, CA 95815.
- Whenever a reference is made in the special provisions to a California Test by number, it shall mean the California Test in effect on the day the Notice to Contractors for the work is dated.
- Whenever the special provisions provide an option between 2 or more tests, the Engineer will determine the test method to be used.
- Whenever a specification, manual, or test designation provides for test reports (such as certified mill test reports) from the manufacturer, copies of those reports, identified as to the lot of material, shall be furnished to the Engineer. The manufacturer's test reports shall supplement the inspection, sampling and testing provisions of this Section 4-1.03 and shall not constitute a waiver of the State's right to inspect. When material which cannot be identified with specific test reports is proposed for use, the Engineer may, at his discretion, select random samples from the lot for testing. Testing specimens from the random samples, including those required for retest, shall be prepared in conformance with the referenced specification and furnished by the Contractor at his expense. The number of samples and test specimens shall be entirely at the discretion of the Engineer.

· When requested by the Engineer, the Contractor shall furnish, without charge, samples of all materials entering into the work, and no material shall be used prior to approval by the Engineer, except as provided in Section 4-1.04, "Certificates of Compliance," of these General Conditions.

4-1.035 TESTING BY CONTRACTOR

· The Contractor shall be responsible for controlling the quality of the material entering the work and of the work performed, and shall perform testing as necessary to ensure quality control. The test methods used for quality control testing by the Contractor shall be as determined by the Contractor. The results of those quality control tests shall be made available to the Engineer upon request. Contractor performed quality control tests are for the Contractor's use in controlling the work and will not be accepted for use as acceptance tests.

4-1.04 CERTIFICATES OF COMPLIANCE

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

· Materials used on the basis of a Certificate of Compliance may be sampled and tested at any time. The fact that material is used on the basis of a Certificate of Compliance shall not relieve the Contractor of responsibility for incorporating material in the work which conforms to the requirements of the plans and special provisions and any material not conforming to those requirements will be subject to rejection whether in place or not.

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

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

SECTION 5

LEGAL RELATIONS AND RESPONSIBILITIES

5-1.01 LAWS TO BE OBSERVED

The Contractor shall keep informed of and observe, and comply with and cause all of his agents and employees to observe and comply with all prevailing Federal and State laws, and rules and regulations made pursuant to the Federal and State laws, and county and municipal ordinances, and regulations, which in any way affect the conduct of the work of the contract. If any conflict arises between provisions of the contract and any laws above referred to, the Contractor shall notify the Engineer at once in writing. The Contractor shall protect and indemnify the State or any of its officers, agents, and servants against any claim or liability arising from or based on the violation of any law, rule, or regulation, whether by the Contractor or the Contractor's agents or employees.

5-1.01A Hours of Labor

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

5-1.01B 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 works violating this section is subject to all the penalties imposed for a violation of this chapter."

Attention is directed to the following "Nondiscrimination Clause" that is required by Chapter 5 of Division 4 of Title 2, California Code of Regulations:

NONDISCRIMINATION CLAUSE

1. During the performance of this contract, contractor and its subcontractors shall not unlawfully discriminate against any employee or applicant for employment because of race, religion, color, national origin, ancestry, physical handicap, medical condition, marital status, age (over 40) or sex. Contractors and subcontractors shall ensure that the evaluation and treatment of their employees and applicants for employment are free of such discrimination. Contractors and subcontractors shall comply with the provisions of the Fair Employment and Housing Act (Gov. Code, Section 12990 et seq.) and the applicable regulations promulgated thereunder (California Code of Regulations, Title 2, Section 7285.0 et seq.). The applicable regulations of the Fair Employment and Housing Commission implementing Government Code, Section 12990, set forth in Chapter 5 of Division 4 of Title 2 of the California Code of Regulations are incorporated into this contract by reference and made a part hereof as if set forth in full. Contractor and its subcontractors shall give written notice of their obligations under this clause to labor organizations with which they have a collective bargaining or other agreement.
2. This Contractor shall include the nondiscrimination and compliance provisions of this clause in all subcontracts to perform work under the contract.

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

These specifications are applicable to all nonexempt State contracts and subcontracts, and to the "Standard California Nondiscrimination Construction Contract Specifications" set forth herein. The specifications are applicable to all nonexempt State construction contracts and subcontracts of \$5,000 or more.

1. As used in the specifications:
 - a. "Administrator" means Administrator, Office of Compliance Programs, California Department of Fair Employment and Housing, or any person to whom the Administrator delegates authority;
 - b. "Minority" includes:
 - (i) Black (all persons having primary origins in any of the black racial groups of Africa, but not of Hispanic origin);
 - (ii) Hispanic (all persons of primary culture or origin in Mexico, Puerto Rico, Cuba, Central or South America or other Spanish derived culture or origin regardless of race);
 - (iii) Asian/Pacific Islander (all persons having primary origins in any of the original peoples of the Far East, Southeast Asia, the Indian Subcontinent or the Pacific Islands); and
 - (iv) American Indian/Alaskan Native (all persons having primary origins in any of the original peoples of North America and who maintain culture identification through tribal affiliation or community recognition).
2. Whenever the contractor or any subcontractor subcontracts a portion of the work, it shall physically include in each subcontract of \$5,000 or more the nondiscrimination clause in this contract directly or through incorporation by reference. Any subcontract for work involving a construction trade shall also include the Standard California Construction Contract Specifications, either directly or through incorporation by reference.
3. The contractor shall implement the specific nondiscrimination standards provided in paragraphs 6(a) through (e) of these specifications.
4. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the contractor's obligations under these specifications, Government Code, Section 12990, or the regulations promulgated pursuant thereto.
5. In order for the nonworking training hours of apprentices and trainees to be counted, such apprentices and trainees must be employed by the contractor during the training period, and the contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor or the California Department of Industrial Relations.
6. The contractor shall take specific actions to implement its nondiscrimination program. The evaluation of the contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The contractor must be able to demonstrate fully its efforts under Steps a. through e. below:
 - a. Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and at all facilities at which the contractor's employees are assigned to work. The contractor, where possible, will assign two or more women to each construction project. The contractor shall specifically ensure that all foremen, superintendents, and other on-site supervisory personnel are aware of and carry out the contractor's obligations to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.
 - b. Provide written notification within seven days to the director of DFEH when the union or unions with which the Contractor has a collective bargaining agreement has not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.
 - c. Disseminate the Contractor's equal employment opportunity policy by providing notice of the policy to unions and training, recruitment and outreach programs and requesting their cooperation in assisting the Contractor to meet its obligations; and by posting the company policy on bulletin boards accessible to all employees at each location where construction work is performed.
 - d. Ensure all personnel making management and employment decisions regarding hiring, assignment, layoff, termination, conditions of work, training, rates of pay or other employment decisions, including all supervisory personnel, superintendents, general foremen, on-site foremen, etc., are aware of the Contractor's equal employment opportunity policy and obligations, and discharge their responsibilities accordingly.
 - e. Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the equal employment opportunity policy and the Contractor's obligations under these specifications are being carried out.
7. Contractors are encouraged to participate in voluntary associations which assist in fulfilling their equal employment opportunity obligations. The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the contractor is a member and participant, may be asserted as fulfilling any one or

more of its obligations under these specifications provided that the contractor actively participates in the group, makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation to comply, however, is the Contractor's.

8. The Contractor is required to provide equal employment opportunity for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Fair Employment and Housing Act (Gov. Code, Section 12990 et seq.) if a particular group is employed in a substantially disparate manner.
9. Establishment and implementation of a bona fide affirmative action plan pursuant to Section 8104 (b) of this Chapter shall create a rebuttal presumption that a contractor is in compliance with the requirements of Section 12990 of the Government Code and its implementing regulations.
10. The Contractor shall not use the nondiscrimination standards to discriminate against any person because of race, color, religion, sex, national origin, ancestry, physical handicap, medical condition, marital status or age over 40.
11. The Contractor shall not enter into any subcontract with any person or firm decertified from state contracts pursuant to Government Code Section 12990.
12. The Contractor shall carry out such sanctions and penalties for violation of these specifications and the nondiscrimination clause, including suspension, termination and cancellation of existing subcontracts as may be imposed or ordered pursuant to Government Code Section 12990 and its implementing regulations by the awarding agency. Any Contractor who fails to carry out such sanctions and penalties shall be in violation of these specifications and Government Code Section 12990.
13. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company equal employment opportunity policy is being carried out, to submit reports relating to the provisions hereof as may be required by OCP and to keep records. Records shall at least include for each employee the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number when assigned, social security number, race, sex, status, (e.g., mechanic, apprentice trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and locations at which the work was performed. Records shall be maintained in any easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, contractors shall not be required to maintain separate records.

NOTE: Authority cited: Sections 12935(a) and 12990(d), Government Code. Reference: Section 12990, Government Code.

5-1.01C Prevailing Wage

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

1. The contract executed between the contractor and the subcontractor for the performance of work on the public works project shall include a copy of the provisions of Sections 1771, 1775, 1776, 1777.5, 1813, and 1815 of the Labor Code.
2. The contractor shall monitor the payment of the specified general prevailing rate of per diem wages by the subcontractor to the employees, by periodic review of the certified payroll records of the subcontractor.

3. Upon becoming aware of the subcontractor's failure to pay the specified prevailing rate of wages to the subcontractor's workers, the contractor shall diligently take corrective action to halt or rectify the failure, including, but not limited to, retaining sufficient funds due the subcontractor for work performed on the public works project.
4. Prior to making final payment to the subcontractor for work performed on the public works project, the contractor shall obtain an affidavit signed under penalty of perjury from the subcontractor that the subcontractor has paid the specified general prevailing rate of per diem wages to the subcontractor's employees on the public works project and any amounts due pursuant to Section 1813 of the Labor Code.

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

· Pursuant to the provisions of Section 1773 of the Labor Code, the Department has obtained the general prevailing rate of wages (which rate includes employer payments for health and welfare, pension, vacation, travel time, and subsistence pay as provided for in Section 1773.8 of the Labor Code, apprenticeship or other training programs authorized by Section 3093 of the Labor Code, and similar purposes) applicable to the work to be done, for straight time, overtime, Saturday, Sunday and holiday work. The holiday wage rate listed shall be applicable to all holidays recognized in the collective bargaining agreement of the particular craft, classification or type of workmen concerned. The general prevailing wage rates and any applicable changes to these wage rates are available at the Labor Compliance Office at the offices of the District Director of Transportation for the district in which the work is situated. For work situated in District 9, the wage rates are available at the Labor Compliance Office at the offices of the District Director of Transportation for District 6, located at Fresno. General prevailing wage rates are also available from the California Department of Industrial Relations' internet web site at: <http://www.dir.ca.gov>.

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

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

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

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

5-1.01D Travel And Subsistence Payments

Attention is directed to the requirements in Section 1773.8 of the Labor Code. The Contractor shall make travel and subsistence payments to each workman, needed to execute the work, in conformance with the requirements in Labor Code Section 1773.8.

5-1.01E Payroll Records

· Attention is directed to the provisions of Labor Code Section 1776, a portion of which is quoted below. Regulations implementing Labor Code Section 1776 are located in Sections 16016 through 16019 and Sections 16207.10 through 16207.19 of Title 8, California Code of Regulations.

- "1776. (a) Each contractor and subcontractor shall keep accurate payroll records, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per
- Contract No. <Dist>-<Contract_No>

diem wages paid to each journeyman, apprentice, worker, or other employee employed by him or her in connection with the public work. Each payroll record shall contain or be verified by a written declaration that it is made under penalty of perjury, stating both of the following:

- (1) The information contained in the payroll record is true and correct.
- (2) The employer has complied with the requirements of Sections 1771, 1811, and 1815 for any work performed by his or her employees on the public works project.

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

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

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

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

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

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

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

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

· A copy of all payrolls shall be submitted weekly to the 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. The employee's address and social security number need only appear on the first payroll on which that name appears. The 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 required by the contract. The "Statement of Compliance" shall be on forms furnished by the Department or on any form with identical wording. The Contractor shall be responsible for the submission of copies of payrolls of all subcontractors.

· If by the 15th of the month, the Contractor has not submitted satisfactory payrolls for all work performed during the monthly period ending on or before the 1st of that month, the Department will retain an amount equal to 10 percent of the estimated value of the work performed during the month from the next monthly estimate, except that this retention shall not exceed \$10,000 nor be less than \$1,000. Retentions for failure to submit satisfactory payrolls shall be additional to all other

retentions provided for in the contract. The retention for failure to submit payrolls for any monthly period will be released for payment on the monthly estimate for partial payments next following the date that all the satisfactory payrolls for which the retention was made are submitted.

- The Contractor and each subcontractor shall preserve their payroll records for a period of 3 years from the date of completion of the contract.

5-1.01F Trench Safety

- Attention is directed to the provisions of Section 6705 of the Labor Code concerning trench excavation safety plans.
- The Construction Safety Orders of the Division of Occupational Safety and Health shall apply to all excavations. For all excavations 1.5 m or more in depth, the Contractor shall submit to the Engineer a detailed plan showing the design and details of the protective systems to be provided for worker protection from the hazard of caving ground during excavation. The detailed plan shall include any tabulated data and any design calculations used in the preparation of the plan. Excavation shall not begin until the detailed plan has been reviewed and approved by the Engineer.

- Detailed plans of protective systems for which the Construction Safety Orders require design by a registered professional engineer shall be prepared and signed by an engineer who is registered as a Civil Engineer in the State of California, and shall include the soil classification, soil properties, soil design calculations that demonstrate adequate stability of the protective system, and any other design calculations used in the preparation of the plan.

- No plan shall allow the use of a protective system less effective than that required by the Construction Safety Orders.

- If the detailed plan includes designs of protective systems developed only from the allowable configurations and slopes, or Appendices, contained in the Construction Safety Orders, the plan shall be submitted at least 5 days before the Contractor intends to begin excavation. If the detailed plan includes designs of protective systems developed from tabulated data, or designs for which design by a registered professional engineer is required, the plan shall be submitted at least 3 weeks before the Contractor intends to begin excavation.

- In addition to these provisions detailed plans of the protective systems for excavations on or affecting railroad property will be reviewed for adequacy of protection provided for railroad facilities, property, and traffic. These plans for excavations on or affecting railroad property shall be submitted at least 9 weeks before the Contractor intends to begin excavation requiring the protective systems. Approval by the Engineer of the detailed plans for the protective systems will be contingent upon the plans being satisfactory to the railroad company involved.

5-1.01G 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 prime Contractor.

- It is State policy to encourage the employment and training of apprentices on public works contracts as may be permitted under local apprenticeship standards.

5-1.01H Fair Labor Standards Act

- The attention of bidders is invited to the fact that the State of California, Department of Transportation, has been advised by the Wage and Hour Division, U.S. Department of Labor, that contractors engaged in construction work are required to meet the provisions of the Fair Labor Standards Act of 1938 and as amended (52 Stat. 1060).

5-1.01I Workers' Compensation

- Pursuant to the requirements in Section 1860 of the Labor Code, the Contractor will be required to secure the payment of workers' compensation to the Contractor's employees in conformance with the requirements in Section 3700 of the Labor Code.

- Prior to the commencement of work, the Contractor shall sign and file with the 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 the provisions of Section 3700 before commencing the performance of the work of this contract."

- This certification is included in the contract, and signature and return of the contract as provided in Section 2-1.04, "Execution of Contract," of the Instructions to Bidders shall constitute signing and filing of the certificate.

5-1.01J Air Pollution Control

- The Contractor shall comply with all air pollution control rules, regulations, ordinances and statutes which apply to any work performed pursuant to the contract, including any air pollution control rules, regulations, ordinances and statutes, specified in Section 11017 of the Government Code.
- Unless otherwise provided in the special provisions, material to be disposed of shall not be burned, either inside or outside the premises.

5-1.01K Use Of Pesticides

- The Contractor shall comply with all rules and regulations of the Department of Food and Agriculture, the Department of Health, the Department of Industrial Relations and all other agencies which govern the use of pesticides required in the performance of the work on the contract.
- Pesticides shall include but shall not be limited to herbicides, insecticides, fungicides, rodenticides, germicides, nematocides, bactericides, inhibitors, fumigants, defoliant, desiccants, soil sterilants, and repellents.
- Any substance or mixture of substances intended for preventing, repelling, mitigating, or destroying weeds, insects, diseases, rodents, or nematodes and any substance or mixture of substances intended for use as a plant regulator, defoliant or desiccant shall be considered a pesticide.

5-1.01L Sound Control Requirements

- The Contractor shall comply with all local sound control and noise level rules, regulations and ordinances which apply to any work performed pursuant to the contract.
- Each internal combustion engine, used for any purpose on the job or related to the job, shall be equipped with a muffler of a type recommended by the manufacturer. No internal combustion engine shall be operated on the project without the muffler.

5-1.01M Environmental Clearances

- The Department will obtain all environmental clearances and authorizations necessary for the project as set forth in the plans and specifications. The Contractor shall comply with the provisions, including giving notices during construction when required, of these authorizations. In the event the obtaining of these authorizations delays completion of all or any portion of the work, an extension of time determined pursuant to the provisions in Section 6-1.08, "Liquidated Damages," of these General Conditions will be granted and the Contractor shall not be entitled to any additional compensation because of the delays.

5-1.01N 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.
- The Environmental Quality Act (Public Resources Code, Sections 21000 to 21176, inclusive) may be applicable to permits, licenses and other authorizations which the Contractor must obtain from local agencies in connection with performing the work of the contract. The Contractor shall comply with the provisions of those statutes in obtaining the permits, licenses and other authorizations and they shall be obtained in sufficient time to prevent delays to the work.
- In the event that the Department has obtained permits, licenses or other authorizations, applicable to the work, in conformance with the requirements in the Environmental Quality Act, the Contractor shall comply with the provisions of those permits, licenses and other authorizations.

5-1.01O Assignment Of Antitrust Actions

- The Contractor's attention is directed to the following requirements in Public Contract Code 7103.5 and Government Code Sections 4553 and 4554, which shall be applicable to the Contractor and the 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 action it may have under Section 4 of the Clayton Act (15 U.S.C. Sec. 15) or under the Cartwright Act (Chapter 2 (commencing with Section 16700) of Part 2 of Division 7 of the Business and Professions Code), arising from purchases of goods, services, or materials pursuant to the public works contract or the subcontract. This assignment shall be made and become effective at the time the awarding body tenders final payment to the contractor, without further acknowledgement by the parties."

"If an awarding body or public purchasing body receives, either through judgment 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."

5-1.01P Safety And Health Provisions

- The Contractor shall conform to all applicable occupational safety and health standards, rules, regulations and orders established by the State of California.
- Working areas utilized by the Contractor to perform work during the hours of darkness, shall be lighted to conform to the minimum illumination intensities established by California Division of Occupational Safety and Health Construction Safety Orders.
- All lighting fixtures shall be mounted and directed in a manner precluding glare to approaching traffic.

5-1.01Q Suits To Recover Penalties And Forfeitures

- Attention is directed to Sections 1730 to 1733, inclusive, of the Labor Code concerning suits to recover amounts withheld from payment for failure to comply with requirements of the Labor Code or contract provisions based on those laws.
- Those sections provide that a suit on the contract for alleged breach thereof in not making the payment is the exclusive remedy of the Contractor or the Contractor's assignees with reference to amounts withheld for those penalties or forfeitures; and that the suit must be commenced and actual notice thereof received by the awarding authority prior to 90 days after completion of the contract and the formal acceptance of the job.
- Submission of a claim under Section 7-1.07, "Final Payment and Claims," of these General Conditions for the amounts withheld from payment for those penalties and forfeitures is not a prerequisite for those suits and these claims will not be considered.

5-1.01R Water Pollution

- The Contractor shall exercise every reasonable precaution to protect streams, lakes, reservoirs, bays, and coastal waters from pollution with fuels, oils, bitumens, calcium chloride and other harmful materials and shall conduct and schedule operations so as to avoid or minimize muddying and silting of streams, lakes, reservoirs, bays and coastal waters. Care shall be exercised to preserve roadside vegetation beyond the limits of construction.
- Water pollution control work is intended to provide prevention, control, and abatement of water pollution to streams, waterways, and other bodies of water, and shall consist of constructing those facilities which may be shown on the plans, specified herein or in the special provisions, or directed by the Engineer.
- In order to provide effective and continuous control of water pollution it may be necessary for the Contractor to perform the contract work in small or multiple units, on an out of phase schedule, and with modified construction procedures. The Contractor shall provide temporary water pollution control measures, including but not limited to, dikes, basins, ditches, and applying straw and seed, which become necessary as a result of the Contractor's operations. The Contractor shall coordinate water pollution control work with all other work done on the contract.
- Before starting any work on the project, the Contractor shall submit, for acceptance by the Engineer, a program to control water pollution effectively during construction of the project. The program shall show the schedule for the erosion control work included in the contract and for all water pollution control measures which the Contractor proposes to take in connection with construction of the project to minimize the effects of the operations upon adjacent streams and other bodies of water. The Contractor shall not perform any clearing and grubbing or earthwork on the project, other than that specifically authorized in writing by the Engineer, until the program has been accepted.
- If the measures being taken by the Contractor are inadequate to control water pollution effectively, the Engineer may direct the Contractor to revise the operations and the water pollution control program. The directions will be in writing and will specify the items of work for which the Contractor's water pollution control measures are inadequate. No further work shall be performed on those items until the water pollution control measures are adequate and, if also required, a revised water pollution control program has been accepted.
- The Engineer will notify the Contractor of the acceptance or rejection of any submitted or revised water pollution control program in not more than 5 working days.
- The State will not be liable to the Contractor for failure to accept all or any portion of an originally submitted or revised water pollution control program, nor for any delays to the work due to the Contractor's failure to submit an acceptable water pollution control program.
- The Contractor may request the Engineer to waive the requirement for submission of a written program for control of water pollution when the nature of the Contractor's operation is such that erosion is not likely to occur. Waiver of this requirement will not relieve the Contractor from responsibility for compliance with the other provisions of this section. Waiver of the requirement for a written program for control of water pollution will not preclude requiring submittal of a written program at a later time if the Engineer deems it necessary because of the effect of the Contractor's operations.
- Unless otherwise approved by the Engineer in writing, the Contractor shall not expose a total area of erodible earth material, which may cause water pollution, exceeding 70 000 m² for each separate location, operation, or spread of equipment before either temporary or permanent erosion control measures are accomplished.

- Where erosion which will cause water pollution is probable due to the nature of the material or the season of the year, the Contractor's operations shall be so scheduled that permanent erosion control features will be installed concurrently with or immediately following grading operations.
- Nothing in the terms of the contract nor in the provisions in this Section 5-1.01R shall relieve the Contractor of the 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.
- When borrow material is obtained from other than commercially operated sources, erosion of the borrow site during and after completion of the work shall not result in water pollution. The material source shall be finished, where practicable, so that water will not collect or stand therein.
- The requirements of this section shall apply to all work performed under the contract and to all non-commercially operated borrow or disposal sites used for the project.
- The Contractor shall also conform to the following provisions:
 1. Where working areas encroach on live streams, barriers adequate to prevent the flow of muddy water into streams shall be constructed and maintained between working areas and streams, and during construction of the barriers, muddying of streams shall be held to a minimum.
 2. Removal of material from beneath a flowing stream shall not be commenced until adequate means, such as a bypass channel, are provided to carry the stream free from mud or silt around the removal operations.
 3. Should the Contractor's operations require transportation of materials across live streams, the operations shall be conducted without muddying the stream. Mechanized equipment shall not be operated in the stream channels of the live streams except as may be necessary to construct crossings or barriers and fills at channel changes.
 4. Water containing mud or silt from aggregate washing or other operations shall be treated by filtration, or retention in a settling pond, or ponds, adequate to prevent muddy water from entering live streams.
 5. Oily or greasy substances originating from the Contractor's operations shall not be allowed to enter or be placed where they will later enter a live stream.
 6. Portland cement or fresh portland cement concrete shall not be allowed to enter flowing water of streams.
 7. When operations are completed, the flow of streams shall be returned as nearly as possible to a meandering thread without creating possible future bank erosion, and settling pond sites shall be graded so they will drain and will blend in with the surrounding terrain.
 8. Material derived from roadway work shall not be deposited in a live stream channel where it could be washed away by high stream flows.
 9. Where there is possible migration of anadromous fish in streams affected by construction on the project, the Contractor shall conduct work operations so as to allow free passage of the migratory fish.
- Compliance with the requirements of this section shall in no way relieve the Contractor from the responsibility to comply with the other provisions of the contract, in particular the responsibility for damage and for preservation of property.

5-1.02 PROTECTION AND USE OF PROPERTY

- The Contractor shall be responsible for and provide and maintain all proper temporary walks, roads, guards, railings, lights, warning signs, and take precaution at all times to avoid injury or damage to any person or any property, and upon completion of the work, or at other times as directed, restore premises and adjacent property to a proper condition.
- The Contractor shall protect adjoining property and nearby buildings, including State buildings, State roads, and public streets or roads, from dust, dirt, debris, or other nuisance arising out of the Contractor's operations or storage practices, and, if ordered by the Engineer, the Contractor shall provide and install suitable safeguards, approved by the Engineer, to protect objects from damage. If any objects are injured or damaged by reason of the Contractor's operations, they shall be replaced or restored at the Contractor's expense. The facilities shall be replaced or restored to a condition as good as when the Contractor entered upon the work, or as good as required by the specifications accompanying the contract, if any of the objects are a part of the work being performed under the contract.
- If the Contractor damages any buildings, roads or other property which belong to the State, or any department or agency thereof, then the Engineer, at his option, may retain from the money due under the contract an amount sufficient to insure repair of the damage.

. The Engineer may make or cause to be made those temporary repairs that are necessary to restore to service any damaged highway facility. The cost of the repairs shall be borne by the Contractor and may be deducted from any moneys due or to become due to the Contractor under the contract.

. The fact that any underground facility is not shown upon the plans shall not relieve the Contractor of the responsibility of protecting underground improvements or facilities. It shall be the Contractor's responsibility, pursuant thereto, to ascertain the location of those underground improvements or facilities, which may be subject to damage by reason of the Contractor's operations.

5-1.03 (BLANK)

5-1.031 INDEMNIFICATION

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

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

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

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

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

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

5-1.032 INSURANCE

. Insurance shall conform to the following requirements:

5-1.032A Casualty Insurance

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

5-1.032A(1) Workers' Compensation and Employer's Liability Insurance

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

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

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

5-1.032A(2) Liability Insurance

· The Contractor shall carry General Liability and Umbrella or Excess Liability Insurance covering all operations by or on behalf of the Contractor providing insurance for bodily injury liability, and property damage liability for the limits of liability indicated below and including coverage for:

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

5-1.032A(3) Liability Limits/Additional Insureds

· The limits of liability shall be at least:

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

· The State and the Department, including their officers, directors, agents (excluding agents who are design professionals), and State employees, shall be named as additional insureds under the General Liability and Umbrella Liability Policies with respect to liability arising out of or connected with work or operations performed by or on behalf of the Contractor under this contract. Coverage for those additional insureds shall not extend to liability:

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

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

5-1.032B Automobile Liability Insurance

· The Contractor shall carry automobile liability insurance, including coverage for all owned, hired and non-owned automobiles. The primary limits of liability shall be not less than \$1,000,000 combined single limit each accident for bodily injury and property damage. The umbrella or excess liability coverage required under Section 5-1.032A(3), "Liability Limits/Additional Insureds," shall also apply to automobile liability.

5-1.032C Policy Forms, Endorsements and Certificates

· The Contractor's General Liability Insurance shall be provided under Commercial General Liability policy form no. CG0001 as published by the Insurance Services Office (ISO) or under a policy form at least as broad as policy form no. CG0001.

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

5-1.032D Enforcement

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

5-1.032E Self-Insurance

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

5-1.032F Miscellaneous

· Nothing contained in the Contract is intended to make the public or any member thereof a third party beneficiary of the Insurance or Indemnity provisions of these General Conditions, nor is any term, condition or other provision of the Contract intended to establish a standard of care owed to the public or any member thereof.

5-1.04 OCCUPANCY BY THE DEPARTMENT PRIOR TO ACCEPTANCE

· The Department reserves the right to occupy all or any part of the project prior to completion of the entire contract, upon written order therefor. In that event, the Contractor will be relieved of responsibility for any injury or damage to that part as results from the Department's occupancy and use by the Department. If the Contractor carries insurance against damage to the premises or against liability to third persons covering the premises so used and occupied by the Department, and if the occupancy results in increased premiums for insurance, the Department will pay to the Contractor the added cost for insurance during the period of occupancy.

· This occupancy does not constitute acceptance by the Director either of the complete work or of any portion thereof, nor will it relieve the Contractor of full responsibility for correcting defective work or materials found at any time before the formal written acceptance of the entire contract by the Director or during the full guarantee period after project acceptance, as provided in Section 7-1.09, "Guarantee," of these General Conditions.

5-1.05 CONTRACTOR'S RESPONSIBILITY FOR THE WORK

· Except as otherwise provided herein, the Contractor shall have the charge and care of the work and shall bear the risk of injury or damage to any part of the work by the action of the elements or from any other cause whether arising from the execution or from the nonexecution of the work until the acceptance of the contract by the Director. The Contractor shall rebuild, repair, restore, and make good all injuries or damages to any portion of the work occasioned by any cause before its completion and acceptance, and shall bear the expense thereof. In case of suspension of work from any cause whatever, the Contractor shall be responsible for the work and shall also be responsible for all materials, and shall properly store them if necessary, and shall provide suitable drainage and erect temporary structures where necessary.

The Contractor will be relieved of responsibility for any injury or damage to the work caused by the following:

- (1) An earthquake in excess of a magnitude of 3.5 on the Richter Scale or a tidal wave, when the effect of that event has been proclaimed a disaster or state of emergency by the Governor of the State of California or by the President of the United States, or was of such magnitude at the site of the work as to have been sufficient to have caused a proclamation of disaster or state of emergency, had it occurred in a populated area.
- (2) Occupancy and use by the Department or the public prior to the completion of the entire project.
- (3) Acts of the Federal Government or the public enemy.

5-1.06 RESPONSIBILITY FOR UTILITIES

The Contractor shall be responsible for the cost for any and all work, expense or special precautions caused or required by the existence or proximity of utilities encountered in performing the work, including without limitation thereon, repair of any or all damage and all hand or exploratory excavation required. The Contractor is cautioned that the utilities may include communication cables or electrical cables which may be high voltage, and when working or excavating in the vicinity of any cables, or the ducts enclosing cables, the Contractor shall observe any special precautions required and the cost of these special precautions. Suitable warning signs, barricades, and safety devices shall be erected as necessary or required.

However, if during the course of the work the Contractor encounters utility installations which are not shown or indicated on the plans or in the special provisions, or which are found in a location substantially different from that shown, and the utilities are not reasonably apparent from visual examination, then the Contractor shall promptly notify the Engineer in writing. Where necessary for the work of the contract, the Engineer shall issue a written order to the Contractor to make adjustment, rearrangement, repair, removal, alteration, or special handling of the utility, including repair of utility if damaged. The Contractor shall perform the work described in the written order, and compensation therefor will be made in conformance with the provisions in Section 3, "Changes in the Work," of these General Conditions, relating to changes in the work. Except for the items of cost specified in Section 3, "Changes in the Work," of these General Conditions, the Contractor shall receive no compensation for any other cost, damage, delay, interference, or hindrance to him due to the presence of these utilities. If the Contractor fails to give the notice specified above and thereafter acts without instructions from the Engineer, then the Contractor shall be liable for any or all damage to these utilities or other work of the contract which arises from the Contractor's operations subsequent to discovery thereof, and the Contractor shall repair and make good any damage at the Contractor's expense.

5-1.07 PROPERTY RIGHTS IN MATERIALS

Nothing in the contract shall be construed as vesting in the Contractor any right of property in the materials used after they have been attached or affixed to the work or soil or after partial payment has been made as provided in Section 7-1.05, "Partial Payment," of these General Conditions for material delivered on the ground or stored subject to or under the control of the State and unused. These material shall become the property of the State of California upon being so attached or affixed or upon payment for materials delivered on the ground or stored subject to or under the control of the State and unused, as provided in Section 7-1.05, "Partial Payment," of these General Conditions.

5-1.08 LEGAL ACTIONS AGAINST THE DEPARTMENT

If, pursuant to court order, the Department temporarily suspends performance of all or any portion of the work, an extension of time determined pursuant to the provisions in Section 6-1.08, "Liquidated Damages," of these General Conditions will be granted, and the Contractor shall not be entitled to any additional compensation because of the suspension.

5-1.09 NO PERSONAL LIABILITY

Neither the Director, the Engineer, nor any other officer or authorized employee of the Department of Transportation shall be personally responsible for any liability arising under the contract.

5-1.10 PATENTS

The Contractor shall assume all costs arising from the use of patented materials, equipment, devices, or processes used on or incorporated in the work, and agrees to indemnify and save harmless the State of California, the Director, the Engineer, and their duly authorized representatives, from all suits at law, or actions of every nature for, or on account of the use of any patented materials, equipment, devices, or processes.

5-1.11 PAYMENT OF TAXES

The contract price paid for the work shall include full compensation for all taxes which the Contractor is required to pay, whether imposed by Federal, State or local government, including, without being limited to, Federal excise tax. No tax exemption certificate nor any document designed to exempt the Contractor from payment of any tax will be furnished to the Contractor by the Department, as to any tax on labor, services, materials, transportation, or any other items furnished pursuant to the contract.

5-1.12 COOPERATION

· Should construction be under way by State forces or other forces or by other contractors within or adjacent to the limits of the work or should work of any other nature be under way by other forces within or adjacent to those limits, the Contractor shall cooperate with all the other contractors or other forces to the end that any delay, interference or hindrance to their work will be avoided. The right is reserved to perform other or additional work at or near the site at any time, by the use of other forces.

SECTION 6

PROSECUTION AND PROGRESS

6-1.01 SUBLETTING AND SUBCONTRACTING

· The Contractor shall be responsible for all work performed under the contract. All persons engaged in the work will be considered as employees of the Contractor. The Contractor shall give personal attention to the fulfillment of the contract and shall keep the work under the Contractor's control. When any subcontractor fails to prosecute a portion of the work in a manner satisfactory to the Engineer, the Contractor shall remove that subcontractor immediately upon written request of the Engineer, and the subcontractor shall not again be employed on the work. Although the sections of the contract may be arranged according to various trades, or general grouping of the work, the Contractor is not obligated to sublet the work in the same manner. The State will not arbitrate disputes among subcontractors or between the Contractor and one or more subcontractors concerning responsibility for performing any part of the work.

· Subcontracts shall include provisions that the contract between the State and the Contractor is part of the subcontract, and that all terms and provisions of the contract are incorporated in the subcontract. Subcontracts shall also contain certification by the subcontractor that the subcontractor is experienced in and qualified to do, and knowledgeable about, the subcontracted work. Copies of subcontracts shall be available to the Engineer upon written request, and shall be provided to the Engineer at the time any litigation against the State concerning the project is filed.

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

· The Contractor shall not substitute any person as subcontractor in place of a subcontractor listed on the Contractor's bid proposal without the written approval of the Engineer. Substitutions must be in conformance with the provisions of the "Subletting and Subcontracting Fair Practices Act" beginning with Section 4100 of the Public Contract Code. Violations of this Act by the Contractor may subject him to penalties which may include cancellation of contract, assessment of 10 percent of the subcontractor's bid, and disciplinary action by the Contractors' State License Board.

6-1.02 ASSIGNMENT

· The performance of the contract may not be assigned, except upon the written consent of the Director. Consent will not be given to any proposed assignment which would relieve the original Contractor or the Contractor's surety of their responsibilities under the contract nor will the Director consent to any assignment of a part of the work under the contract.

· The Contractor may assign moneys due or to become due the Contractor under the contract and the assignment will be recognized by the Department, if given proper notice thereof, to the extent permitted by law, but any assignment of moneys shall be subject to all proper set-offs in favor of the Department and to all deductions provided for in the contract and particularly all money withheld, whether assigned or not, shall be subject to being used by the Department for the completion of the work in the event that the Contractor should be in default therein.

6-1.03 BEGINNING OF WORK

· The Contractor shall begin work within 15 calendar days after receiving notice that the contract has been approved by the Attorney General or the attorney appointed and authorized to represent the Department, and shall diligently prosecute the same to completion within the time limit provided in the special provisions.

· The Contractor shall notify the Engineer, in writing, of the Contractor's intent to begin work at least 72 hours before work is begun. The notice shall be delivered to the Office of the District Director of Transportation in the district in which the work is situated and shall specify the date the Contractor intends to start. If the project has more than one location of work, a separate notice shall be given for each location.

· Should the Contractor begin work in advance of receiving notice that the contract has been approved as above provided, any work performed by the Contractor in advance of the date of approval shall be considered as having been done by the Contractor at the Contractor's own risk and as a volunteer unless the contract is approved.

· The delivery to the State for execution and approval of the contract properly executed on behalf of the Contractor and surety and the minimum 72 hours advance written notice as required above shall constitute the Contractor's authority to enter upon the site of the work and to begin operations, subject to the Contractor's assumption of the risk of the disapproval of the contract, as above provided, and subject also to the following:

- (1) The Contractor shall, on commencing operations, take all precautions required for public safety and shall observe all the provisions in these General Conditions and the special provisions.
- (2) In the event of disapproval, the Contractor shall at the Contractor's expense do that work that is necessary to leave the site in a neat condition to the satisfaction of the Engineer.
- (3) All work done according to the contract prior to its approval, will, when the contract is approved, be considered authorized work and will be paid for as provided in the contract.

- (4) The Contractor shall not be entitled to any additional compensation or an extension of time for any delay, hindrance or interference caused by or attributable to commencement of work prior to the date on which the contract was approved by the Attorney General or the attorney appointed and authorized to represent the Department, except to the extent the delay, hindrance or interference would have been compensable hereunder had work been commenced on the date of the approval and the progress thereof been the same as that actually made.

6-1.04 PROGRESS SCHEDULE

- The Contractor shall submit to the Engineer a practicable progress schedule within 15 days of approval of the contract, and within 7 days of the Engineer's written request at any other time.
- The Contractor may furnish the schedule on a form of the Contractor's choice or, if requested, the Engineer will furnish a form for the Contractor's use. If the Engineer furnishes a form, the Engineer will also furnish to the Contractor, on request, on or before the last day of each month a copy of the form showing the status of work actually completed during the preceding estimate period.
- The schedule shall show the order in which the Contractor proposes to carry out the work, the dates on which the Contractor will start the several salient features of the work, and the contemplated dates for completing those salient features.
- The progress schedules submitted shall be consistent in all respects with the time and order of work requirements of the contract.
- Subsequent to the time that submittal of a progress schedule is required in conformance with these General Conditions, no progress payment will be made for any work until a satisfactory schedule has been submitted to the Engineer.

6-1.05 SCHEDULE OF VALUES

- The Contractor shall submit to the Engineer a schedule of values for each lump sum item. The sum of the items listed in the schedule of values shall equal the contract lump sum prices. Overhead and profit shall not be listed as separate items. The schedule of values shall be approved by the Engineer before any partial payment estimate is prepared.

6-1.06 TEMPORARY SUSPENSION OF WORK

- The Engineer shall have the authority to suspend the work wholly or in part, for any time period as the Engineer deems necessary, due to unsuitable weather, or to such other conditions as are considered unfavorable for the suitable prosecution of the work, or for any time period as the Engineer deems necessary due to the failure on the part of the Contractor to carry out orders given, or to perform any provision of the contract.
- The Contractor shall immediately comply with the written order of the Engineer to suspend the work wholly or in part. The suspended work shall be resumed when conditions are favorable and methods are corrected, as ordered or approved in writing by the Engineer.
- If the Engineer orders a suspension of all of the work or a portion of the work which is the current controlling operation or operations, due to unsuitable weather or to such other conditions as are considered unfavorable to the suitable prosecution of the work, the days on which the suspension is in effect shall not be considered working days as defined in Section 6-1.07, "Time of Completion," of these General Conditions. If a portion of work at the time of the suspension is not a current controlling operation or operations, but subsequently does become the current controlling operation or operations, the determination of working days will be made on the basis of the then current controlling operation or operations.
- If a suspension of work is ordered by the Engineer, due to the failure on the part of the Contractor to carry out orders given or to perform any provision of the contract, the days on which the suspension order is in effect shall be considered working days if those days are working days within the meaning of the definition set forth in Section 6-1.07, "Time of Completion," of these General Conditions.
- In the event of a suspension of work under any of the conditions set forth in this Section 6-1.06, the suspension of work shall not relieve the Contractor of the Contractor's legal responsibilities as set forth in these General Conditions.
- The Contractor shall have no claim for damage or compensation for any delay, interference or hindrance resulting from an ordered temporary suspension of the work.
- In addition to the requirements specified above, the following shall apply:

If the performance of all or any portion of the work is suspended or delayed by the Engineer in writing for an unreasonable period of time (not originally anticipated, customary, or inherent to the construction industry) and the Contractor believes that additional compensation or contract time or additional compensation and contract time is due as a result of the suspension or delay, the Contractor shall submit to the Engineer in writing a request for adjustment within 7 calendar days of receipt of the notice to resume work. The request shall set forth the reasons and support for the adjustment.

Upon receipt, the Engineer will evaluate the Contractor's request. If the Engineer agrees that the cost or time or cost and time required for the performance of the contract has increased as a result of the suspension and the suspension was caused by conditions beyond the control of and not the fault of the Contractor, the Contractor's suppliers, or subcontractors at any approved tier, and not caused by weather, the Engineer will make an adjustment (excluding profit)

and modify the contract in writing accordingly. The Engineer will notify the Contractor of the Engineer's determination whether or not an adjustment of the contract is warranted.

No contract adjustment will be allowed unless the Contractor has submitted the request for adjustment within the time prescribed.

No contract adjustment will be allowed under the provisions specified in this section to the extent that performance would have been suspended or delayed by any other cause, or for which an adjustment is provided for or excluded under any term or condition of this contract.

6-1.07 TIME OF 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 time set forth in the special provisions.

. A working day is defined as any day, except Saturdays, Sundays and legal holidays and days on which the Contractor is specifically required by the special provisions to suspend construction operations, and except days on which the Contractor is prevented by inclement weather or conditions resulting immediately therefrom adverse to the current controlling operation or operations, as determined by the Engineer, from proceeding with at least 75 percent of the normal labor and equipment force engaged on the controlling operation or operations for at least 60 percent of the total daily time being currently spent on the controlling operation or operations.

. Should the Contractor prepare to begin work at the regular starting time in the morning of any day on which inclement weather, or the conditions resulting from the weather, or the condition of the work, prevents the work from beginning at the usual starting time and the crew is dismissed as a result thereof and the Contractor does not proceed with at least 75 percent of the normal labor and equipment force engaged in the current controlling operation or operations for at least 60 percent of the total daily time being currently spent on the controlling operation or operations, the Contractor will not be charged for a working day whether or not conditions should change thereafter during that day and the major portion of the day could be considered to be suitable for those construction operations.

. The current controlling operation or operations is to be construed to include any feature of the work which, if delayed, will delay the time of completion of the contract.

. Determination that a day is a nonworking day by reason of inclement weather or conditions resulting immediately therefrom shall be made and agreed upon during that day by conference between the Engineer and the Contractor. In the event of failure to agree, the Contractor will be allowed 15 days from the issuance of the weekly statement of working days in which to file a written protest setting forth in what respects the Contractor differs from the Engineer, otherwise the decision of the Engineer shall be deemed to have been accepted by the Contractor as correct. The Engineer will furnish the Contractor a weekly statement showing the number of working days charged to the contract for the preceding week, the number of working days of time extensions being considered or approved, the number of working days originally specified for the completion of the contract and the number of working days remaining to complete the contract and the extended date for completion thereof, except when working days are not being charged in conformance with the provisions in Section 6-1.06, "Temporary Suspension of Work," of these General Conditions.

6-1.08 LIQUIDATED DAMAGES

. It is agreed by the parties to the contract that in case all the work called for under the contract in all parts and requirements is not finished or completed within the number of working days as set forth in the special provisions, damage will be sustained by the State of California, and that it is and will be impracticable and extremely difficult to ascertain and determine the actual damage which the State will sustain in the event of and by reason of the delay; and it is therefore agreed that the Contractor will pay to the State of California, the sum set forth in the special provisions per day for each and every calendar day's delay in finishing the work in excess of the number of working days prescribed; and the Contractor agrees to pay the liquidated damages herein provided for, and further agrees that the Department may deduct the amount thereof from any moneys due or that may become due the Contractor under the contract.

. It is further agreed that in case the work called for under the contract is not finished and completed in all parts and requirements within the number of working days specified, the Director shall have the right to increase the number of working days or not, as the Director may deem best to serve the interest of the State, and if the Director decides to increase the number of working days, the Director shall further have the right to charge to the Contractor, the Contractor's heirs, assigns or sureties and to deduct from the final payment for the work all or any part, as the Director may deem proper, of the actual cost of engineering, inspection, superintendence, and other overhead expenses which are directly chargeable to the contract, and which accrue during the period of the extension, except that cost of final surveys and preparation of final statement shall not be included in the charges.

. The Contractor will be granted an extension of time and will not be assessed with liquidated damages or the cost of engineering and inspection for any portion of the delay in completion of the work beyond the time named in the special provisions for the completion of the work caused by acts of God or of the public enemy, fire, floods, tsunamis, earthquakes, epidemics, quarantine restrictions, strikes, labor disputes, shortage of materials and freight embargoes, provided, that the Contractor shall notify the Engineer in writing of the causes of delay within 15 days from the beginning of that delay. The

Engineer shall ascertain the facts and the extent of the delay, and the Engineer's findings thereon shall be final and conclusive.

· No extension of time will be granted for a delay caused by a shortage of materials unless the Contractor furnishes to the Engineer documentary proof that the Contractor has made every effort to obtain the materials from all known sources within reasonable reach of the work in a diligent and timely manner, and further proof in the form of supplementary progress schedules, as required in Section 6-1.04, "Progress Schedule," of these General Conditions that the inability to obtain the materials when originally planned, did in fact cause a delay in final completion of the entire work which could not be compensated for by revising the sequence of the Contractor's operations. The term "shortage of materials," as used in this section, shall apply only to materials, articles, parts or equipment which are standard items and are to be incorporated in the work. The term "shortage of materials," shall not apply to materials, parts, articles, or equipment which are processed, made, constructed, fabricated or manufactured to meet the specific requirements of the contract. Only the physical shortage of material will be considered under these provisions as a cause for extension of time. Delays in obtaining materials due to priority in filling orders will not constitute a shortage of materials.

· If the Contractor is delayed in completion of the work by reason of changes made under Section 3, "Changes in the Work," of these General Conditions or by any act of the Engineer or of the Department, not contemplated by the contract, an extension of time commensurate with the delay in completion of the work thus caused will be granted and the Contractor shall be relieved from any claim for liquidated damages, or engineering and inspection charges or other penalties for the period covered by that extension of time; provided that the Contractor shall notify the Engineer in writing of the causes of delay within 15 days from the beginning of the delay. The Engineer shall ascertain the facts and the extent of the delay, and the Engineer's findings thereon shall be final and conclusive.

· Except as provided in Public Contract Code Section 7102, the Contractor shall have no claim for damage or compensation for any delay or hindrance whether or not contemplated by the contract.

· It is the intention of the above provisions that the Contractor shall not be relieved of liability for liquidated damages or engineering and inspection charges for any period of delay in completion of the work in excess of that expressly provided for in this Section 6-1.08.

6-1.09 TERMINATION

6-1.09A Termination Of Contract - "Convenience Of State"

· The Department reserves the right to terminate the contract at any time if the Director determines that to do so would be in the best interest of the State.

· Termination of the contract and the total compensation payable to the Contractor in the event of termination shall be governed by the following:

- (1) The Engineer will issue the Contractor a written notice signed by the Director, specifying that the contract is to be terminated. Upon receipt of that written notice and, except as otherwise directed in writing by the Engineer, the Contractor shall:
 - (a) Stop all work under the contract except that specifically directed to be completed prior to acceptance.
 - (b) Perform work the Engineer deems necessary to secure the project for termination.
 - (c) Remove equipment from the site of the work.
 - (d) Take the required action as is necessary to protect materials from damage.
 - (e) Notify all subcontractors and suppliers that the contract is being terminated and that their contracts or orders are not to be further performed unless otherwise authorized in writing by the Engineer.
 - (f) Provide the Engineer with an inventory list of all materials previously produced, purchased or ordered from suppliers for use in the work and not yet used in the work, including its storage location, and any other information as the Engineer may request.
 - (g) Dispose of materials not yet used in the work as directed by the Engineer. It shall be the Contractor's responsibility to provide the State with good title to all materials purchased by the State hereunder, including materials for which partial payment has been made as provided in Section 7-1.05, "Partial Payments," of these General Conditions and with bills of sale or other documents of title for the materials.
 - (h) Subject to the prior written approval of the Engineer, settle all outstanding liabilities and all claims arising out of subcontracts or orders for materials terminated hereunder. To the extent directed by the Engineer, the Contractor shall assign to the Department all the right, title and interest of the Contractor under subcontracts or orders for materials terminated hereunder.
 - (i) Furnish the Engineer with the documentation required to be furnished by the Contractor under the provisions of the contract including, on projects as to which Federal funds are involved, all documentation required under the Federal requirements included in the contract.
 - (j) Take other actions as the Engineer may direct.

- (2) Acceptance of the contract as hereinafter specified shall not relieve the Contractor of responsibility for damage to materials except as follows:

The Contractor's responsibility for damage to materials for which partial payment has been made as provided in Section 7-1.05, "Partial Payments," of these General Conditions and for materials furnished by the State for use in the work and unused shall terminate when the Engineer certifies that the materials have been stored in the manner and at the locations the Engineer has directed.

The Contractor's responsibility for damage to materials purchased by the State subsequent to the issuance of the notice that the contract is to be terminated shall terminate when title and delivery of those materials has been taken by the State.

When the Engineer determines that the Contractor has completed the work under the contract directed to be completed prior to termination and all other work as may have been ordered to secure the project for termination, the Engineer will recommend that the Director formally accept the contract, and immediately upon and after the acceptance by the Director, the Contractor will not be required to perform any further work thereon and shall be relieved of contractual responsibilities for injury to persons or damage to property which occurs after the formal acceptance of the project by the Director.

- (3) The total compensation to be paid to the Contractor shall be determined by the Engineer on the basis of the following:

- (a) The reasonable cost to the Contractor, without profit, for all work performed under the contract, including mobilization, demobilization and work done to secure the project for termination.

When in the opinion of the Engineer the cost of the work is excessively high due to costs incurred to remedy or replace defective or rejected work, the reasonable cost to be allowed will be the estimated reasonable cost of performing that work in compliance with the requirements of the plans and special provisions and the excessive actual cost shall be disallowed.

- (b) A reasonable allowance for profit on the cost of work performed as determined under Subsection (a), provided the Contractor establishes to the satisfaction of the Engineer that it is reasonably probable that the Contractor would have made a profit had the contract been completed and provided further, that the profit allowed shall in no event exceed 4 percent of the cost.

- (c) The reasonable cost to the Contractor of handling material returned to the vendor, delivered to the Department or otherwise disposed of as directed by the Engineer.

- (d) A reasonable allowance for the Contractor's administrative costs in determining the amount payable due to termination of the contract.

All records of the Contractor and subcontractors, necessary to determine compensation in conformance with the provisions of this Section shall be open to inspection or audit by representatives of the Department at all times after issuance of the notice that the contract is to be terminated and for a period of 3 years, and these records shall be retained for that period.

After acceptance of the work by the Director, the Engineer may make payments on the basis of interim estimates pending issuance of the Final Statement, when in the Engineer's opinion the amount thus paid, together with all amounts previously paid or allowed, will not result in total compensation in excess of that to which the Contractor will be entitled. All payments, including payment upon the Final Statement, shall be subject to deduction for prior payments and amounts, if any, to be kept or retained under the provisions of the contract.

- The provisions of this Section shall be included in all subcontracts.

6-1.09B Termination Of Control - "Default Of Contractor"

· Failure to supply an adequate working force, or material of proper quality, or failure to comply with Section 10262 of the State Contract Act, or in any other respect to prosecute the work with the diligence and force specified by the contract, is grounds for termination of the Contractor's control over the work and for taking over the work by the State. The procedures for termination, completion of the work, and the rights and obligations of the parties are provided for in the State Contract Act (Public Contract Code Sections 10253-10260).

· If the Contractor's control of the work is terminated or the Contractor abandons the work and the contract work is completed in conformance with the provisions in Section 10255 of the State Contract Act, any dispute concerning the amount to be paid by the State to the Contractor or the Contractor's surety or to be paid to the State by the Contractor or the Contractor's surety, under the provisions in Section 10258 of the State Contract Act, shall be subject to arbitration in conformance with the provisions in Section 7-1.10, "Arbitration," of these General Conditions. The surety shall be bound by the arbitration award and is entitled to participate in the arbitration proceedings.

SECTION 7
ACCEPTANCE AND PAYMENT

7-1.01 ACCEPTANCE

· The contract will be accepted in writing by the Director when the whole shall have been completed in all respects in conformance with the provisions of the contract to the full satisfaction of the Department.

7-1.02 SCOPE OF PAYMENT

· The Contractor shall accept the compensation provided in the contract as full payment for furnishing all labor, materials, tools, equipment, 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, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the work until the acceptance by the Director and for all risks of every description connected with the prosecution of the work, also for all expenses incurred in consequence of the suspension or discontinuance of the work as provided in the contract; and for completing the work according to the contract. Neither the payment of any estimate nor of any retained percentage shall relieve the Contractor of any obligation to make good any defective work or material.

· No compensation will be made in any case for loss of anticipated profits.

7-1.03 NOTICE OF POTENTIAL CLAIM

· The Contractor shall not be entitled to the payment of any additional compensation for any act, or failure to act, by the Engineer, including failure or refusal to issue a change order, or for the happening of any event, thing, occurrence, or other cause, unless the Contractor shall have given the Engineer due written notice of potential claim as hereinafter specified. Compliance with this Section 7-1.03 shall not be a prerequisite as to matters within the scope of the protest provisions in Section 3, "Changes in the Work," or Section 6-1.07, "Time of Completion," or the notice provisions in Section 2-1.045, "Differing Site Conditions," or Section 6-1.08, "Liquidated Damages," or Section 5-1.06, "Responsibility for Utilities," of these General Conditions.

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

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

· It is the intention of this Section 7-1.03 that differences between the parties arising under and by virtue of the contract be brought to the attention of the Engineer at the earliest possible time in order that those 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 or occurrence for which no written notice of potential claim as herein required was filed.

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

7-1.04 STOP NOTICES

· The State of California, by and through the Department or other appropriate State office or officers, may at its option and at any time retain out of any amounts due the Contractor, sums sufficient to cover claims, filed pursuant to Section 3179 et seq of the Civil Code.

· Stop notice information may be obtained from the Departmental Disbursing Office at 1801 30th Street, East Building, Sacramento, California.

7-1.05 PARTIAL PAYMENTS

· The Department, once in each month upon request of the Contractor for partial payments, shall cause an estimate in writing to be made by the Engineer. The estimate shall include the total amount of work done and acceptable materials furnished to the time of the estimate, and the value thereof. The acceptable materials shall include materials that are furnished and delivered to the work site and are not incorporated in the work.

· The Department shall retain 10 percent of the estimated value of the work done and 10 percent of the value of materials so estimated to have been furnished and delivered and not incorporated in the work as aforesaid as part security for the fulfillment of the contract by the Contractor, except that at any time after 20 percent of the work has been completed, if the Engineer finds that satisfactory progress is being made, the Department may reduce the total amount being retained from payment pursuant to the above requirements to 5 percent of the total estimated value of the work and materials and may also reduce the amount retained from any of the remaining partial payments to 5 percent of the estimated value of the work and materials. In addition, on any partial payment made after 95 percent of the work has been completed, the Department may reduce the amount withheld from payment pursuant to the requirements of this Section 7-1.05, to such lesser amount as the Department determines is adequate security for the fulfillment of the balance of the work and other requirements of the contract, but in no event will that amount be reduced to less than 125 percent of the estimated value of the work yet to be completed as determined by the Engineer. The reduction will only be made upon the written request of the Contractor and shall be approved in writing by the surety on the Performance Bond and by the surety on the Payment Bond. The approval of the surety shall be submitted to the Disbursing Officer of the Department; the signature of the person executing the approval for the surety shall be properly acknowledged and the power of attorney authorizing the person to give that consent must either accompany the document or be on file with the Department.

· The Department shall pay monthly to the Contractor, while carrying on the work, the balance not retained, as aforesaid, after deducting therefrom all previous payments and all sums to be kept or retained under the provisions of the contract. No monthly estimate or payment shall be required to be made when, in the judgment of the Engineer, the work is not proceeding in conformance with the provisions of the contract.

· No monthly estimate or payment shall be construed to be an acceptance of any defective work or improper materials.

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

7-1.06 PAYMENT OF WITHHELD FUNDS

· Attention is directed to Section 7-1.05, "Partial Payments," of these General Conditions and in particular to the retention provisions of Section 7-1.05, of these General Conditions.

· Upon the Contractor's request, pursuant to Public Contract Code Section 10263, the Department will make payment of funds withheld from progress payments to ensure performance of the contract if the Contractor deposits in escrow with the State Treasurer, or with a bank acceptable to the Department, securities equivalent to the amount withheld. The Contractor shall be beneficial owner of any securities substituted for moneys withheld and shall receive any interest thereon. Upon satisfactory completion of the contract, the securities shall be returned to the Contractor.

· Alternatively, upon the Contractor's request, the Department 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 Department, pursuant to the terms in Section 10263 of the Public Contract Code.

· Alternatively, and subject to the approval of the Department, the payment of retentions earned may be deposited directly with a person licensed under Division 6 (commencing with Section 17000) of the Financial Code as the escrow agent. Upon written request of an escrow agent that has not been approved by the Department under subdivision (c) of Section 10263 of the Public Contract Code, the Department will provide written notice to that escrow agent within 10 business days of receipt of the request indicating the reason or reasons for not approving that escrow agent. The payments will be deposited in a trust account with a Federally chartered bank or savings association within 24 hours of receipt by the escrow agent. The Contractor shall not place any retentions with the escrow agent in excess of the coverage provided to that escrow agent pursuant to subdivision (b) of Section 17314 of the Financial Code. In all respects not inconsistent with subdivision (c) of Section 10263 of the Public Contract Code, the remaining provisions of Section 10263 of the Public Contract Code shall apply to escrow agents acting pursuant to subdivision (c) of Section 10263 of the Public Contract Code.

· 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 agreed to by the Contractor and the Department.

· The escrow agreement used pursuant to this Section 7-1.06 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.

7-1.07 FINAL PAYMENT AND CLAIMS

· After acceptance of the work by the Director, the Department will make a final monthly payment pending approval of the final statement. The final monthly payment will be the balance found to be due after deduction of all previous payments, all amounts to be kept or retained under the provisions of the contract, and such further amounts as the Engineer determined to be necessary pending approval of the final statement. The Engineer will promptly submit to the Contractor a final

Contract No. <Dist>-<Contract_No>

statement of the sum due the Contractor under the contract. The statement shall take into account the contract price, as adjusted by any change order; amounts already paid; and sums to be withheld for incomplete work, liquidated damages, and for any other cause under the contract. The Contractor shall submit written approval of the final statement or submit a written statement of all claims arising under or by virtue of the contract so that the Engineer receives the written approval or statement of claims no later than close of business of the thirtieth day after receiving the final statement of the sum due the Contractor. If the thirtieth day falls on a Saturday, Sunday or legal holiday, then receipt of the written approval or statement of claims by the Engineer shall not be later than the close of business of the next business day. The approval of that statement or the failure to file a claim within the specified 30 day period shall constitute a waiver by the Contractor of any additional right to compensation under or by reason of the contract and the payment so made by the State shall thereupon become a complete statement between the State and the Contractor.

. To constitute the filing of a claim, the Contractor shall set forth in writing the basis for the claim and the amount of money for which demand is made and shall submit the same to the Engineer. No demand by the Contractor shall be recognized as a claim by the State unless it is filed in conformance with this paragraph.

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

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

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

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

(name)
_____ of
(title)

(company)

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

Dated _____

/s/ _____

Subscribed and sworn before me this _____ day

of _____.

Notary Public
My Commission Expires _____

- . Failure to submit the notarized certificate will be sufficient cause for denying the claim.
- . Any claim for overhead type expenses or costs, in addition to being certified as stated above, shall be supported by an audit report of an independent Certified Public Accountant. Any claim for overhead shall also be subject to audit by the State at its discretion.
- . Any costs or expenses incurred by the State in reviewing or auditing any claims that are not supported by the Contractor's cost accounting or other records shall be deemed to be damages incurred by the State within the meaning of the California False Claims Act.

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

. Upon final determination of the claims, the Engineer will then make and issue the Engineer's final statement in writing and within 30 days thereafter the State will pay the entire sum, if any, found due thereon. That final statement shall be conclusive and binding against both parties to the contract on all questions relating to the amount of work done and the compensation payable therefor, except as otherwise provided in Section 7-1.08, "Clerical Errors," of these General Conditions.

7-1.08 CLERICAL ERRORS

. Notwithstanding the provisions in Section 7-1.07, "Final Payment And Claims," of these General Conditions, for a period of 3 years after acceptance of the work, all estimates and payments made pursuant to Section 7-1.07, including the final statement and payment, shall be subject to correction and adjustment for clerical errors in the calculations involved in the determination of quantities and payments. The Contractor and the Department agree to pay to the other any sum due under the provisions of this Section 7-1.08, provided, however, if the total sum to be paid is less than \$200, no payment shall be made.

7-1.09 GUARANTEE

. The Contractor hereby unconditionally guarantees that the mechanical and electrical equipment and related components in the building work will be done in conformance with the requirements of the contract, and further guarantees the same to be and remain free of defects in workmanship and materials for a period of 6 months from the date of acceptance of the contract. The Contractor hereby agrees to repair or replace any and all mechanical and electrical equipment and related components in the building work that may prove to be not in conformance with the requirements of the contract or that may be defective in its workmanship or material within the guarantee period specified, without any expense whatsoever to the Department, ordinary wear and tear and unusual abuse or neglect excepted.

. A portion of the performance bond for the contract in a sum equal to one half the value of the mechanical and electrical equipment and related components in the building work, shall remain in full force and effect during the guarantee period. The value of those mechanical and electrical equipment and related components shall be the value determined in conformance with the requirements specified in Section 6-1.05, "Schedule of Values" of the General Conditions.

. The Contractor further agrees that, within 10 calendar days after being notified in writing by the Department of any mechanical and electrical equipment and related components in the building work not in conformance with the requirements of the contract or any defects in the mechanical and electrical equipment and related components in the building work, he shall commence and prosecute with due diligence all work necessary to fulfill the terms of this guarantee, and shall complete the work within a reasonable period of time, and, in the event the Contractor fails to comply, he does hereby authorize the Department to proceed to have such work done at the Contractor's expense and he shall honor and pay the cost and charges therefor upon demand. The Department shall be entitled to all costs and expenses, including reasonable attorney's fees, necessarily incurred upon the Contractor's refusal to honor and pay the above costs and charges.

7-1.10 ARBITRATION

. Sections 10240-10240.13, inclusive of the Public Contract Code provides for the resolution of contract claims by arbitration.

. Claims (demands for monetary compensation or damages) arising under or related to performance of the contract shall be resolved by arbitration unless the Department and the Contractor agree in writing, after the claim has arisen, to waive arbitration and to have the claim litigated in a court of competent jurisdiction. Arbitration shall be pursuant to Public Contract Code Sections 10240-10240.13, inclusive, and applicable regulations (see Subchapter 3 [Sections 301-382, inclusive] of Chapter 2 of Title 1 of the California Code of Regulations). The arbitration decision shall be decided under and in conformance with the law of this State, supported by substantial evidence and, in writing, contain the basis for the decision, findings of fact, and conclusions of law.

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

**STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION**

SPECIAL PROVISIONS

Annexed to Contract No. 03-1C3904

DIVISION 0 BIDDING AND CONTRACT REQUIREMENTS

0.01 INSTRUCTIONS TO BIDDERS AND GENERAL CONDITIONS

The work embraced herein shall conform to the provisions in the Instructions to Bidders and General Conditions for Building Construction of the Department of Transportation, dated January, 2002, a single publication attached hereto and referred to herein as "Instructions to Bidders" and "General Conditions", and the following special provisions.

In case of conflict between the Instructions to Bidders or the General Conditions and these special provisions, the special provisions shall take precedence over and be used in lieu of the conflicting portions.

0.02 PROPOSAL REQUIREMENTS AND CONDITIONS

The bidder's attention is directed to the provisions in Section 1, "Proposal Requirements and Conditions," of the Instructions to Bidders, and these special provisions for the requirements and conditions which the bidder must observe in the preparation of the proposal form and the submission of the bid.

In addition to the subcontractors required to be listed in conformance with Section 1-1.05, "Required Listing of Proposed Subcontractors," of the Instructions to Bidders, each proposal shall have listed therein the name and address of each DVBE subcontractor to be used for credit in meeting the goal, and to whom the bidder proposes to directly subcontract portions of the work. The list of subcontractors shall also set forth the portion of work that will be performed by each subcontractor listed. A sheet for listing the subcontractors is included in the Proposal.

The Bidder's Bond form mentioned in the last paragraph in Section 1-1.07, "Proposal Guaranty," of the Instructions to Bidders will be found following the signature page of the Proposal.

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

0.024 DISABLED VETERAN BUSINESS ENTERPRISE (DVBE)

Section 10115 of the Public Contract Code requires the Department to implement provisions to establish a goal for Disabled Veteran Business Enterprise (DVBE) in contracts.

It is the policy of the Department that Disabled Veteran Business Enterprise (DVBE) shall have the maximum opportunity to participate in the performance of contracts financed solely with state funds. The Contractor shall ensure that DVBEs have the maximum opportunity to participate in the performance of this contract and shall take all necessary and reasonable steps for this assurance. The Contractor shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of subcontracts. Failure to carry out the requirements of this paragraph shall constitute a breach of contract and may result in termination of this contract or other remedy the Department may deem appropriate.

Bidder's attention is directed to the following:

- A. "Disabled Veteran Business Enterprise" (DVBE) means a business concern certified as a DVBE by the Office of Small Business Certification and Resources, Department of General Services.
- B. A DVBE may participate as a prime contractor, subcontractor, joint venture partner with a prime or subcontractor, or vendor of material or supplies.
- C. Credit for DVBE prime contractors will be 100 percent.
- D. A DVBE joint venture partner must be responsible for a clearly defined portion of the work to be performed. Responsibility means actually performing, managing and supervising that portion of the work with its own forces. The DVBE joint venture partner must share in the ownership, control, management responsibilities, risks and profits of the joint venture. The DVBE joint venturer must submit the joint venture agreement with the Caltrans Bidder DVBE Information form required in Division 0.026, "Submission of DVBE Information," elsewhere in these special provisions.

- E. A DVBE must perform a commercially useful function, i.e., must be responsible for the execution of a distinct element of the work and must carry out its responsibility by actually performing, managing and supervising the work.
- F. Credit for DVBE vendors of materials or supplies is limited to 60 percent of the amount to be paid to the vendor for the material unless the vendor manufactures or substantially alters the goods.
- G. Credit for trucking by DVBEs will be as follows:
 1. One hundred percent of the amount to be paid when a DVBE trucker will perform the trucking with his/her own trucks, tractors and employees.
 2. Twenty percent of the amount to be paid to DVBE trucking brokers who do not have a "certified roster."
 3. One hundred percent of the amount to be paid to DVBE trucking brokers who have signed agreements that all trucking will be performed by DVBE truckers if credit is toward the DVBE goal, a "certified roster" showing that all trucks are owned by DVBEs, and a signed statement on the "certified roster" that indicates that 100 percent of revenue paid by the broker will be paid to the DVBEs listed on the "certified roster."
 4. Twenty percent of the amount to be paid to trucking brokers who are not a DVBE but who have signed agreements with DVBE truckers assuring that at least 20 percent of the trucking will be performed by DVBE truckers if credit is toward the DVBE goal, a "certified roster" showing that at least 20 percent of the number of trucks are owned by DVBE truckers, and a signed statement on the "certified roster" that indicates that at least 20 percent of the revenue paid by the broker will be paid to the DVBEs listed on the "certified roster."

The "certified roster" referred to herein shall conform to the requirements in Division 0.026, "Submission Of DVBE Information," elsewhere in these special provisions.

- H. DVBEs and DVBE joint venture partners must be certified DVBEs as determined by the Department of General Services, Office of Small Business Certification and Resources, 1531 "I" Street, Second Floor, Sacramento, CA 95814, on the date bids for the project are opened before credit may be allowed toward the DVBE goal. It is the Contractor's responsibility to verify that DVBEs are certified.
- I. Noncompliance by the Contractor with these requirements constitutes a breach of this contract and may result in termination of the contract or other appropriate remedy for a breach of this contract.

0.025 DVBE GOAL FOR THIS PROJECT

The Department has established the following goal for Disabled Veteran Business Enterprise (DVBE) participation for this project:

Disabled Veteran Business Enterprise (DVBE): 3 percent.

It is the bidder's responsibility to make a sufficient portion of the work available to subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DVBE subcontractors and suppliers, so as to assure meeting the goal for DVBE participation.

The Office of Small Business Certification and Resources, Department of General Services, may be contacted at (916) 322-5060 or visit their internet web site at <http://www.osmb.dgs.ca.gov/> for program information and certification status. The Department's Business Enterprise Program may also be contacted at (916) 227-9599 or the internet web site at <http://www.dot.ca.gov/hq/bep/>.

0.026 SUBMISSION OF DVBE INFORMATION

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

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

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

finding the bid or proposal nonresponsive. Other bidders need not submit DVBE information unless requested to do so by the Department.

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

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

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

If credit for trucking by a DVBE trucking broker is shown on the bidder's information as 100 percent of the revenue to be paid by the broker is to be paid to DVBE truckers, a "certified roster" of the broker's trucks to be used must be included. The "certified roster" must indicate that all the trucks are owned by certified DVBEs and must show the DVBE truck numbers, owner's name, Public Utilities Commission Cal-T numbers, and the DVBE certification numbers. The roster must indicate that all revenue paid by the broker will be paid to DVBEs listed on the "certified roster".

If credit for trucking by a trucking broker who is not a DVBE is shown in the bidder's information, a "certified roster" of the broker's trucks to be used must be included. The "certified roster" must indicate that at least 20 percent of the broker's trucks are owned by certified DVBEs and must show the DVBE truck numbers, owner's name, Public Utilities Commission Cal-T numbers, and the DVBE certification number. The roster must indicate that at least 20 percent of the revenue paid by the broker will be paid to DVBEs listed on the "certified roster".

A bidder shall be deemed to have made good faith efforts upon submittal, within time limits specified by the Department, of documentary evidence that all of the following actions were taken:

- A. Contact was made with the Office of Small Business Certification and Resources (OSBCR), Department of General Services or their web site at <http://www.osmb.dgs.ca.gov/> to identify Disabled Veteran Business Enterprises.
- B. Advertising was published in trade media and media focusing on Disabled Veteran Business Enterprises, unless time limits imposed by the Department do not permit that advertising.
- C. Invitations to bid were submitted to potential Disabled Veteran Business Enterprise contractors.
- D. Available Disabled Veteran Business Enterprises were considered.

0.027 SMALL BUSINESS PREFERENCE

Attention is directed to "Award and Execution of Contract" of these special provisions.

Attention is also directed to the Small Business Procurement and Contract Act, Government Code Section 14835, et seq and Title 2, California Code of Regulations, Section 1896, et seq.

Bidders who wish to be classified as a Small Business under the provisions of those laws and regulations, shall be certified as Small Business by the Department of General Services, Office of Small Business Certification and Resources, 1531 "I" Street, Second Floor, Sacramento, CA 95814.

To request Small Business Preference, bidders shall fill out and sign the Request for Small Business Preference form in the Proposal and shall attach a copy of their Office of Small Business Certification and Resources (OSBCR) small business certification letter to the form. The bidder's signature on the Request for Small Business Preference certifies, under penalty of perjury, that the bidder is certified as Small Business at the time of bid opening and further certifies, under penalty of perjury, that under the following conditions, at least 50 percent of the subcontractors to be utilized on the project are either certified Small Business or have applied for Small Business certification by bid opening date and are subsequently granted Small Business certification.

The conditions requiring the aforementioned 50 percent level of subcontracting by Small Business subcontractors apply if:

- A. The lowest responsible bid for the project exceeds \$100,000; and
- B. The project work to be performed requires a Class A or a Class B contractor's license; and
- C. Two or more subcontractors will be used.

If the above conditions apply and Small Business Preference is granted in the award of the contract, the 50 percent Small Business subcontractor utilization level shall be maintained throughout the life of the contract.

0.028 CALIFORNIA COMPANY PREFERENCE

Attention is directed to "Award and Execution of Contract" of these special provisions.

In conformance with the requirements of Section 6107 of the Public Contract Code, a "California company" will be granted a reciprocal preference for bid comparison purposes as against a nonresident contractor from any state that gives or requires a preference to be given contractors from that state on its public entity construction contracts.

A "California company" means a sole proprietorship, partnership, joint venture, corporation, or other business entity that was a licensed California contractor on the date when bids for the public contract were opened and meets one of the following:

- A. Has its principal place of business in California.
- B. Has its principal place of business in a state in which there is no local contractor preference on construction contracts.
- C. Has its principal place of business in a state in which there is a local contractor construction preference and the contractor has paid not less than \$5000 in sales or use taxes to California for construction related activity for each of the five years immediately preceding the submission of the bid.

To carry out the "California company" reciprocal preference requirements of Section 6107 of the Public Contract Code, all bidders shall fill out and sign the California Company Preference form in the Proposal. The bidder's signature on the California Company Preference form certifies, under penalty of perjury, that the bidder is or is not a "California company" and if not, the amount of the preference applied by the state of the nonresident Contractor.

A nonresident Contractor shall disclose any and all bid preferences provided to the nonresident Contractor by the state or country in which the nonresident Contractor has its principal place of business.

Proposals without the California Company Preference form filled out and signed may be rejected.

0.03 AWARD AND EXECUTION OF CONTRACT

The bidder's attention is directed to the provisions in Section 2, "Award and Execution of Contract," of the Instructions to Bidders and these special provisions for the requirements and conditions concerning award and execution of contract.

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

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

Attention is also directed to "Small Business Preference" of these special provisions. Any bidder who is certified as a Small Business by the Department of General Services, Office of Small Business Certification and Resources will be allowed a preference in the award of this contract, if it be awarded, under the following conditions:

- A. The apparent low bidder is not certified as a Small Business, or has not filled out and signed the Request for Small Business Preference included with the bid documents and attached a copy of their Office of Small Business Certification and Resources (OSBCR) small business certification letter to the form; and
- B. The bidder filled out and signed the Request for Small Business Preference form included with the bid documents and attached a copy of their Office of Small Business Certification and Resources (OSBCR) small business certification letter to the form.

The small business preference will be a reduction in the bid submitted by the small business contractor, for bid comparison purposes, by an amount equal to 5 percent of the amount bid by the apparent low bidder, the amount not to exceed \$50,000. If this reduction results in the small business contractor becoming the low bidder, then the contract will be awarded to the small business contractor on the basis of the actual bid of the small business contractor notwithstanding the reduced bid price used for bid comparison purposes.

Attention is also directed to "California Company Preference" of these special provisions.

The amount of the California company reciprocal preference shall be equal to the amount of the preference applied by the state of the nonresident contractor with the lowest responsive bid, except where the "California company" is eligible for a California Small Business Preference, in which case the preference applied shall be the greater of the two, but not both.

If the bidder submitting the lowest responsive bid is not a "California company" and with the benefit of the reciprocal preference, a "California company's" responsive bid is equal to or less than the original lowest responsive bid, the "California company" will be awarded the contract at its submitted bid price except as provided below.

Small business bidders shall have precedence over nonsmall business bidders in that the application of the "California company" preference for which nonsmall business bidders may be eligible shall not result in the denial of the award to a small business bidder.

0.04 BEGINNING OF WORK, TIME OF COMPLETION AND LIQUIDATED DAMAGES

Attention is directed to the provisions in Section 6-1.03, "Beginning of Work," Section 6-1.07, "Time of Completion," and Section 6-1.08, "Liquidated Damages," of the General Conditions and these special provisions.

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

This work shall be diligently prosecuted to completion before the expiration of **140 WORKING DAYS** beginning on the fifteenth calendar day after approval of the contract.

The Contractor shall pay to the State of California the sum of \$600 per day, for each and every calendar day's delay in finishing the work in excess of the number of working days prescribed above.

0.05 (BLANK)

0.052 DIFFERING SITE CONDITIONS

Attention is directed to Section 2-1.045, "Differing Site Conditions," of the General Conditions.

During the progress of the work, if subsurface or latent conditions are encountered at the site differing materially from those indicated in the "Materials Information," log of test borings, other geotechnical data obtained by the Department's investigation of subsurface conditions, or an examination of the conditions above ground at the site, the party discovering those conditions shall promptly notify the other party in writing of the specific differing conditions before they are disturbed and before the affected work is performed.

The Contractor will be allowed 15 days from the notification of the Engineer's determination of whether or not an adjustment of the contract is warranted, in which to file a notice of potential claim in conformance with the provisions of Section 7-1.03, "Notice of Potential Claim," of the General Conditions and as specified herein; otherwise the decision of the Engineer shall be deemed to have been accepted by the Contractor as correct. The notice of potential claim shall set forth in what respects the Contractor's position differs from the Engineer's determination and provide any additional information obtained by the Contractor, including but not limited to additional geotechnical data. The notice of potential claim shall be accompanied by the Contractor's certification that the following were made in preparation of the bid: a review of the contract, a review of the "Materials Information," a review of the log of test borings and other records of geotechnical data to the extent they were made available to bidders prior to the opening of bids, and an examination of the conditions above ground at the site. Supplementary information, obtained by the Contractor subsequent to the filing of the notice of potential claim, shall be submitted to the Engineer in an expeditious manner.

0.053 INTEREST ON PAYMENTS

Interest shall be payable on progress payments, payments after acceptance, final statement, ordered changes in the work payments, and claim payments as follows:

- A. Unpaid progress payments, payment after acceptance, and final statements shall begin to accrue interest 30 days after the Engineer prepares the payment estimate.
- B. Unpaid ordered changes in work bills shall begin to accrue interest 30 days after preparation of the first pay estimate following receipt of a properly submitted and undisputed bill for ordered changes in the work. To be properly submitted, the bill must be submitted within 7 days of the performance of the ordered change in the work and in conformance with the provisions in Section 3, "Changes in the Work," and Section 7-1.05, "Partial Payments," of the General Conditions. An undisputed ordered change in the work bill not submitted within 7 days of performance of the ordered change in the work will begin to accrue interest 30 days after the preparation of the second pay estimate following submittal of the bill.
- C. The rate of interest payable for unpaid progress payments, payments after acceptance, final payments, and ordered change in the work payments shall be 10 percent per annum.

- D. The rate of interest payable on a claim, protest or dispute ultimately allowed under this contract shall be 6 percent per annum. Interest shall begin to accrue 61 days after the Contractor submits to the Engineer information in sufficient detail to enable the Engineer to ascertain the basis and amount of that claim, protest or dispute.

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

0.054 FINAL PAYMENT AND CLAIMS

Attention is directed to Section 7-1.07, "Final Payment and Claims," of the General Conditions.

If the Contractor files a timely written statement of claims in response to the proposed final estimate, the District that administers the contract will submit a claim position letter to the Contractor by hand delivery or deposit in the U.S. mail within 135 days of acceptance of the contract. The claim position letter will delineate the District's position on the Contractor's claims. If the Contractor disagrees with the claim position letter, the Contractor shall submit a written notification of its disagreement to be received by the District not later than 15 days after the Contractor's receipt of the claim position letter. The written notification of disagreement shall set forth the basis for the Contractor's disagreement and be submitted to the office designated in the claim position letter. The Contractor's failure to provide a timely, written notification of disagreement shall constitute the Contractor's acceptance and agreement with the determinations provided in the claim position letter and with final payment pursuant to the claim position letter.

If the Contractor files a timely notification of disagreement with the District claim position letter, the board of review designated by the District Director to review claims that remain in dispute will meet with the Contractor within 45 days after receipt by the District of the notification of disagreement. Attendance by the Contractor at the board of review meeting shall be mandatory.

If the District fails to submit a claim position letter to the Contractor within 135 days after the acceptance of the contract and the Contractor has claims that remain in dispute, the Contractor may request a meeting with the board of review designated by the District Director to review claims that remain in dispute. The Contractor's request for a meeting shall identify the claims that remain in dispute. If the Contractor files a request for a meeting, the board of review will meet with the Contractor within 45 days after the District receives the request for the meeting. Attendance by the Contractor at the District Director's board of review meeting shall be mandatory.

Failure of the Contractor to file a timely written statement of claims in response to the proposed final estimate, or to file a timely notification of disagreement with the District claim position letter, or to attend the District Director's board of review meeting shall constitute a failure to pursue diligently and exhaust the administrative procedures in the contract and shall be a bar to arbitration in conformance with the requirements in Section 10240.2 of the California Public Contract Code.

0.055 REMOVAL OF ASBESTOS AND HAZARDOUS SUBSTANCES

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

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

If performance of the Contractor's current controlling operation is delayed in the area, and the delay could not be avoided by the judicious handling of forces, equipment, and plant, an extension of time determined in conformance with the provisions in Section 6-1.08, "Liquidated Damages," of the General Conditions will be granted. Compensation for the delay will be made only for the Contractor's actual losses due to idle time of equipment, necessary payments for idle time of workers, and cost of extra moving of equipment, in conformance with the provisions in Section 3-1.01E, "Allowable Costs for Changes," of the General Conditions, except that no markups will be added.

0.06 (BLANK)

0.067 YEAR 2000 COMPLIANCE

This contract is subject to Year 2000 Compliance for automated devices in the State of California.

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

The Contractor shall provide the Engineer a Certificate of Compliance from the manufacturer in conformance with the provisions in Section 4-1.04, "Certificates of Compliance," of the General Conditions for all automated devices furnished for the project.

0.07 SUBCONTRACTOR AND DVBE RECORDS

The Contractor shall maintain records of all subcontracts entered into with certified DVBE subcontractors and records of materials purchased from certified DVBE suppliers. The records shall show the name and business address of each DVBE subcontractor or vendor and the total dollar amount actually paid each DVBE subcontractor or vendor.

Upon completion of the contract, a summary of these records shall be prepared on Form CEM-2402 (S) and certified correct by the Contractor or the Contractor's authorized representative, and shall be furnished to the Engineer.

0.075 PERFORMANCE OF DVBE SUBCONTRACTORS AND SUPPLIERS

The DVBEs listed by the Contractor in response to the provisions in Division 0.026, "Submission of DVBE Information," and Division 3, "Award and Execution of Contract," of these special provisions, which are determined by the Department to be certified DVBEs, shall perform the work and supply the materials for which they are listed, unless the Contractor has received prior written authorization to perform the work with other forces or to obtain the materials from other sources.

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

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

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

0.077 SUBCONTRACTING

Attention is directed to the provisions in Section 6-1.01, "Subletting and Subcontracting," of the General Conditions, and Division 0.02, "Proposal Requirements and Conditions," Division 0.026, "Submission of DVBE Information," and Division 0.030, "Award and Execution of Contract," of these special provisions.

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

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

The DVBE information furnished under Division 0.026, "Submission of DVBE Information," of these special provisions is in addition to the subcontractor information required to be furnished in Section 1-1.05, "Required Listing of Proposed Subcontractors," of the Instructions to Bidders and Section 6-1.01, "Subletting and Subcontracting," of the General Conditions.

Section 10115 of the Public Contract Code requires the Department to implement provisions to establish a goal for Disabled Veteran Business Enterprise (DVBE) participation in highway contracts that are State funded. As a part of this requirement:

- A. No substitution of a DVBE subcontractor shall be made at any time without the written consent of the Department, and
- B. If a DVBE subcontractor is unable to perform successfully and is to be replaced, the Contractor shall make good faith efforts to replace the original DVBE subcontractor with another DVBE subcontractor.

The provisions in Division 0.024, "Disabled Veteran Business Enterprise (DVBE)," of these special provisions that DVBEs shall be certified on the date bids are opened does not apply to DVBE substitutions after award of the contract.

0.082 PROMPT PROGRESS PAYMENT TO SUBCONTRACTORS

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

DIVISION 1. GENERAL REQUIREMENTS

1.01 SCOPE

The building work described herein and as shown on the plans shall conform to the requirements of the General Conditions and these special provisions.

The building work to be done consists, in general, of demolishing an existing 21 m² addition; demolishing an existing metal roof; constructing a 72 m² Hydraulic Pump Building, with concrete tilt-up walls, steel roof framing and built-up roof; constructing a concrete retaining wall and slab for a cooling tower, including related mechanical and electrical work; and such other items or details, not mentioned above, that are required by the plans, General Conditions, or these special provisions shall be performed, placed, constructed or installed at the Caltrans Headquarters Translab.

1.02 ORDER OF WORK

The first order of work shall be for the Contractor to contact the Sacramento Municipal Utility District (SMUD) and make arrangements for the new electrical service and to pothole the existing utilities.

The Contractor shall maintain a minimum 3.1 meter traveled way on the west side of the roadway between the Materials and Research Building and the Materials Testing Lab Building while placing electrical conduit in the roadway.

The Contractor shall notify the Translab Facility Coordinator, Sharon Pitcher, at (916) 227-7120 at least 5 working days prior to closing the roadway and parking stalls. The roadway and parking stalls shall not be closed for more than 5 working days without consent from the Translab Facility Coordinator.

1.03 NOTIFICATION

The Contractor shall prepare a building demolition notification form and attachments. The original documents are to be sent to Sacramento Metropolitan Air Quality Management District, 777 12th Street 3rd floor, Sacramento, CA 95814, as required by NESHAP, 40CFR Part 61, and California Air Resources Control Board rules. The "A" copy of the notification form and attachments shall be provided to the Engineer (NESHAP Coordinator) by certified mail, a minimum of 30 days prior to demolition. No demolition of the structure shall take place until the Contractor has received written confirmation from the Engineer that notification has been approved by the Air Resources Board. If the Contractor does not receive direction from the Engineer within 20 days after submittal that changes to the notification are required, or written confirmation of receipt and approval by the Air Resources Board, then an extension of time commensurate with the delay in completion of the work thus caused will be granted and the Contractor shall be relieved from any claim for liquidated damages, or engineering and inspection charges or other penalties for the period covered by that extension of time; provided that the Contractor shall notify the Engineer in writing of the causes of delay within 15 days from the beginning of the delay. The Engineer shall ascertain the facts and the extent of the delay, and the Engineer's findings thereof shall be final and conclusive.

1.04 SPECIAL PROJECT PROCEDURES

The existing concrete tilt-up wall panels are prestressed with prestressing rods in both the vertical and horizontal directions. The Contractor shall accurately locate the prestressing rods by appropriate testing methods prior to attaching ledgers, blocking, flashings, or other items to the wall. Fasteners may be relocated to avoid prestressing rods as directed or approved by the Engineer.

1.05 STATE-FURNISHED MATERIALS

Attention is directed to Section 4-1.01, "Materials," of the General Conditions and these special provisions.

The Contractor shall submit a written request to the Engineer for the delivery of State-furnished materials at least 15 days in advance of the date of their intended use. The request shall state the quantity and type of each material.

The Contractor shall be responsible for all materials furnished to him, and shall pay all demurrage and storage charges. State-furnished materials lost or damaged from any cause whatsoever shall be replaced by the Contractor at his expense. The Contractor shall be liable to the Department for the cost of replacing State-furnished material and such costs may be deducted from any monies due or to become due the Contractor.

All State-furnished materials that are not used in the work shall remain the property of the State and shall be delivered to the Engineer.

The following materials will be furnished free of charge to the Contractor at the site of the work:

Hydraulic pump

1.06 AREAS FOR CONTRACTOR'S USE

No area is available within the contract limits for the exclusive use of the Contractor. The Contractor shall arrange with the Engineer for areas to store equipment and materials within the work area.

1.07 COOPERATION

Attention is directed to Sections 5-1.06, "Responsibility for Utilities," and 5-1.12, "Cooperation," of the General Conditions and these special provisions.

Work by State forces will be in progress within the contract limits during the working period for this contract.

The Contractor shall comply with all security policies and normal working hours of the State concerning the Caltrans Headquarters Translab.

The Contractor shall plan his work to minimize interference with State forces and the public. Interruptions to any services for the purpose of making or breaking a connection shall be made only after consultation with and for such time periods as directed by the Engineer.

1.08 MEASUREMENT AND PAYMENT

The contract lump sum price paid for building work shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the building work, complete in place, as shown on the plans, as specified in the General Conditions and these special provisions, and as directed by the Engineer

Full compensation for any incidental materials and labor, not shown on the plans or specified, which are necessary to complete the building work shall be considered as included in the contract lump sum price paid for building work and no additional compensation will be allowed therefor.

1.09 SUBMITTALS

Shop drawings, material lists, descriptive data, samples and other submittals specified in these special provisions shall be submitted for approval in accordance with the provisions in Section 2-1.04, "Shop Drawings, Descriptive Data, Samples, and Alternatives," of the General Conditions and these special provisions

Unless otherwise permitted in writing by the Engineer and except submittals for "Alternatives" in conformance with the provisions of said Section 2-1.04 of the General Conditions, all submittals required by these special provisions shall be submitted within 35 days after the contract has been approved.

Attention is directed to the provisions in Section 2-1.01, "Authority of Engineer," of the General Conditions. The Engineer may request submittals for materials or products where submittals have not been specified in these special provisions, or may request that additional information be included in specified submittals, as necessary to determine the quality or acceptability of such materials or products.

Submittals shall be delivered to the locations indicated in these special provisions. If a specific location is not indicated, the submittal shall be delivered to the Division of Structure Design, Documents Unit, Fourth Floor, Mail Station 9-4/4I, 1801 30th Street, Sacramento, California 95816, telephone (916) 227-8252, or the submittals shall be mailed to the Division of Structure Design, Documents Unit, Mail Station 9-4/4I, P. O. Box 942874, Sacramento, California 94274-0001.

1.10 OBSTRUCTIONS

Attention is directed to Sections 5-1.02, "Protection and Use of Property," 5-1.03, "Responsibility for Damage," and 5-1.06, "Responsibility for Utilities," of the General Conditions and these special provisions.

Attention is directed to the existence of certain underground facilities that may require special precautions be taken by the Contractor to protect the health, safety and welfare of workers and of the public. Facilities requiring special precautions include, but are not limited to: conductors of petroleum products, oxygen, chlorine, and toxic or flammable gases; natural gas in pipelines greater than 150 mm in diameter or pipelines operating at pressures greater than 415 kPa (gage); underground electric supply system conductors or cables, with potential to ground of more than 300 V, either directly buried or in a duct or conduit which do not have concentric grounded or other effectively grounded metal shields or sheaths.

If these facilities are not located on the plans in both alignment and elevation, no work shall be performed in the vicinity of the facilities, except as provided herein for conduit to be placed under pavement, until the owner, or the owner's representative, has located the facility by potholing, probing or other means that will locate and identify the facility. The Contractor shall pothole Caltran's underground facilities. Conduit to be installed under pavement in the vicinity of onsite

facilities shall be placed by trenching or directional drilling/boring in conformance with the provisions in "Earthwork for Building Work, Aggregate Base, and Asphalt Concrete" of these special provisions. The directional drilling/boring shall conform to the requirements of the Sacramento Municipal Utility District (SMUD). If, in the opinion of the Engineer, the Contractor's operations are delayed or interfered with by reason of the utility facilities not being located by the owner or the owner's representative, an extension of time determined pursuant to the provisions in Section 6-1.08, "Liquidated Damages," of these General Conditions will be granted and the Contractor shall not be entitled to any additional compensation because of said delays.

The utilities shown on the Utility Plan to be potholed are utilities that if the facility is rendered inoperable during construction have potential to impact the projects schedule, and severely inconvenience the Contractor, public and/or State.

The Contractor shall notify the Engineer and the appropriate regional notification center for operators of subsurface installations at least 5 working days prior to performing any excavation or other work close to any underground pipeline, conduit, duct, wire or other structure. Regional notification centers include but are not limited to the following:

Underground Service Alert
Northern California (USA)
Telephone: 1(800)642-2444

Underground Service Alert
Southern California (USA)
Telephone: 1(800)422-4133

South Shore Utility
Coordinating Council (DIGS)
Telephone: 1(800)541-3447

Western Utilities
Underground Alert, Inc.
Telephone: 1(800)424-3447

1.11 TEMPORARY FENCE

Temporary fence shall be furnished, constructed, maintained, and later removed as shown on the plans, as specified in these special provisions and as directed by the Engineer.

Fence fabric shall be fabricated of 3 mm (11-gage) wire for fences 2135 mm or less in height, 3.8 mm (9-gage) wire for fences over 2135 mm in height and shall have 50 mm mesh.

Used materials may be installed provided the used materials are good, sound and are suitable for the purpose intended, as determined by the Engineer.

Materials may be commercial quality provided the dimensions and sizes of the materials are equal to, or greater than, the dimensions and sizes shown on the plans or specified herein.

Posts shall be either metal or wood at the Contractor's option Post lengths shall be 815 mm longer than height of fabric.

Galvanizing and painting of steel items will not be required.

Treating wood with a wood preservative will not be required.

Concrete footings for metal posts will not be required.

Temporary fence that is damaged during the progress of the work shall be repaired or replaced by the Contractor at the Contractor's expense.

When no longer required for the work, as determined by the Engineer, temporary fence shall be removed. Removed facilities shall become the property of the Contractor and shall be removed from the site of the work, except as otherwise provided in this section.

Holes caused by the removal of temporary fence shall be backfilled with materials equal to or better in quality and to the same thickness as the surrounding materials.

1.12 PRESERVATION OF PROPERTY

Attention is directed to Sections 5-1.02, "Protection and Use of Property," 5-1.03, "Responsibility for Damage," 5-1.05, "Contractor's Responsibility for the Work," and 5-1.06, "Responsibility for Utilities," of the General Conditions.

Operations shall be conducted in such a manner that existing facilities, surfacing, installations, and utilities which are to remain in place will not be damaged. Temporary surfacing, facilities, utilities and installations shall also be protected until they are no longer required. The Contractor, at his expense shall furnish and install piling, sheet piling, cribbing, bulkheads, shores, or whatever means may be necessary to adequately support material carrying such facilities, or to support the facilities themselves and shall maintain such support until they are no longer needed.

1.13 WATER POLLUTION CONTROL

Water pollution control work shall conform to the requirements in Section 5-1.101R, "Water Pollution," of the General Conditions, and these special provisions.

Water pollution control work shall conform to the requirements in the "Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual" and the "Construction Site Best Management Practices (BMPs) Manual," and addenda thereto issued up to, and including, the date of advertisement of the project, hereafter referred to respectively as the "Preparation Manual" and the "Construction Site BMP Manual" and collectively as the "Manuals." Copies of the Manuals may be obtained from the Department of Transportation, Material Operations Branch, Publication Distribution Unit, 1900 Royal Oaks Drive, Sacramento, California 95815, Telephone: (916) 445-3520. Copies of the Manuals may also be obtained from the Department's Internet Web Site at: <http://www.dot.ca.gov/hq/construc/stormwater.html>.

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

Unless arrangements for disturbance of areas outside the project limits are made by the Department and made part of the contract, it is expressly agreed that the Department assumes no responsibility to the Contractor or property owner whatsoever with respect to any arrangements made between the Contractor and property owner to allow disturbance of areas outside the project limits.

The Contractor shall be responsible for the costs and for any liability imposed by law as a result of the Contractor's failure to comply with the requirements set forth in this section "Water Pollution Control" including, but not limited to, compliance with the applicable provisions of the Manual and Federal, State and local regulations. For the purposes of this paragraph, costs and liabilities include but are not limited to fines, penalties and damages whether assessed against the State or the Contractor, including those levied under the Federal Clean Water Act and the State Porter Cologne Water Quality Act.

In addition to any remedy authorized by law, so much of the money due the Contractor under the contract that shall be considered necessary by the Department may be retained by the State of California until disposition has been made of the costs and liabilities.

The retention of money due the Contractor shall be subject to the following:

1. The Department will give the Contractor 30 days notice of its intention to retain funds from any partial payment which may become due to the Contractor prior to acceptance of the contract. Retention of funds from any payment made after acceptance of the contract may be made without prior notice to the Contractor.
2. No retention of additional amounts out of partial payments will be made if the amount to be retained does not exceed the amount being withheld from partial payments pursuant to Section 7-1.05, "Partial Payments," of the General Conditions.
3. If the Department has retained funds and it is subsequently determined that the State is not subject to the costs and liabilities in connection with the matter for which the retention was made, the Department shall be liable for interest on the amount retained at the legal rate of interest for the period of the retention.

Conformance with the requirements of this section "Water Pollution Control," shall not relieve the Contractor from the Contractor's responsibilities, as provided in Section 5-1.02, "Protection and Use of Property," and Section 5-1.03, "Responsibility for Damage," of the General Conditions.

WATER POLLUTION CONTROL PROGRAM PREPARATION, APPROVAL AND UPDATES.—As part of the water pollution control work, a Water Pollution Control Program, hereafter referred to as the "WPCP," is required for this contract. The WPCP shall conform to the requirements in Section 5-1.101R, "Water Pollution," of the General Conditions, the requirements in the Manuals, and these special provisions.

No work having potential to cause water pollution, as determined by the Engineer, shall be performed until the WPCP has been approved by the Engineer.

Within 30 days after the approval of the contract, the Contractor shall submit 3 copies of the WPCP to the Engineer. The Contractor shall allow 7 days for the Engineer to review the WPCP. If revisions are required, as determined by the Engineer, the Contractor shall revise and resubmit the WPCP within 7 days of receipt of the Engineer's comments and shall allow 7 days for the Engineer to review the revisions. Upon the Engineer's approval of the WPCP, 3 additional copies of the WPCP incorporating the required changes shall be submitted to the Engineer. Minor changes or clarifications to the initial submittal may be made and attached as amendments to the WPCP. In order to allow construction activities to proceed, the Engineer may conditionally approve the WPCP while minor revisions or amendments are being completed.

The objectives of the WPCP shall be to identify pollution sources that may adversely affect the quality of storm water discharges associated with the project and to identify, construct, implement and maintain water pollution control measures,

hereafter referred to as control measures, to reduce to the extent feasible pollutants in storm water discharges from the construction site during construction under this contract.

The WPCP shall incorporate control measures in the following categories:

1. Soil stabilization practices;
2. Sediment control practices;
3. Sediment tracking control practices;
4. Wind erosion control practices; and
5. Nonstorm water management and waste management and disposal control practices.

Specific objectives and minimum requirements for each category of control measures are contained in the Manuals.

The Contractor shall consider the objectives and minimum requirements presented in the Manuals for each of the above categories. When minimum requirements are listed for any category, the Contractor shall incorporate into the WPCP and implement on the project, one or more of the listed minimum controls required in order to meet the pollution control objectives for the category. In addition, the Contractor shall consider other control measures presented in the Manuals and shall incorporate into the WPCP and implement on the project the control measures necessary to meet the objectives of the WPCP. The Contractor shall document the selection process in accordance with the procedure specified in the Manuals.

The WPCP shall include, but not be limited to, the following items as described in the Preparation Manual:

1. Project description and Contractor's certification;
2. Project information;
3. Pollution sources, control measures, and water pollution control drawings; and
4. Amendments, if any.

The Contractor shall amend the WPCP, graphically and in narrative form, whenever there is a change in construction activities or operations which may affect the discharge of significant quantities of pollutants to surface waters, ground waters, municipal storm drain systems, or when deemed necessary by the Engineer. The WPCP shall also be amended if the WPCP has not achieved the objective of reducing pollutants in storm water discharges. Amendments shall show additional control measures or revised operations, including those in areas not shown in the initially approved WPCP, which are required on the project to control water pollution effectively. Amendments to the WPCP shall be submitted for review and approval by the Engineer in the same manner specified for the initially approved WPCP. Amendments shall be dated and attached to the on-site WPCP document.

The Contractor shall keep a copy of the WPCP, together with updates, revisions and amendments at the project site.

WPCP IMPLEMENTATION.—Upon approval of the WPCP, the Contractor shall be responsible throughout the duration of the project for installing, constructing, inspecting and maintaining the control measures included in the WPCP and any amendments thereto and for removing and disposing of temporary control measures. Unless otherwise directed by the Engineer or specified in these special provisions, the Contractor's responsibility for WPCP implementation shall continue throughout any temporary suspension of work ordered in accordance with Section 6-1.06, "Temporary Suspension of Work," of the General Conditions. Requirements for installation, construction, inspection, maintenance, removal and disposal of control measures are specified in the Manual and these special provisions.

Soil stabilization practices and sediment control measures, including minimum requirements, shall be provided throughout the winter season, defined as between October 15 and April 15.

Implementation of soil stabilization practices and sediment control measures for soil-disturbed areas of the project site shall be completed, except as provided for below, no later than 20 days prior to the beginning of the winter season or upon start of applicable construction activities for projects which begin either during or within 20 days of the winter season.

Throughout the winter season, the active, soil-disturbed area of the project site shall be no more than 2.0 hectares. The Engineer may approve, on a case-by-case basis, expansions of the active, soil-disturbed area limit. The Contractor shall demonstrate the ability and preparedness to fully deploy soil stabilization practices and sediment control measures to protect soil-disturbed areas of the project site before the onset of precipitation. The Contractor shall maintain a quantity of soil stabilization and sediment control materials on site equal to 100 percent of that sufficient to protect unprotected, soil-disturbed areas on the project site and shall maintain a detailed plan for the mobilization of sufficient labor and equipment to fully deploy control measures required to protect unprotected, soil-disturbed areas on the project site prior to the onset of precipitation. The Contractor shall include a current inventory of control measure materials and the detailed mobilization plan as part of the WPCP.

Throughout the winter season, soil-disturbed areas of the project site shall be considered to be nonactive whenever soil disturbing activities are expected to be discontinued for a period of 20 or more days and the areas are fully protected. Areas that will become nonactive either during the winter season or within 20 days thereof shall be fully protected with soil

stabilization practices and sediment control measures within 10 days of the discontinuance of soil disturbing activities or prior to the onset of precipitation, whichever is first to occur.

Throughout the winter season, active soil-disturbed areas of the project site shall be fully protected at the end of each day with soil stabilization practices and sediment control measures unless fair weather is predicted through the following work day. The weather forecast shall be monitored by the Contractor on a daily basis. The National Weather Service forecast shall be used, or an alternative weather forecast proposed by the Contractor may be used if approved by the Engineer. If precipitation is predicted prior to the end of the following work day, construction scheduling shall be modified, as required, and the Contractor shall deploy functioning control measures prior to the onset of the precipitation.

The Contractor shall implement, year-round and throughout the duration of the project, control measures included in the WPCP for sediment tracking, wind erosion, nonstorm water management and waste management and disposal.

The Engineer may order the suspension of construction operations which create water pollution if the Contractor fails to conform to the requirements of this section "Water Pollution Control" as determined by the Engineer.

MAINTENANCE.—To ensure the proper implementation and functioning of control measures, the Contractor shall regularly inspect and maintain the construction site for the control measures identified in the WPCP. The Contractor shall identify corrective actions and time frames to address any deficient measures or reinitiate any measures that have been discontinued.

The construction site inspection checklist provided in the Preparation Manual shall be used to ensure that the necessary measures are being properly implemented, and to ensure that the control measures are functioning adequately. The Contractor shall submit one copy of each site inspection record to the Engineer.

During the winter season, inspections of the construction site shall be conducted by the Contractor to identify deficient measures, as follows:

1. Prior to a forecast storm;
2. After all precipitation which causes runoff capable of carrying sediment from the construction site;
3. At 24 hour intervals during extended precipitation events; and
4. Routinely, at a minimum of once every 2 weeks.

If the Contractor or the Engineer identifies a deficiency in the deployment or functioning of an identified control measure, the deficiency shall be corrected by the Contractor immediately, or by a later date and time if requested by the Contractor and approved by the Engineer in writing, but not later than the onset of subsequent precipitation events. The correction of deficiencies shall be at no additional cost to the State.

The Engineer will retain an amount equal to 25 percent of the estimated value of the contract work performed during estimate periods in which the Contractor fails to conform to the requirements of this section "Water Pollution Control" as determined by the Engineer.

Retentions for failure to conform to the requirements of this section "Water Pollution Control" shall be in addition to the other retentions provided for in the contract. The amounts retained for failure of the Contractor to conform to the requirements of this section will be released for payment on the next monthly estimate for partial payment following the date that a WPCP has been implemented and maintained, and water pollution is adequately controlled, as determined by the Engineer.

1.14 UTILITY CONNECTION

The Contractor shall make all arrangements and obtain all permits and licenses required for the extension of and connection to each utility service applicable to this project, shall furnish all labor and materials necessary for such extensions which are not performed or provided by the utility, and shall furnish and install any intermediate equipment required by the serving utilities.

Upon written request by the Contractor, the State will pay all utility permits, licenses, connection charges, and excess length charges directly to the utility. Such request shall be submitted not less than 45 days before service connections are required.

The costs incurred by the Contractor for the extension of utilities beyond the limits shown on the plans, and in furnishing and installing any intermediate equipment required by the serving utilities, will be paid for as an ordered change as provided in Section 3, "Changes in the Work," of the General Conditions.

Full compensation for any costs incurred by the Contractor to obtain the permits and licenses shall be considered as included in the contract lump sum price paid for building work and no additional compensation will be allowed therefor.

1.15 TEMPORARY UTILITIES

The Contractor may obtain electrical power and water from existing State outlets within the contract limits free of charge for contract operations where such utilities exist, provided that such utility services are in service and are not required by the State for other purposes and subject to the provisions in "Cooperation" of these special provisions.

The Contractor, at his own expense, shall obtain any additional electrical power and water or other utilities required for his operations and shall make and maintain the necessary service connections.

The Contractor shall provide and pay for telephone service he may require. State telephone facilities shall not be used.

The Contractor shall provide adequate temporary lighting to perform the work and allow the Engineer to inspect the project as each portion is completed.

1.16 SANITARY FACILITIES

State sanitary facilities will not be available for use by the Contractor's employees, during normal State working hours. Tools shall not be cleaned nor shall cleaning liquids be disposed of in State sanitary facilities or sewers.

1.17 REFERENCES

Attention is directed to Section 1-1.26, "Abbreviations," of the General Conditions

When reference is made to the Uniform Building Code (UBC) on the plans or in the special provisions, it shall be the 1997 Uniform Building Code as amended by the 1998 Title 24 California Building Standards Code.

1.18 PROJECT RECORD DRAWINGS

The Contractor shall prepare and maintain one set of project record drawings, using an unaltered set of original project plans, to clearly show all as-constructed information for the project. As a minimum, the information to be shown shall include 1) any plan clarifications or change orders, 2) locations of any underground utilities, or 3) the location, size, type, and manufacturer of all major products or components selected by the Contractor for use in the work.

All markings shall be placed on the project record drawings using red ink or red pencil. Original figures shall not be eradicated nor written over and superseded material shall be neatly lined out. Additional drawings shall be submitted if the required information cannot be clearly shown on the original set of project plans. The additional drawings shall be not less than 279 mm x 432 mm in size and shall have the contract number on each sheet. The Contractor shall sign and date each sheet of the project record drawings to verify that all as-constructed information shown on the drawings is correct.

The Contractor shall periodically review the set of project record drawings with the Engineer during the progress of the work to assure that all changes and other required information are being recorded.

Before completion of the work, the Contractor shall request a review of the project record drawings to determine the completeness and adequacy of them. If the project record drawings are unacceptable, the Contractor shall inspect, measure, and survey the project as necessary to record the required additional information.

The set of completed project record drawings shall be delivered to the Engineer prior to acceptance of the contract.

1.19 FIELD ENGINEERING

This section specifies administrative and procedural requirements for field engineering services to be performed by the Contractor.

Lines and grades.--Such stakes or marks will be set by the Engineer as he determines to be necessary to establish the lines and grades required for the completion of the work shown on the plans and as specified in these special provisions. In general, these will consist of the primary vertical and horizontal control points.

Stakes and marks set by the Engineer shall be carefully preserved by the Contractor. In case such stakes and marks are destroyed or damaged they will be replaced at the Engineer's earliest convenience. The Contractor will be charged for the cost of necessary replacement or restoration of such stakes and marks which in the judgment of the Engineer were carelessly or willfully destroyed or damaged by the Contractor's operations. This charge will be deducted from any moneys due or to become due the Contractor.

All other stakes or marks required to establish the lines and grades required for the completion of the work shall be the responsibility of the Contractor.

Existing utilities and equipment.--The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, the Contractor shall investigate and verify the existence and location of underground utilities and other construction.

Prior to construction, the Contractor shall verify the location and invert elevation at points of connection of sanitary and septic sewers, storm sewer, and water or fire service piping.

Surveys for layout and performance.--The Contractor shall perform all surveys for layout and performance, reduce field notes, and make all necessary calculations and drawings necessary to carry out the work.

The Contractor shall locate and layout site improvements, and other work requiring field engineering services, including pavements, stakes for grading, fill and topsoil placement, utility slopes and invert elevations by instrumentation and similar appropriate means.

Batter boards shall be located and laid out for structures, building foundations, column grids and locations, floor levels and, control lines and levels required for mechanical and electrical work.

Survey accuracy and tolerances.--The tolerances generally applicable in setting survey stakes for foundations, slabs, and underground work shall not exceed the following:

Survey Stakes or Markers	Tolerance
Rough grading or excavation	30 mm
Trimming or preparation of subgrade for roadways	15 mm
Roadway surfacing, steel or concrete pipe	6 mm
Structures or building construction	3 mm

Such tolerance shall not supersede stricter tolerances required by the plans or special provisions, and shall not otherwise relieve the Contractor of responsibility for measurements in compliance therein.

1.20 SUBSTITUTION OF NON-METRIC MATERIALS AND PRODUCTS

Only materials and products conforming to the requirements of the specifications shall be incorporated in the work. When metric materials and products are not available, and when approved by the Engineer, and at no cost to the State, materials and products in the inch-pound (imperial) system which are of equal quality and of the required properties and characteristics for the purpose intended, may be substituted for the equivalent metric materials and products, subject to the following requirements:

Materials and products shown on the plans or in the special provisions as being equivalent may be substituted for the metric materials and products specified or detailed on the plans.

Before other non-metric materials and products will be considered for use the Contractor shall furnish, at the Contractor's expense, evidence satisfactory to the Engineer that the materials and products proposed for use are equal to or better than the materials and products specified or detailed on the plans. The burden of proof as to the quality and suitability of substitutions shall be upon the Contractor and the Contractor shall furnish all information necessary as required to the Engineer. The Engineer will be the sole judge as to the quality and suitability of the substituted materials and products and the Engineer's decision shall be final.

When the Contractor elects to substitute non-metric materials and products, including materials and products shown on the plans or in the special provisions as being equivalent, a list of substitutions to be made shall be submitted for approval.

The following substitutions of materials and products will be allowed:

SUBSTITUTION TABLE FOR SIZES OF HIGH STRENGTH STEEL FASTENERS, ASTM Designation: A 325M	
METRIC SIZE SHOWN ON THE PLANS mm x thread pitch	IMPERIAL SIZE TO BE SUBSTITUTED inch
M16 x 2	5/8
M20 x 2.5	3/4
M22 x 2.5	7/8
M24 x 3	1
M27 x 3	1-1/8
M30 x 3.5	1-1/4
M36 x 4	1-1/2

SUBSTITUTION TABLE FOR REINFORCEMENT	
METRIC BAR DESIGNATION NUMBER AS SHOWN ON THE PLANS	IMPERIAL BAR DESIGNATION NUMBER TO BE SUBSTITUTED
10	3
13	4
16	5
19	6
22	7
25	8
29	9
32	10
36	11
43	14
57	18

SUBSTITUTION TABLE FOR WELDED PLAIN WIRE REINFORCEMENT, ASTM DESIGNATION: A 185	
	US CUSTOMARY UNITS SIZE TO BE SUBSTITUTED inch ² x 100
MW9	W1.4
MW10	W1.6
MW13	W2.0
MW15	W2.3
MW19	W2.9
MW20	W3.1
MW22	W3.5
MW25	W3.9, except W3.5 in piles only
MW26	W4.0
MW30	W4.7
MW32	W5.0
MW35	W5.4
MW40	W6.2
MW45	W6.5
MW50	W7.8
MW55	W8.5, except W8.0 in piles only
MW60	W9.3
MW70	W10.9, except W11.0 in piles only
MW80	W12.4
MW90	W14.0
MW100	W15.5

The sizes in the following tables of materials and products are exact conversions of metric sizes of materials and products and are listed as acceptable equivalents:

CONVERSION TABLE FOR SIZES OF: (1) STEEL FASTENERS FOR GENERAL APPLICATIONS, ASTM Designation: A 307 or AASHTO Designation: M 314, Grade 36 or 55, and (2) HIGH STRENGTH STEEL FASTENERS, ASTM Designation: A 325 or A 449	
DIAMETER	
METRIC SIZE SHOWN ON THE PLANS mm	EQUIVALENT IMPERIAL SIZE inch
6, or 6.35	1/4
8 or 7.94	5/16
10, or 9.52	3/8
11, or 11.11	7/16
13 or 12.70	1/2
14, or 14.29	9/16
16, or 15.88	5/8
19, or 19.05	3/4
22, or 22.22	7/8
24, 25, or 25.40	1
29, or 28.58	1-1/8
32, or 31.75	1-1/4
35, or 34.93	1-3/8
38 or 38.10	1-1/2
44, or 44.45	1-3/4
51, or 50.80	2
57, or 57.15	2-1/4
64, or 63.50	2-1/2
70 or 69.85	2-3/4
76, or 76.20	3
83, or 82.55	3-1/4
89 or 88.90	3-1/2
95, or 95.25	3-3/4
102, or 101.60	4

CONVERSION TABLE FOR NOMINAL THICKNESS OF SHEET METAL			
UNCOATED HOT AND COLD ROLLED SHEETS		HOT-DIPPED ZINC COATED (GALVANIZED) SHEETS	
METRIC THICKNESS SHOWN ON THE PLANS mm	EQUIVALENT US STANDARD GAGE inch	METRIC THICKNESS SHOWN ON THE PLANS mm	EQUIVALENT GALVANIZED SHEET GAGE inch
7.94	0.3125		
6.07	0.2391		
5.69	0.2242		
5.31	0.2092		
4.94	0.1943		
4.55	0.1793		
4.18	0.1644	4.270	0.1681
3.80	0.1495	3.891	0.1532
3.42	0.1345	3.510	0.1382
3.04	0.1196	3.132	0.1233
2.66	0.1046	2.753	0.1084
2.28	0.0897	2.372	0.0934
1.90	0.0747	1.994	0.0785
1.71	0.0673	1.803	0.0710
1.52	0.0598	1.613	0.0635
1.37	0.0538	1.461	0.0575
1.21	0.0478	1.311	0.0516
1.06	0.0418	1.158	0.0456
0.91	0.0359	1.006 or 1.016	0.0396
0.84	0.0329	0.930	0.0366
0.76	0.0299	0.853	0.0336
0.68	0.0269	0.777	0.0306
0.61	0.0239	0.701	0.0276
0.53	0.0209	0.627	0.0247
0.45	0.0179	0.551	0.0217
0.42	0.0164	0.513	0.0202
0.38	0.0149	0.475	0.0187

CONVERSION TABLE FOR WIRE		
METRIC THICKNESS SHOWN ON THE PLANS	EQUIVALENT USA STEEL WIRE THICKNESS	GAGE NO.
mm	inch	
6.20	0.244	3
5.72	0.225	4
5.26	0.207	5
4.88	0.192	6
4.50	0.177	7
4.11	0.162	8
3.76	0.148	9
3.43	0.135	10
3.05	0.120	11
2.69	0.106	12
2.34	0.092	13
2.03	0.080	14
1.83	0.072	15
1.57	0.062	16
1.37	0.054	17
1.22	0.048	18
1.04	0.041	19
0.89	0.035	20

CONVERSION TABLE FOR COMMON NAILS				
NAIL SIZE	METRIC mm		ENGLISH inch	
	Length	Diameter	Length	Diameter
8d	63.5	3.33	2 1/2	0.131
10d	76.2	3.76	3	0.148
16d	88.9	4.11	3 1/2	0.162

CONVERSION TABLE FOR LUMBER	
METRIC NOMINAL SURFACE DRY SIZE	EQUIVALENT NOMINAL SURFACE DRY U S SIZE
mm	inch
51	2
102	4
152	6
203	8
254	10
305	12

CONVERSION TABLE FOR PLYWOOD	
METRIC mm	ENGLISH inch
6.4	1/4
7.9	5/16
9.5	3/8
11.1	7/16
11.9	15/32
12.7	1/2
15.1	19/32
15.9	5/8
18.3	23/32
19.1	3/4
22.2	7/8
25.4	1
28.6	1 1/8

CONVERSION TABLE FOR INSULATION R-VALUE	
METRIC (K m ² /W)	ENGLISH (HR FT ² F/BTU)
0.5	3
0.7	4
1.4	8
1.9	11
2.3	13
2.5	14
3.3	19
5.3	30

CONVERSION TABLE FOR VAPOR TRANSMISSION RATING	
METRIC (Perm-m)	ENGLISH (perm-inch)
0.29	0.02

CONVERSION TABLE FOR LOW PRESSURE	
METRIC (Pa)	ENGLISH (Inches of Water Column)
30	0.125
60	0.25
90	0.375
120	0.50
150	0.60
155	0.625
175	0.70
185	0.75
200	0.80
250	1.00
310	1.25

CONVERSION TABLE FOR PRESSURE	
METRIC (kPa)	ENGLISH (psi)
10	1.5
210	30
280	40
350	50
690	100
860	125
1040	150
1100	160
1210	175
1380	200
1730	250
2070	300
2170	315
2410	350
2590	375
2760	400
4830	700
5170	750
5520	800
13800	2000
17200	2500
20700	3000
27600	4000
34500	5000
137900	20000

CONVERSION TABLE FOR MIL THICKNESS	
METRIC (mm)	ENGLISH (inch/1000)
0.10	4
0.13	5
0.15	6
0.50	20
0.75	30
1.00	40

CONVERSION TABLE FOR HVAC DUCTING.	
METRIC (mm)	ENGLISH (inch)
100	4
125	5
150	6
175	7
200	8
225	9
250	10
300	12
360	14
410	16
460	18
510	20
560	22
610	24
660	26
710	28
760	30

CONVERSION TABLE FOR MECHANICAL PIPING		
METRIC (GSP, PVC, BSP, DUCTILE IRON)	METRIC (mm)	ENGLISH (inch)
NPS 1/2	15	1/2
NPS 3/4	20	3/4
NPS 1	25	1
NPS 1 1/4	32	1 1/4
NPS 1 1/2	40	1 1/2
NPS 2	50	2
NPS 2 1/2	65	2 1/2
NPS 3	75	3
NPS 4	100	4
NPS 6	150	6

CONVERSION TABLE FOR LUBRICATION PIPING TUBING WALL THICKNESS	
METRIC (mm)	ENGLISH (inch)
2.1	0.083
0.9	0.035

CONVERSION TABLE FOR HOSE/TUBING SIZES O. D.	
METRIC (mm)	ENGLISH (inch)
6	1/4
10	3/8
13	1/2
16	5/8
19	3/4
22	7/8
25	1

CONVERSION TABLE FOR DRUM SIZES			
METRIC		ENGLISH	
L	kg	gallons	pounds
205	180	55	400
60	55	16	120
19	16	5	35

CONVERSION TABLE FOR POWER	
METRIC (kW)	ENGLISH (HP)
0.037	1/20
0.075	1/10
0.18	1/4
0.25	1/3
0.37	1/2
0.55	3/4
0.75	1
1.1	1 1/2
1.5	2
2.2	3
3.7	5
5.5	7 1/2
7.5	10
11	15
15	20
18.5	25
22	30
30	40
37	50
45	60
55	75
75	100
90	120
110	150

CONVERSION TABLE FOR IMPELLER BALANCE		
SYNCHRONOUS RPM	METRIC (g mm/kg)	ENGLISH (ounce- inch/pound)
720	94	0.059
900	73	0.046
1200	54	0.034
1800	41	0.026
3600	17	0.011

CONVERSION TABLE FOR ELECTRICAL CONDUIT	
METRIC SIZE SHOWN ON THE PLANS mm	EQUIVALENT IMPERIAL SIZE inch
16	1/2
21	3/4
27	1
35	1 1/4
41	1 1/2
53	2
103	4

DIVISION 2. SITEWORK

2.01 DEMOLITION

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of demolition and removal of all improvements remaining either wholly or partially within the project limits, including, but not limited to, buildings, foundations, slabs above ground and other features shown to be removed.

PART 2.- PRODUCTS (Not applicable.)

PART 3.- EXECUTION

Description.--The general description of these improvements are as follows:

Hydraulic Pump Building, approximately 21 m², with wood framing, corrugated metal siding, aluminum roofing, concrete slab and footings, and appurtenances.

Metal roof.

Disposal.--The Contractor shall not dispose of the improvements or material therefrom by sale, gift, or in any manner whatsoever to the general public at the site, provided however, that these provisions shall not be construed as limiting or prohibiting the sale or disposal of such improvements or materials at the site to duly licensed contractors or materials men, and provided that the materials are removed from the improvement by the State's Contractor. Removal of the buildings as a unit, or in sections capable of reassembly as a structure, is expressly prohibited.

2.02 REMOVING PORTIONS OF EXISTING FACILITIES

PART 1.- GENERAL

Scope.--This work shall consist of removing portions of the existing facilities, including removal of existing work to gain access to or for new work, in accordance with the details shown on the plans and these special provisions.

PART 2.- PRODUCTS (Not applicable)

PART 3.- EXECUTION

PREPARATION.--

General.--The limits of removal shall be located and identified. Items to be removed and the interface of items to be removed and items to remain intact shall be identified and marked.

Prior to removing concrete, a saw cut approximately 25 mm deep shall be made along the limits of removal on all faces that will be visible in the completed work.

REMOVAL.--

General.--Removal shall be to the limits shown on the plans. Removal shall be done carefully to minimize damage to the portions to remain. Remaining portions that are damaged by the Contractor's operation shall be restored to original condition at the Contractor's expense.

Assemblies to be salvaged which require dismantling for removal shall be matchmarked before dismantling.

Existing apparatuses, devices, or accessories which would be functionally impaired by new construction or remodeling shall be moved, brought out to new surfaces, or provided with new access covers, as necessary to restore apparatuses, devices, or accessories to their original usefulness.

Piping and conduits to be abandoned shall be capped or plugged.

DISPOSAL.--

General.--Materials that are to be removed, shall become the property of the Contractor and shall be disposed of away from the premises. Such disposal shall conform to the laws, rules, and regulations of all agencies having jurisdiction at the disposal site.

SALVAGE.--

General.--Materials or equipment shown on the plans to be salvaged shall remain the property of the State and shall be removed, cleaned and stockpiled at a location at the project site designated by the Engineer.

2.03 RELOCATING MATERIALS AND EQUIPMENT

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of relocating existing materials and equipment in accordance with the details shown on the plans and these special provisions.

PART 2.- PRODUCTS (Not applicable)

PART 3.- EXECUTION

RELOCATION.--

General.--Materials or equipment to be relocated shall be removed carefully to avoid damage to the materials or equipment or to the materials or equipment which are to remain. Assemblies to be relocated which require dismantling for removal shall be matchmarked before dismantling.

The Contractor shall notify the Engineer prior to the relocation work in order that the materials or equipment may be inspected for existing damage.

Materials or equipment to be relocated shall have all adhering concrete, mastics, earth or other deleterious materials removed and shall have all exterior surfaces cleaned.

Materials or equipment which are damaged by the Contractor's operations shall be replaced or restored to match the condition of the materials or equipment prior to the beginning of the Contractor's operations. Replacement or restoration of damaged materials or equipment shall be at the Contractor's expense.

Connections, anchorages and fasteners for relocated materials and equipment shall match existing and shall be furnished and installed by the Contractor. Assemblies which have been dismantled shall be reassembled to match the existing installation. Relocated materials and equipment shall be installed as required for new work.

Modifications to wiring and plumbing to accommodate relocated items shall be as shown on the plans. Ends of piping and conduits to be abandoned shall be capped.

Surfaces that are exposed to view upon removal or relocation of materials or equipment shall be patched. Bumps shall be removed and depressions filled, and the surface finished to match the existing surfaces. Depressions in concrete less than 25 mm deep shall be deepened to 25 mm minimum depth before filling with cement mortar.

DISPOSAL.--

General.--Material from existing facilities to be reused in the work, in the opinion of the Engineer, is unsuitable for use shall become the property of the Contractor and disposed of away from the premises. Such disposal shall conform to the laws, rules, and regulations of all agencies having jurisdiction at the disposal site. The unsuitable material shall be replaced as ordered by the Engineer and will be paid for as provided in Section 3, "Changes in the Work," of the General Conditions.

2.04 REMOVAL AND DISPOSAL OF ASBESTOS

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of removing and disposing of hazardous or asbestos-related materials which are designated on the plans or specified in these special provisions to be removed and disposed of.

Where existing hazardous or asbestos-related materials are to be removed during demolition, construction or alterations, such material shall be treated as hazardous waste, and shall be removed, hauled and disposed of in accordance with all applicable Federal, State and local laws and ordinances.

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

1. California Health and Safety Code, Division 20, Chapter 6.5, Hazardous Waste Control.
2. California Code of Regulations, Title 22, Division 4, Chapter 30, "Minimum Standards for Management of Hazardous and Extremely Hazardous Material," latest revisions, as applicable.
3. California Code of Regulations, Title 8, General Industry Safety Order 5208 Asbestos.
4. Occupational Safety and Health Administration, Part 26 (amended), of Title 29 of the Code of Federal Regulations.

PART 2.- PRODUCTS (Not applicable)

PART 3.- EXECUTION

REMOVAL.--

Preparation.--Prior to performing operations involving the removal of hazardous waste containing asbestos, the Contractor shall provide written notification to the following agencies:

State Department of Toxic Substances Control
400 P Street
Sacramento, CA 95814
Telephone No. (916) 322-0476

Division of Occupational Safety and Health
2424 Arden Way, Suite 165
Sacramento, CA 95825
Telephone No. (916) 263-2800

Sacramento Metropolitan Air Quality Management
District
777 12th Street, 3rd floor
Sacramento, CA 95814

The Contractor shall notify Division of Occupational Safety and Health (CAL OSHA) 24 hours prior to performing removal operations of materials containing asbestos.

The Contractor shall notify the Engineer 3 working days in advance of commencement of removal operations of material containing asbestos.

Handling.--The Contractor shall comply with all Federal, State, and local regulations for the removal of material containing asbestos prior to demolition, shall place such removed material in approved plastic containers (double ply, 0.15 mm minimum thickness, plastic bags) with caution labels affixed to said bags. Such caution labels shall have conspicuous, legible lettering which spells out the following, or equivalent warning:

**CAUTION
CONTAINS ASBESTOS FIBERS
BREATHING ASBESTOS DUST MAY
CAUSE SERIOUS BODILY HARM**

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

The Contractor shall comply with all Federal, State and local requirements for safety which shall include providing employees with coveralls (preferably disposable plastic coated), rubber gloves (to be discarded after use), rubber boots (to be washed thoroughly after use), and disposable dust respirators (to cover nose and mouth). The use of goggles shall be optional.

The Contractor shall be responsible for verifying that all employees, who are involved in asbestos removal operations, wear the protective devices enumerated herein during removal operations.

Transporting.--All haulers of hazardous waste material shall be currently registered with the State Department of Health Services (DOHS), and shall have a U.S. Environmental Protection Agency Identification Number (U.S. EPA I.D. Number). All vehicles used to transport hazardous waste material shall have affixed to the vehicle a valid Certificate of Compliance issued by DOHS. If a roll off or drop box is utilized, both the drop box and the transporting vehicle must have a valid Certificate of Compliance issued by DOHS.

Disposal.--The Engineer will obtain the required EPA generator identification numbers, and will sign the hazardous waste manifests.

The Contractor shall dispose of all hazardous waste containing asbestos at a Class I, Class II-1, Class II-2, or Class 3 disposal site (old designation), or at a Class I, Class II, or Class 3 disposal site (new designation), which had previously agreed to accept the hazardous waste.

The Contractor shall notify the proper authorities at the disposal site in advance of delivery of hazardous waste containing asbestos to the disposal site.

2.05 LEAD ABATEMENT.--

PART 1.- GENERAL

SUMMARY.--

Scope.--The work shall consist of procedures for removal, repair, and disposal of lead based materials which are designation on the plans or specified in these special provisions to be removed and disposed of.

Where existing lead based materials are to be removed during demolition, construction or alterations, such material shall be treated as hazardous waste, and shall be removed, hauled and disposed of in accordance with all applicable Federal, State and local laws and ordinances.

SUBMITTALS.--

Health and safety.--A Code of Safe Practices, an Injury and Illness Prevention Program, and a Hazard Communication Program in accordance with the provisions of Construction Safety Orders 1509 and 1510 shall be submitted for approval.

QUALITY ASSURANCE.--

Codes and standards.--Codes which govern removal and disposal of materials containing lead include, but are not limited to the following:

1. California Health and Safety Code, Division 20, Chapter 6.5, "Hazardous Waste Control Act."
2. California Code of Regulations, Title 22, Division 4, Chapter 30, "Minimum Standards for Management of Hazardous and Extremely Hazardous Material."
3. California Code of Regulations, Title 8, General Industry Safety Order, Section 1532.1, Lead.
4. Occupational Safety and Health Administration, Part 26 (amended), of Title 29 of the Code of Federal Regulations.

Compliance program.--The Contractor shall submit the compliance programs required in subsection (e)(2), "Compliance Program," of said Section 1532.1, "Lead," to the Engineer for approval before starting removal work on the project and at such times when revisions to the program are ordered by the Engineer. The compliance programs shall be prepared by an industrial hygienist certified by the American Council of Industrial Hygiene. The Engineer will notify the Contractor of the approval or rejection of any submitted or revised compliance program in not more than 10 working days.

If measures being taken by the Contractor are inadequate to provide for worker safety and the containment and collection of residue from existing paint systems, the Engineer will direct the Contractor to revise his operations and the compliance program. Such directions will be in writing and will specify the items of work for which the Contractor's compliance programs are inadequate. No further work shall be performed on said items until the compliance programs are adequate and, if required, a revised compliance program has been approved.

The State will not be liable to the Contractor for failure to approve all or any portion of an originally submitted or revised compliance program for worker safety and the containment and collection of residue from existing paint systems, nor for any delays to the work due to the Contractor's failure to submit an acceptable compliance program.

Field sampling.--The Contractor shall furnish sampling and testing programs for air and soil as applicable. The programs shall be prepared and carried out by an industrial hygienist certified by the American Council of Industrial Hygiene. The number and location of the samples shall be designated by the Engineer.

Air samples, if required, shall be collected during removal operations to measure concentrations of heavy metals and total particulate matter in the ambient air as PM-10 (particulate matter with an aerodynamic diameter less than or equal to 10 micrometers). Air samples shall be collected and analyzed in accordance with the Code of Federal Regulations 40 CFR PART 50, Appendix J, except as follows:

1. Air samples shall be Reference or Equivalent Method PM-10 Samplers as designated by the U. S. Environmental Agency and in accordance with requirements of 40 CFR PART 53.
2. Sampling time each day shall coincide with the time of removal operations but the duration of sampling shall be not less than 8 hours.
3. Immediately following analysis for PM-10, all samples will be analyzed for heavy metal content in accordance with 40 CFR PART 50, Appendix G.

A minimum of 4 soil samples shall be collected before start of work which disturbs the existing paint system, and a minimum of 4 soil samples shall be collected within 36 hours following completion of the work which disturbs the existing paint system. A soil sample shall consist of 5 plugs, each 20 mm diameter and 15 mm deep, taken at each corner and center of a 0.30 meter square area. Soil samples shall be analyzed for total lead, total chromium and total zinc in accordance with Method 3050 in "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846" by the United States Environmental Protection Agency.

Sample analysis results shall be submitted in triplicate to the Engineer within 10 days after sampling. Sample analysis reports shall be prepared by the certified hygienist and include the following information:

For both air and soil sample analysis results, the date and sample location of sample collection, sample number, contract number, and facility name as shown on the contract plans will be required.

For air sample analysis results, the following will be required:

1. Start time, end time and duration of sample collection.
2. Start time and end times of cleaning on the day of sample collection.

3. Concentrations of PM-10 expressed as micrograms PM-10 per standard cubic meter of air.
4. Concentrations of heavy metals expressed as micrograms per standard cubic meter of air.

For soil sample analysis results, the concentrations of heavy metal expressed as parts million will be required.

PART 2.- PRODUCTS (Not applicable.)

PART 3.- EXECUTION

REMOVAL.--

Notification.--The Contractor shall notify the Engineer 3 working days in advance of commencement of removal operations of material containing lead or lead based materials.

Method of removal.--Painted materials shall be removed using the wet process removal equipment and methods, to a depth required to remove all paint and provide clean substrate suitable for a new finish.

Removed material and water used for removal shall be collected. Removed material shall be separated from water using approved filters.

Handling.--The Contractor shall comply with all Federal, State, and local regulations for the removal of material containing lead prior to demolition, shall place such removed material in approved plastic containers (double ply, 0.15 mm minimum thickness, plastic bags) with caution labels affixed to said bags. Such caution labels shall have conspicuous, legible lettering which spells out the following, or equivalent warning:

**CAUTION
CONTAINS LEAD**

Temporary storage on the ground of material and residue produced when the existing paint system is disturbed will not be permitted. Material and residue shall be stored in leak proof containers and shall be handled in such a manner that no spillage will occur.

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

Safety measures.--The Contractor shall comply with all Federal, State and local requirements for safety which shall include providing employees with coveralls (preferably disposable plastic coat ed), rubber gloves (to be discarded after use), rubber boots (to be washed thoroughly after use), and respirators.

The Contractor shall be responsible for verifying that all employees, who are involved in removal operations, wear the required protective devices during removal operations.

DISPOSAL.--

Transporting.--All haulers of hazardous waste material shall be currently registered with the State Department of Health Services (DOHS), and shall have a U.S. Environmental Protection Agency Identification Number (U.S. EPA I.D. Number). All vehicles used to transport hazardous waste material shall have affixed to the vehicle a valid Certificate of Compliance issued by DOHS. If a roll off or drop box is utilized, both the drop box and the transporting vehicle must have a valid Certificate of Compliance issued by DOHS.

Disposal.--The Engineer will obtain the required EPA generator identification numbers, and will sign the hazardous waste manifests.

All material and residue produced during removal operations shall be tested and disposed of by the Contractor in California at an approved Class 1 disposal facility in accordance with the requirements of the disposal facility operator.

The Contractor shall notify the proper authorities at the disposal site in advance of delivery of hazardous waste containing lead to the disposal site.

2.06 CLEARING AND GRUBBING

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of removing all objectionable material from the building site in accordance with the details shown on the plans and these special provisions.

Clearing and grubbing shall be performed in advance of any other grading or construction operations.

The area to be cleared and grubbed shall be within the building work construction area.

SITE CONDITIONS.--

Traffic.--Clearing and grubbing shall be conducted to ensure minimum interference with roads, street, walks or other occupied areas.

Protection of existing landscaping and trees.--Existing landscaping and trees which are to remain in place shall be protected from injury or damage. Existing trees shall be protected with a temporary fence around the drip line.

PART 2.- PRODUCTS (Not applicable.)

PART 3.- EXECUTION

SITE CLEARING.--

General.--Remove trees, shrubs, grass and other vegetation, concrete and masonry, improvements, or obstructions interfering with the new construction.

Trees to be removed shall be grubbed to a depth of not less than 0.6 meter below finished grade.

REMOVAL OF WASTE MATERIAL.--

Hauling.--When hauling is done over highways or city streets, and when directed by the Engineer, the loads shall be trimmed and all material removed from shelf areas of the vehicles.

Disposal.--Trees, shrubs, grass, weeds and other vegetation, debris, and any obstructions above or below the ground surface that interfere with the building work, shall be removed and disposed of off the premises.

2.07 BORING FOR CONDUIT

GENERAL.--This work shall consist of boring for electrical conduit to be placed under Folsom Boulevard in accordance with the details shown on the plans and these special provisions.

The Contractor shall not open trench Folsom Boulevard.

The Contractor shall bore underneath Folsom Boulevard to place electrical conduit so as not to disturb traffic or utilities. The boring shall conform to the requirements of the Sacramento Municipal Utility District (SMUD) and the City of Sacramento.

Ends of the conduit shall lie outside the surfaced roadway. Boring pits required for boring the conduit shall be excavated and backfilled in accordance with the requirements specified for conduit trenches under "Earthwork for Building Work" in Division 2, "Sitework," of these special provisions. Boring pits shall not undermine the roadway surfacing.

2.08 EARTHWORK FOR BUILDING WORK

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of performing earthwork for building work in accordance with the details shown on the plans and these special provisions.

Earthwork for building work shall consist of structure excavation and structure backfill. Structure excavation shall include excavation for footings, foundations, walls, slabs, and trenches. Structure backfill shall include backfilling under slabs; backfilling under and around footings; backfilling for walls, backfilling for pipes and conduits; backfilling holes resulting from removal of existing facilities. In addition to structure excavation and structure backfill, earthwork for building work shall include any other earthwork, not mentioned, but necessary to complete the building work.

Attention is directed to the Materials Information Handout for information regarding foundation recommendations and reports that were prepared for use during the design of this project.

Attention is directed to the requirements of "Field Engineering" in Division 1, "General Requirements," of these special provisions.

QUALITY ASSURANCE.--

Samples.--Samples of sand, pea gravel, or crushed stone, weighing not less than 11 kg, shall be submitted to the Engineer at the jobsite for approval.

SITE CONDITIONS.--

Existing underground piping and conduit.--The location of existing underground piping and conduit is based on the best records available. Before beginning work, the Contractor shall accurately locate the piping and conduit involved in the work. If the location of the existing piping or conduit deviates from the location shown on the plans by more than 1.5 meters, or, if no elevations are indicated and the piping or conduit is more than 0.9 meter below grade, the cost of the additional excavation, backfill, piping or conduit, and removal and replacement of concrete, if any, will be paid for as an ordered change in accordance with the requirements specified in Section 3, "Changes in the Work," of the General Conditions.

Existing surfaced or planted areas.--Existing surfaced or planted areas that are removed, broken or damaged by the Contractor's operations shall be restored to their original condition except as otherwise shown on the plans or specified herein.

Restoration materials shall be equal to or better than the original materials. Surfacing shall be replaced to match the material thickness, grades, and finish of the adjacent surrounding surfaces.

PART 2.- PRODUCTS

BACKFILL MATERIALS.--

Structure backfill.--

Structure and trench backfill shall be free of organic and other deleterious material and shall be suitable for the required compaction. Gravel without sand matrix shall not be used except as free draining granular material beneath slabs and footings.

Sand.--

Sand shall be clean, washed sand, free from clay or organic material graded such that 100 percent passes the 6 mm sieve, 90 percent to 100 percent passes the 4.75 mm sieve and not more than 5 percent passes the 75 µm sieve size.

PART 3.- EXECUTION

PREPARATION & RESTORATION.--

Sawcutting.--Prior to excavation or trenching, existing surfacing shall be removed to saw cut lines, or to existing wood dividers or expansion joints, if any. The saw cut shall be to a neat line and have a depth not less than 25 mm.

Restoration.--Surfacing shall be replaced to match the thickness, grades and finish of the adjacent surrounding surfaces.

STRUCTURE EXCAVATION.--

General.--Unless otherwise noted, all excavation for building work shall be classified as structure excavation.

Footing excavation.--The bottom of excavations shall not be disturbed. The contractor shall excavate by hand to the final grade. The bottom of concrete footings shall be poured against undisturbed material. Unless otherwise noted, compaction of the bottom of footing excavation is not required unless the material is disturbed. The footing depths shown on the plans shall be changed to suit field conditions when directed by the Engineer. Solid rock at or near required depths shall not be disturbed. Unsuitable material shall be excavated down to firm bearing as directed by the Engineer. Work and materials required because of excavation in excess of the depths shown on the plans, when such excavation has been ordered by the Engineer, will be paid for as an ordered change in accordance with the requirements in Section 3, "Changes in the Work," of the General Conditions.

Excavate to the elevations and dimensions within a tolerance of ± 12 mm. Limits of the excavation shall allow for adequate working space for installing materials and as required for safety of personnel. Such working space excavation shall be replaced in kind and compacted at the Contractor's expense.

Overdepth excavation for footings shall be backfilled with concrete or such other material recommended by the Contractor and approved by the Engineer. Relative compaction shall be not less than 95 percent.

Excavation for pipes and conduits.--Pipes or conduits in the same trench shall have a minimum clear distance between pipes or conduits of 150 mm. Pipes or conduits shall have not less than 0.75 meter of cover from top of pipes or conduits to finished grade unless otherwise shown on the plans or specified.

Trenching shall be of sufficient depth to permit placing a minimum depth of 100 mm of compacted sand under all pipes and conduits.

Excavation adjacent to trees shall be performed by hand methods where necessary to avoid injury to trees and roots. Roots 50 mm in diameter and larger shall be protected with heavy burlap. Roots smaller than 50 mm in diameter adjacent to trees shall be hand trimmed. Cuts through roots 13 mm in diameter and larger shall be sealed with tree trimmers' asphaltic emulsion. If trenches remain open more than 24 hours, the side of the trench adjacent to the tree shall be shaded with burlap and kept damp. Materials shall not be stockpiled within the drip line of trees.

Dewatering.--Excavations shall be kept clear of standing water. Water shall be removed by pumping if necessary. Water removed from excavation shall be carried away from the building site and disposed of in a manner that will not harm State or adjacent property.

STRUCTURE BACKFILLING.--

General.--Unless otherwise noted, all backfill for building work shall be classified as structure backfill. Backfill shall be placed and compacted in horizontal layers, not more than 150 mm thick prior to compaction, and to the lines and grades shown on the plans or to original ground.

Structure backfill.--After structures are in place and forms are removed, wood and other debris shall be removed from excavations before placing structure backfill.

Backfilling pipes and conduits.--Backfill placed under pipe and conduits shall be compacted sand, 100 mm minimum depth. Backfill material placed to a level 150 mm above tops of pipes and conduits shall be sand or fine earth and particles shall not exceed 13 mm in greatest dimension. For wrapped, coated, or plastic pipe or conduits, sand shall be used for

backfill. Backfill material placed higher than 150 mm above tops of pipes or conduits shall consist of material free of stones or lumps exceeding 100 mm in greatest dimension except:

- (a) The top 300 mm of backfill under roads, walks or paving shall consist of aggregate base material.
- (b) The top 150 mm of backfill in planted areas shall consist of topsoil.

COMPACTION.--

General.--Relative compaction shall be determined in accordance with California Test 216 or 231. Unless otherwise noted below, all backfill shall be compacted to a minimum relative compaction of 90 percent. Unless approved in writing by the Engineer, compaction by jetting or ponding will not be permitted.

Compact original ground.--Original ground surface under fill with surfacing of concrete and asphalt concrete shall be compacted to a relative compaction of not less than 95 percent for a minimum depth of 150 mm.

Subgrade preparation.--Preparation of subgrade material for placing aggregate base, surfacing, or slabs thereon shall include fine grading, compaction, reworking as necessary. The upper 150 mm of the subgrade shall have the same compaction as the fill to be placed over it.

The prism of backfill directly underneath the building foundation and sloping downward at 1:1 shall be compacted to 95 percent.

Structure backfill.--Structure backfill shall be compacted to not less than 95 percent relative compaction.

Trench backfill.--Trench backfill placed beneath slabs or paved areas shall be compacted to a relative compaction of not less than 95 percent.

DISPOSAL.--

Surplus material.--Surplus material from the excavation shall be disposed of away from the premises.

FIELD QUALITY CONTROL.--

Inspection.--When the excavation is substantially completed to grade, the Contractor shall notify the Engineer. No concrete shall be placed until the foundation has been approved by the Engineer.

Testing.--The State will conduct compaction tests during the backfilling and compacting operations.

2.09 STRUCTURE EXCAVATION (CONTAMINATED)

Scope--Structure Excavation (Contaminated) shall conform to the provisions in Division 2, "Earthwork for Building Work," of these special provisions.

Soil with diesel and motor oil contamination will be encountered during the excavation necessary for construction of this project. Diesel and motor oil contaminated soil has been identified in the top 0.5-0.8 meters of soil immediately adjacent to the south exterior corner of the hydraulic pump building. Motor oil contamination has been identified at concentrations of up to 1800 mg/kg. Diesel contamination has been identified at concentrations of up to 352 mg/kg. TPH-Gasoline contamination has been identified at concentrations of up to 0.09 mg/kg from 0.5-1.5 meters at the west exterior corner of the hydraulic pump building. Benzene, Toluene, Ethylbenzene, Xylenes, PCB's, VOC's and SVOC's were not detected in any of the test samples analyzed.

When excavated, this material will become classified as designated waste. Excavated soil material that is designated waste shall be disposed of at an appropriately permitted facility. Attention is directed to "Earthwork for Building Work" elsewhere in these special provisions.

A Site Investigation Report has been completed and copies of the report may be obtained at the Department of Transportation, Plans and Bid Documents, Room 0200, Transportation Building, 1120 N Street, P.O. Box 942874, Sacramento, California 94274-001, Telephone No. (916) 654-4490, and are available for inspection at the office of the District Director of Transportation at 703 B Street, Marysville, California. The applicable report is entitled, Hazardous Waste Preliminary Site Investigation Report, prepared by PSIEnvironmental Consultants, under Task Order No. 03-1C3901XM, PSI Project No.575-1G035 dated November 20, 2001.

Applicable rules and regulations.— Excavation, transport and disposal of hazardous waste material and designated waste material shall be in accordance with the rules and regulations of the following agencies:

- Department of Toxic Substance Control (DTSC)
- Integrated Waste Management Board
- Regional Water Quality Control Board (RWQCB)
- State Air Resources Board
- United States Department of Transportation (USDOT)
- United States Environmental Protection Agency (USEPA)
- California Environmental Protection Agency (CAL-EPA):
- California Division of Occupational Safety and Health Administration (CAL-OSHA)
- Sierra County Department of Environmental Health

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, including registration as appropriate for transporting vehicles carrying the designated waste. The California Environmental Quality Act (CEQA) of 1970 (Chapter 1433, States. 1970), as amended, may be applicable to permits, licenses and authorizations which the Contractor shall obtain from all agencies in connection with performing the work of the contract. The Contractor shall comply with the provisions of said statutes in obtaining such permits, licenses and other authorizations.

Health, safety and work plan.— The Contractor shall also prepare a detailed Health, Safety and Work Plan for site personnel. The Health, Safety and Work Plan shall include mandatory personal protective equipment, training, equipment decontamination procedures, spill plan, site clean up procedures, and physical barrier requirements in accordance with California Code of Regulations (CCR), Title 8. The Health, Safety and Work plan shall also include a description of the order of work, material handling, material segregation, stockpile locations, sampling protocols, transportation and disposal sites for petroleum hydrocarbon materials and shall be submitted for review and acceptance by the Engineer at least 15 working days prior to beginning any excavation work. If the plan is unacceptable it shall be returned, within 15 working days of submittal to the Contractor for revision. The Engineer shall have 5 working days to review and accept or reject the revised plan from the date the revised plan is received from the Contractor. No work shall proceed until the plan is accepted by the Engineer. Prior to submittal, the Contractor shall have the Health, Safety and Work Plan for all excavation work approved by a Certified Industrial Hygienist. Water from decontamination procedures shall be collected and disposed of at an appropriate disposal site by the Contractor. Non-reusable protective equipment, once used by any personnel, including State personnel, shall be collected and disposed of at an appropriate disposal site by the Contractor.

Safety training.-- Prior to performing any excavation work, all personnel working on the project, including State Personnel, shall complete required training specified in the Contractor's compliance program covering the potential hazards as identified. Any required training shall be provided by the Contractor who shall provide a certification of the completion of the Safety Training Program for all personnel. Personal protective equipment required by the Contractor's Health, Safety and Work for personnel working on the project will also be supplied to State personnel by the Contractor. The number of State personnel requiring the above mentioned safety training program and personal protective equipment will be two (2). Full compensation for safety training shall be considered as included in the lump sum price paid for Building Work and no additional compensation will be allowed therefor.

Segregation of designated waste.-- All excavated material shall be stockpiled in a fenced area on two layers of 10-mil thick (minimum) black polyethylene. A perimeter berm for the stockpile shall be constructed by wrapping the edges of the plastic over hay bales, or equivalent, to prevent contaminated water runoff and infiltration. The stockpiles shall be covered with one layer of 10-mil (minimum) black polyethylene at all times. The plastic shall be sufficiently weighted with sandbags to prevent wind damage to the plastic. Stockpiled petroleum impacted material shall be tested and disposed of within 30 days of completion of excavation work.

Sampling and analysis requirements.-- The Contractor shall test soil. If any of this material is found through testing to contain concentrations above 1.0 mg/kg of either TPH-Motor Oil, TPH-Diesel, or TPH-Gasoline; or concentrations above 5.0 µg/kg of either Benzene, Toluene, Ethylbenzene, or Xylene, the material shall be disposed of at an appropriately permitted facility. The material shall become the property of the Contractor if testing shows contaminant concentrations below those mentioned above. Contractor's sampling and testing analysis shall be performed using the sampling and testing analysis procedure required by the regulatory agencies in the locality of the job and any acceptance requirements put forth by a disposal facility. At a minimum, two samples shall be collected from the stockpiled soil.

The laboratory used shall be certified by the California Department of Health Services for the required analyses.

Samples shall be analyzed for Motor Oil (TPH-MO) by Test Method Modified EPA 8015 and Total Petroleum Hydrocarbons Diesel (TPH-D) and Gasoline (TPH-G) by Test Method Modified EPA 8015 and BTEX by EPA Method 8021.

If additional Structural Excavation (Contaminated) is required at the direction of the Engineer, such extra excavation will be paid for as an ordered change in accordance with the requirements in Section 3, "Changes in the Work," of the General Conditions.

Estimated quantities of designated waste material is 10 cubic meters.

No water shall be allowed to enter excavated area (except groundwater) from entering the excavated area. In the case such water does enter this area, such water shall be tested prior to discharge. No disposal of such water by pumping or other means shall be performed until the results of such testing have been submitted to the Engineer for review and approval. If the results of such testing indicate that the level of petroleum hydrocarbon products exceed levels considered allowable by the applicable regulatory agencies, the water shall be handled in accordance with all applicable laws and regulations. Should testing of water be required as a result of the failure of the Contractor's measures to prevent uncontrolled water from entering the excavated area, this testing and disposal shall be performed at the Contractor's expense and no additional compensation will be allowed therefor. Should testing of water be required as a result of groundwater entering the excavated area, testing groundwater will be paid for as change in the work as provided in Section 3 of the General Conditions. Disposal of contaminated groundwater will be paid for as change in the work as provided in Section 3 of the General Conditions.

Payment.--Full compensation for Structure Excavation (Contaminated), including furnishing all labor, training, materials, tools, equipment, and incidentals, and for doing all the work involved in excavation of designated waste material, complete in place, including sampling, testing, transporting, constructing containment facility and stockpiling, sorting the material into its appropriate classification, loading from stockpiles, transporting and disposing, including disposal fees, as specified in these special provisions and as directed by the Engineer, shall be considered as included in the contract lump sum price paid for Building Work and no additional compensation will be allowed therefor.

2.10 AGGREGATE BASE

PART 1.-GENERAL

SUMMARY.--

Scope.--This work shall consist of furnishing, spreading and compacting aggregate base in accordance with the details shown on the plans and these special provisions.

PART 2.-PRODUCTS

Aggregate base.--

Aggregate base shall be commercial quality aggregates consisting of broken stone; crushed gravel; natural, clean, rough-surfaced gravel and sand; or a combination thereof.

Aggregate base shall conform to the following grading as determined by California Test 202:

Sieve or Screen Size	Percentage Passing
25 mm	100
19 mm	90 - 100
4.75 mm	35 - 60
600 µm	10 - 30
75 µm	2 - 9

Aggregate base shall also conform to the following quality requirements:

Tests	California Test No.	Test Requirements
Durability Index	229	35 Min.
Resistance (R-Value)	301	78 Min.
Sand Equivalent	217	22 Min.

PART 3.-EXECUTION

SPREADING AND COMPACTING.--

Spreading.--Aggregate base shall be placed and compacted to the lines and grades shown on the plans.

Spreading and compacting shall be performed by methods that will produce a uniform base, free from pockets of coarse or fine material.

Compaction.--Relative compaction of each layer of compacted base material shall be not less than 95 percent, as determined by California Test 216 or 231.

2.11 FREE DRAINING GRANULAR MATERIAL

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of furnishing and placing free draining granular material beneath slabs in accordance with the details shown on the plans and these special provisions.

PART 2.- PRODUCTS

Free draining granular material.--

Free draining granular material shall be clean, hard, durable, free-draining rock. The material gradation shall be such that all passes the 25 mm screen, and not more than 10 percent passes the 4.75 mm sieve as determined by California Test 202. Granular material shall be free from organic material, clay balls or other deleterious substances.

PART 3.- EXECUTION.--

SPREADING AND CONSOLIDATING.--

General.--Free draining granular material shall be placed, spread and consolidated by tamping or vibrating.

2.12 CAST-IN-DRILLED-HOLE CONCRETE PILES

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of constructing cast-in-drilled-hole concrete piles in accordance with the details shown on the plans and these special provisions.

PART 2.-PRODUCTS

Concrete and reinforcement.--

Concrete and reinforcement shall conform to the requirements specified under "Cast-In-Place Concrete" in Division 3, "Concrete and Reinforcement," of these special provisions.

PART 3.-EXECUTION

CONSTRUCTION.--

Drilling holes.--All holes for concrete piles shall be drilled to the tip elevations or depths shown on the plans. All holes shall be examined for straightness and any hole which on visual inspection from the top shows less than 1/2 the diameter of the hole at the bottom of the hole shall be rejected. Suitable casings shall be furnished and placed when required to prevent caving of the hole.

All loose material existing at the bottom of the hole after drilling operations have been completed shall be removed before placing concrete in the hole.

Material resulting from drilling holes shall be wasted on the job site as directed by the Engineer.

Surface water shall not be permitted to enter the hole and all water which may have infiltrated into the hole shall be removed before placing concrete therein.

Placing reinforcement.--The reinforcing cage shall be placed and secured symmetrically about the center of the pile and shall be securely blocked to clear the sides of the hole.

Longitudinal reinforcing steel shall be continuous for the entire length of pile, including pile extensions.

Placing concrete.--The concrete filling shall be vibrated to a dense and homogeneous condition. Concrete placed in drilled holes shall be placed against undisturbed material except when portions of the pile will be exposed to view. Surfaces exposed to view and adjacent surfaces within 250 mm of finished grade shall be formed.

Casing, if used in drilling operations, shall be removed from the hole as concrete is placed therein. The bottom of the casing shall be maintained not more than 1.5 meter nor less than 0.3 meter below the top of the concrete during withdrawal and placing operations, unless otherwise permitted by the Engineer. Separation of the concrete during withdrawal operations shall be avoided by hammering or otherwise vibrating the casing.

2.13 ASPHALT CONCRETE

PART 1.- GENERAL

Scope.--This work shall consist of furnishing and placing asphalt concrete, and applying a paint binder, in accordance with the details shown on the plans and these special provisions.

Areas to be surfaced with asphalt concrete shall be as shown on the plans, and/or where existing bituminous surfacing has been removed to facilitate the required work.

PART 2.- PRODUCTS

Asphalt concrete.--

Asphalt concrete shall be commercial quality, 13 mm maximum grading, produced at a central mixing plant.

PART 3.- EXECUTION

Mixing.--The aggregate and asphalt binder for asphalt concrete shall be heated and mixed thoroughly.

Placement.--A paint binder of asphaltic emulsion or paving asphalt shall be applied to all existing surfacing upon which asphalt concrete is to be placed, vertical surfaces against which asphalt concrete material is to be placed, and other surfaces designated by the Engineer.

Asphalt concrete shall be spread by methods that will produce an asphalt concrete surfacing of uniform smoothness and texture, and shall be thoroughly compacted by hand rollers, impactors or other methods approved by the Engineer.

2.14 RETAINING WALL DRAIN

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of retaining wall drains, including, but not limited to, filter fabric, perforated pipe, and pervious backfill in accordance with details shown on the plans and these special provisions.

PART 2.- PRODUCTS

Filter Fabric.--

Filter fabric shall be manufactured from polyester, nylon or polypropylene material, or any combination thereof. The fabric shall be permeable, nonwoven, shall not act as a wicking agent, and shall conform to the following:

Specification	Requirements
Weight, grams per square meter, min. ASTM Designation: D 3776	135
Grab tensile strength (25-mm grip), kilonewtons, min. in each direction ASTM Designation: D 4632	0.40
Elongation at break, percent min. ASTM Designation: D 4632	30
Toughness, kilonewtons, min. (Percent elongation x grab tensile strength)	26
Permittivity, 1/sec., min. ASTM Designation: D 4491	0.5

Pervious backfill.--

Pervious backfill material shall consist of gravel, crushed gravel, crushed rock, natural sand, manufactured sand, or combination thereof. Pervious material shall be free of organic material, clay balls or other deleterious substances.

Pervious backfill material shall conform to the following grading requirements:

Sieve or Screen Size	Percentage Passing
50 mm	100
300 µm	0 - 100
150 µm	0 - 8
75 µm	0 - 4

Perforated pipe.--

Perforated pipe shall consist of Schedule 80 polyvinyl chloride (PVC) plastic pipe, conforming to the requirements of ASTM Designation: D 1785. At the option of the Contractor, the type, grade, and design stress designation of the pipe shall be either 1120, 1220, 2110, 2112, 2116 or 2120 as specified in ASTM Designation: D 1785.

Perforated pipe shall have 3 rows of perforations with one row on each side of the pipe and the third row in the top. The perforations shall be 10 mm in diameter spaced at 75-mm centers with the top perforations staggered in relation with the holes on either side.

Fittings for the PVC plastic pipe shall be Schedule 80 Type II PVC solvent weld type fittings conforming to the requirements in ASTM Designation: D 2467. Machined male and female ends may be used in lieu of couplings.

PART 3.- EXECUTION

General.--Trenches for retaining wall drains shall be excavated, the filter fabric placed, the pipe installed and the trench backfilled with pervious backfill according to the dimensions and details shown on the plans. The top 150 mm of the trench shall be backfilled as shown on the plans, with structure backfill in accordance with the requirements specified under "Earthwork for Building Work," elsewhere in this Division 2.

Installation of filter fabric.--Surfaces to receive filter fabric, immediately prior to placing, shall be free of loose or extraneous material and sharp objects that may damage the filter fabric during installation.

Adjacent rolls of the fabric shall be overlapped a minimum of 450 mm. The preceding roll shall overlap the following roll in the direction the material is being spread.

Should the fabric be damaged during placing, the torn or punctured section shall be either completely replaced or shall be repaired by placing a piece of fabric that is large enough to cover the damaged area and to meet the overlap requirement.

Damage to the fabric resulting from the Contractor's vehicles, equipment or operations shall be replaced or repaired by the Contractor at the Contractor's expense.

If filter fabric is to be exposed for more than 72 hours, all fabric of that type shall be treated with ultraviolet ray (UV) protection. The treated fabric shall provide a minimum of 70 percent breaking strength retention after 500 hours exposure when tested in conformance with the requirements in ASTM Designation: D 4355. Unless otherwise specified, the Contractor shall submit samples of the treated filter fabric to the Transportation Laboratory at least 45 days prior to use.

Filter fabric, not treated with UV protection, which is exposed for more than 72 hours shall be removed and replaced at the expense of the Contractor. The replacement fabric either shall be treated with UV protection or shall not be exposed for more than 72 hours.

Installation of perforated pipe.--Lengths of perforated pipe shall be joined by couplers.

Perforated pipes shall be laid with the perforations up.

Backfilling.--Backfilling shall be in accordance with the requirements specified under "Earthwork for Building Work," elsewhere in this Division 2.

2.15 CHAIN LINK FENCING

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of furnishing and installing chain link fencing and gates in accordance with the details shown on the plans and these special provisions.

SUBMITTALS.--

Product data.--Manufacturer's descriptive data, material specifications and layout drawings for the fence, gates, and accessories shall be submitted for approval.

PART 2.- PRODUCTS

General.--All ferrous materials shall be new and galvanized. Posts, caps, braces and other rolled or formed elements shall be hot-dip galvanized after rolling or forming.

Style, finish, and color of each fence post shall match that of the other fence components.

MATERIALS.--

Posts and braces.--

Posts and braces shall conform AASHTO Designation: M 181. Minimum nominal thickness before galvanizing shall be 3 mm for posts and 2 mm for braces. Midpoint deflection of posts about major axis shall not be greater than 6 mm and permanent set about either axis shall not be greater than 0.25 mm as determined by California Test 674. Post lengths shall be 815 mm longer than height of fabric. Rainproof caps shall be furnished for tubular posts.

The resisting moment for posts or braces is defined as the product of the member's section modulus about the designated axis and its yield strength. Posts and braces shall have resisting moments not less than the following minimum values:

Item	Resisting Moment
Line posts	1100 N•m perpendicular to fence line. 550 N•m parallel to fence line.
End, latch and corner posts	1900 N•m in any direction.
Braces	550 N•m about the major axis. 400 N•m about the minor axis.

Fabric.--

Fence fabric shall conform to AASHTO Designation: M 181 for Type I zinc coated fabric with Class C coating. Fabric shall be fabricated of 3.8 mm (9-gage) wire and shall have knuckled finish on top and bottom edges.

WIRE.--

Tension wire.--

Tension wire shall be 4.34 mm (7-gage) coil spring wire galvanized in accordance with the provisions of ASTM Designation: A 116 Coating Class 3.

FENCE FITTINGS.--

Tie wires and hog rings.--

Tie wires and hog rings for attaching fabric to tension wire, top rail and intermediate posts shall be a minimum of 3.8 mm (9-gage) wire conforming to ASTM Designation: F 626, and shall have a Class 3 zinc coating.

Post clips.--

Post clips for fastening fabric to H-posts shall be a minimum of 4.94 mm (6-gage) conforming to ASTM Designation: F 626, and shall have a Class 3 zinc coating.

Turnbuckles and truss tighteners.--

Turnbuckles and truss tighteners shall be galvanized, commercial quality steel, malleable iron, or wrought iron. Truss tightener straps shall be at least 6 mm thick. Devices shall develop the truss bar or rod strength.

Truss rod.--

Truss rod shall be 9 mm diameter steel rod equipped with turnbuckle or truss tightener.

Post caps.--

Post caps shall be galvanized steel, malleable iron or wrought iron with loop to receive tension wire of top rail; one per post. Post caps for tubular posts shall be designed to fit snugly over the post.

MISCELLANEOUS.--

Concrete.--

Concrete for fence construction shall be commercial quality concrete with not less than 300 kilograms of cement per cubic meter.

GATES.--

General.--Gates shall be constructed to be opened and closed easily by one person.

Gate fabric shall be as specified for fence fabric and be firmly attached to frames at a maximum spacing not to exceed 380 mm.

Gate frames shall be fabricated of a minimum of 38 mm standard weight steel pipe or rectangular tubular steel except vertical stays may be 25 mm in outside dimension. Gates shall include all necessary fittings, latches, rods, slide rails, axles, hinges and other gate hardware of commercial quality steel, malleable iron or wrought iron.

Swinging gates.--

Swinging gates shall conform to ASTM Designation: F 900, except as modified in this section.

Hinges shall be furnished with large bearing surfaces for clamping in position and designed to swing either 180 degrees outward, 180 degrees inward, or 90 degrees in or out as shown on the plans. Hinges shall not twist or turn under action of the gate.

Latches for swing gates shall be plunger type arranged to engage the stop, except single gates of less than 3 meters wide may have a forked latch. Latches shall have provision for padlock. Latches for double gates shall be capable of securing both leaves with one padlock.

Gate stops shall be provided for all double gates and shall be suitable for setting in concrete.

Hold-open keepers shall be designed to automatically engage gate leaf and hold it open until manually released.

PART 3.- EXECUTION

PREPARATION.--

Clearing.--All earth, trees, brush, and other obstructions which interfere with the proper construction shall be removed and disposed of.

Connections.--Corner posts with braces in every direction of strain shall be placed at junctions with existing fences. The wire in the new and existing fences shall be fastened to the posts.

INSTALLATION.--

General.--Posts shall be set vertically. Fencing shall be erected in straight lines.

Post setting.--Fence post shall not be driven.
Concrete footings for posts shall be crowned at the top.

Bracing.--End, latch and corner posts shall be braced to the nearest line post. Gate posts shall be braced with horizontal compression braces and 9 mm truss rods as tension members. Other braces shall be the same as gate post braces or diagonal braces.

Chain link fabric.--Chain link fabric shall be fastened on the side of the posts designated by the Engineer.

The fabric shall be fastened to end, latch, corner, and gate posts with 6 mm x 19 mm stretcher bars and not less than 3 mm x 19 mm stretcher bar bands spaced at one foot intervals or, in lieu of using stretcher bars and bar bands for fastening fabric to end and corner posts, the fabric may be fastened by threading through loops formed on the posts.

The fabric shall be fastened to line posts with tie wires or post clips and to tension wires and rails with tie wires or hog rings. The fasteners shall be spaced at approximately 350 mm on line posts and at approximately 450 mm on tension wires and rails. Wire ties shall be given at least one complete turn. Hog rings shall be closed with ends overlapping. The tension wires shall be wrapped around terminal posts. The distance from the top of the fabric to the top tension wire shall be 50 mm maximum.

The fabric shall be stretched and securely fastened to the posts and tension wires. Tension wires shall be stretched tight. The bottom tension wire shall be installed on a straight grade between posts by excavating the high points of ground and in no case will filling of depressions between posts be permitted.

Gates.--Gates shall be hung and hardware adjusted so gates operate satisfactorily from open or closed position. Gate stops shall be set in concrete to engage center drop or plunger bar.

FIELD QUALITY CONTROL.--

Gate tests.--Prior to acceptance of the contract, it shall be demonstrated that the gates operate properly under each possible open and closed position specified.

2.16 GUARD POSTS

PART 1.- GENERAL

Scope.--This work shall consist of constructing guard posts in accordance with the details shown on the plans and these special provisions.

PART 2.- PRODUCTS

Steel posts.--

Steel posts for guard posts shall be standard weight, galvanized steel pipe conforming to the details shown on the plans.

Concrete.--

Concrete for guard posts shall be commercial quality concrete, proportioned to provide a workable mix suitable for the intended use, with not less than 300 kilograms of cement per cubic meter.

PART 3.- EXECUTION

Installation.--The length and diameter of the guard posts shall conform to the details shown on the plans.

Guard posts shall be placed in holes excavated to the depth and cross section shown on the plans, and shall be installed plumb.

Guard posts shall be backfilled with concrete as shown on the plans.

Painting.--Guard posts shall be prepared and painted in accordance with the requirements specified under "Painting" in Division 9, "Finishes," of these special provisions.

DIVISION 3. CONCRETE AND REINFORCEMENT

3.01 CAST-IN-PLACE CONCRETE

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of constructing cast-in-place concrete facilities in accordance with the details shown on the plans and these special provisions.

Whenever the 28-day compressive strength shown on the plans is 25 MPa or greater, the concrete shall be considered to be designated by compressive strength. The 28-day compressive strengths shown on the plans which are less than 25 MPa, are shown for design information and are not to be considered a requirement for acceptance of the concrete.

Related work.--Compressive strength concrete shall conform to the requirements in "Compressive Strength Concrete," elsewhere in this Division 3.

SUBMITTALS.--

Product data.--Manufacturer's descriptive data for admixtures, expansion joint material, vapor barrier, hardener, and sealer shall be submitted for approval.

Descriptive data shall be delivered to the Engineer at the jobsite.

QUALITY ASSURANCE.--

Certificates of Compliance.--Certificates of Compliance shall be furnished for cement, reinforcement, and admixtures, in accordance with the requirements specified in Section 4-1.04, "Certificates of Compliance," of the General Conditions.

PART 2.- PRODUCTS

CONCRETE MIXES.--

Concrete (structural work).--

Commercial quality concrete shall be proportioned to provide a workable mix suitable for the intended use; shall have not less than 350 kg/m³ of cement; 0 to 50 mm penetration, inclusive, as determined by California Test 533.

CONCRETE MATERIALS.--

Cement.--

Cement shall conform to ASTM Designation: C 150, Types II, or III portland cement; or Type IP (MS) Modified cement. Type IP (MS) Modified shall conform to ASTM Designation: C 595 and shall be comprised of an intimate mixture of Type II Modified cement and not more than 20 percent of a pozzolanic material.

Aggregates.--

Aggregates shall be free from deleterious coatings, clay balls and other extraneous materials.

Admixtures.--

Admixtures used in portland cement concrete shall be included on the Department's current list of approved admixtures, and shall conform to ASTM Designation: C 494, Types A, B, D, F or G for chemical admixtures; ASTM Designation: C 260 for air-entraining admixtures; and ASTM Designation: C 618 for mineral admixtures, except loss on ignition shall not exceed 4 percent. Properties of admixtures shall be uniform in each lot.

FORM MATERIALS.--

Forms for exposed finish concrete.--

Forms for exposed surfaces shall be plywood, metal or other panel type materials. Plywood shall be not less than 16 mm thick and without scars, dents, and delaminations. Forms shall be furnished in largest practical pieces to minimize number of joints.

Plywood shall conform to the requirements of U. S. Product Standard PS-1 for Exterior B-B (Concrete Form) Class I.

Forms for edges of slabs shall be nominal 50 mm solid stock lumber, plywood, or metal forms.

Forms for unexposed finish concrete.--

Forms for unexposed finish concrete surfaces shall be plywood, lumber, metal or other acceptable material.

Form ties.--

Form ties shall be factory fabricated, removable or snapoff metal ties for use as necessary to prevent spreading of forms during concrete placement.

Form oil.--

Form oil shall be commercial quality form oil which will permit the ready release of the forms and will not discolor the concrete.

REINFORCING MATERIALS.--

Bar reinforcement.--

Bar reinforcement shall conform to ASTM Designation: A 615/A 615M, Grade 60 [420], or ASTM Designation: A 706/A 706M.

Reinforcing wire.--

Reinforcing wire for cast-in-drilled hole piles shall be cold drawn and shall conform to ASTM Designation: A 82.

Bar supports.--

Bar supports for reinforcement shall be precast mortar blocks or ferrous metal chairs, spacers, metal hangers, supporting wires, and other approved devices of sufficient strength to resist crushing under applied loads.

RELATED MATERIALS.--

Anchor bolts, nuts, and washers.--

Nonheaded anchor bolts shall conform to ASTM Designation: A 36/A 36M, with a minimum hook length of 6.2 diameters.

Headed anchor bolts shall conform to ASTM Designation: A 307.

Nuts shall conform to ASTM Designation: A 563M, Grade A.

Washers for anchor bolts shall be commercial quality.

Exposed anchor bolts, nuts, and washers shall be hot dipped galvanized.

Type A control joints.--

Type A control joints shall be commercial quality, preformed, T-shaped plastic strips with detachable top flange.

Keyed construction joint forms.--

Keyed construction joint forms shall be commercial quality, galvanized metal or plastic, factory fabricated construction joint forms. Forms shall produce a rabbeted key type joint.

Mortar.--

Mortar shall consist of one part cement to 2 parts clean sand and only enough water to permit placing and packing.

Concrete hardener.--

Concrete hardener shall be commercial quality water borne penetrating type magnesium fluosilicate, zinc fluosilicate or combination thereof.

Concrete sealer.--

Concrete sealer shall be commercial quality VOC-compliant, silane type sealer with hydrophobic and oleophobic properties. Concrete sealer shall be ProSoCo, Inc., Standoff Tile and Masonry Protector (TMP); Tamms Industries, Hey'Di H.O.S.; Textured Coatings of America, Inc., Rainstopper 1750W-Clear; or equal.

ADMIXTURES.--

General.--Admixtures shall be used when specified or ordered by the Engineer and may be used at the Contractor's option to conserve cement or to facilitate any construction operation.

Calcium chloride shall not be used in any concrete.

Admixtures shall be combined with concrete materials by methods that produce uniform properties throughout the concrete.

If more than one admixture is used, said admixtures shall be compatible with each other so that the desirable effects of all admixtures will be realized.

Mineral admixtures may be used to replace up to 15 percent of Type II portland cement provided the weight of mineral admixture used is not less than the weight of cement replaced. Mineral admixtures shall not be used to replace Type IP (MS) Modified or Type III cements. Chemical admixtures may be used to reduce up to 5 percent of the portland cement except that the cement content shall not be less than 300 kg/m³. When both chemical and mineral admixtures are used with Type II cement, the weight of cement replaced by mineral admixture may be considered as cement in determining the resulting cement content.

Mineral admixtures will be required in the manufacture of concrete containing aggregates that are determined to be "deleterious" or "potentially deleterious" when tested in accordance with ASTM Designation: C 289. The use of mineral admixture in such concrete shall conform to the requirements in this section except that the use of set retarding admixtures will not be permitted.

When the use of a chemical admixture is specified or is ordered by the Engineer, the admixture shall be used at the rate specified or ordered. If no rate is specified or ordered, or if the Contractor uses a chemical admixture for his own convenience, the admixture shall be used at the dosage normally recommended by the admixture manufacturer.

When air-entrainment is specified or is ordered by the Engineer, the air-entraining admixture shall be used in amounts to produce concrete having the specified or ordered air content as determined by California Test 504. If the Contractor uses air-entrainment for his own convenience, the average air content shall not exceed 4 percent and no single test shall exceed 5 1/2 percent.

Chemical admixtures and air-entraining admixtures shall be dispensed in liquid form. Dispensers shall have sufficient capacity to measure at one time the total quantity required for each batch. If more than one liquid admixture is used in the concrete, a separate measuring unit shall be provided for each liquid admixture and dispensing shall be such that the admixtures are not mixed at high concentrations. When air-entraining admixtures are used with other liquid admixtures, the air-entraining admixtures shall be the first to be incorporated into the mix. Unless liquid admixtures are added to premeasured water for the batch, they shall be discharged to flow into the stream of water so that the admixtures are well dispersed throughout the batch.

BAR REINFORCING STEEL.--

Bending.--Reinforcing steel bars shall accurately conform to the dimensions shown on the plans.

Bars shall be bent or straightened in a manner that will not crack or break the material. Bars with kinks or improper bends shall not be used.

Hooks, bends and splices shall conform to the provisions of the Building Code Requirements for Reinforced Concrete of the American Concrete Institute.

MIXING AND TRANSPORTING CONCRETE.--

General.--When a truck mixer or agitator is used for transporting concrete to the delivery point, discharge shall be complete within 1 1/2 hours, or before 250 revolutions of the drum or blades, whichever comes first, after the introduction of cement to the aggregates.

Truck mixers or agitator shall be equipped with electrically or mechanically actuated revolution counters by which the number of revolutions of the drum or blades may readily be verified. The counters shall be of the continuous-registering type, which accurately register the number of revolutions and shall be mounted on the truck so that the Engineer may safely and conveniently inspect them from alongside the truck. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 30°C or above, a time less than 1 1/2 hours may be required.

When non-agitating hauling equipment is used for transporting concrete to the delivery point, discharge shall be complete within one hour after the introduction of cement to the aggregates. Under conditions contributing to quick stiffening of the concrete, or when the temperature of the concrete is 30°C, or above, the time between the introduction of cement to the aggregates and discharge shall not exceed 45 minutes.

Each load of concrete for the work shall be accompanied by a trip ticket, a copy of which shall be delivered to the Engineer at the jobsite. The trip ticket shall show volume of concrete, weight of cement and aggregates, quantity of each admixture, quantity of water including water added at the jobsite, time of day the concrete is batched, and revolution counter readings on transit mix trucks at the times the truck is charged and unloaded.

PART 3.- EXECUTION

PREPARATION.--

Existing concrete construction.--Where fresh concrete joins existing or previously placed concrete or masonry, the contact surfaces of the existing or previously placed material shall be roughened, cleaned, flushed with water and allowed to dry to a surface dry condition immediately prior to placing the fresh concrete. The roughened surface shall be no smoother than a wood trowelled surface. Cleaning of the contact surfaces shall remove laitance, curing compounds, debris, dirt and such other substances or materials which would prevent bonding of the fresh concrete.

Abrasive blast methods shall be used to clean horizontal construction joints to the extent that clean aggregate is exposed.

Exposed reinforcing steel located at the contact surfaces which is to be encased in the fresh concrete shall be cleaned to remove any substance or material that would prevent bonding of the fresh concrete.

Forms.--Forms shall be mortar tight, true to the dimensions, lines, and grades shown on the plans, securely fastened and supported, and of adequate rigidity to prevent distortion during placing of concrete.

Forms for exposed surfaces shall be constructed with triangular fillets not less than 19 mm x 19 mm attached so as to prevent mortar runs and to produce smooth straight chamfers at all sharp edges of the concrete.

Form fasteners shall be removable without chipping, spalling, heating or otherwise damaging the concrete surface. Form ties shall be removed to a depth of at least 25 mm below the surface of the concrete.

The inside surfaces of forms shall be cleaned of all dirt, mortar and foreign material. Forms shall be thoroughly coated with form oil prior to use.

Forms shall not be stripped until at least 40 hours after placing concrete.

Anchorage and embedded items shall be placed and rigidly secured at their planned locations prior to placing concrete.

Reglets or embedded flashing shall be installed on concrete forms before the concrete is placed.

Placing reinforcing steel.--Reinforcing steel bars shall be accurately placed to the dimensions shown on the plans.

Bar reinforcement conforming to ASTM Designation: A 615/A 615M, Grade 60 [420], or A 706//A 706M shall be lapped at least 45 diameters.

Bars shall be firmly and securely held in position by means of wiring and approved bar supports. The spacing of supports and ties shall prevent displacement of the reinforcing or crushing of supports.

Tie wire shall be clear of concrete formwork and concrete surfaces.

All reinforcing steel shall be in place and inspected before concrete placement begins. Placing of bars on fresh layers of concrete will not be permitted.

Ground bar.--A continuous reinforcing steel bar shall be installed in the building foundation at the location indicated on the plans for the electrical ground bar. The use of epoxy coated reinforcing bar is not permitted. The end of the ground bar shall extend beyond the concrete surface and shall be protected from damage by construction operations.

PLACING CONCRETE.--

General.--Concrete shall be placed and consolidated by means of internal vibrators to form dense, homogeneous concrete free of voids and rock pockets.

Forms and subgrade shall be thoroughly moistened with water immediately before placing concrete.

Concrete shall be placed as nearly as possible to its final location and the use of vibrators for extensive shifting of the concrete will not be permitted.

Concrete shall be deposited and consolidated in a continuous operation within limits of construction joints, until the placing of the panel or section is completed.

When concrete is to be placed in large areas requiring more than two pours, concrete shall be placed in alternate long strips between construction joints and the final slab infilled.

FINISHING CONCRETE SURFACES.--

Finishing unformed surfaces.--Slabs shall be placed full thickness to finish elevation and leveled to screeds by use of long straightedges. The screeds shall be set to grade at approximately 1.8 meter centers. After leveling, screeds shall be removed and the surface shall be floated with wooden floats.

Type A control joint strips shall be inserted into the floated concrete so that the bottom of the top flange is flush with the finish elevation. Strips shall be standard manufactured lengths and shall be placed on an approximate straight line. The top flange of the strips shall be removed after the concrete has set and cured.

The floated surface shall be trowelled with steel trowels. Troweling shall form a dense, smooth and true finish. Walkways, pedestrian ramps, stairs and outdoor slabs for pedestrian traffic shall be given a non-slip broom finish unless a different finish is called for on the plans or in these special provisions.

The application of cement dust coat will not be permitted.

Finished surfaces of floor slabs shall not deviate more than 3 mm from the lower edge of a 3-meter long straight edge.

Finishing formed surfaces.--Formed concrete surfaces shall be finished by filling holes or depressions in the surface, repairing all rock pockets, and removing fins. All surfaces of formed concrete exposed to view shall have stains and discolorations removed, unsightly bulges removed, and all areas which do not exhibit the required smooth, even surface of uniform texture and appearance shall be sanded with power sanders or other approved abrasive means until smooth, even surfaces of uniform texture and appearance are obtained.

Cement mortar, patching and finishing materials used to finish exposed surfaces of concrete shall closely match the color of surrounding surfaces.

CURING CONCRETE.--

General.--Freshly placed concrete shall be protected from premature drying and excessive cold or hot temperatures.

Initial curing of floor slabs shall start as soon as free water has disappeared from the concrete surface. The concrete shall be kept continuously wet by application of water for not less than 7 days after the concrete has been placed.

Cotton mats, rugs, carpets, or sand blankets may be used as a curing medium to retain the moisture during the curing period. Curing materials that will stain or discolor concrete shall not be used on surfaces exposed to view.

Prior to placing the curing medium, the entire surface of the concrete shall be kept damp by applying water with a nozzle that so atomizes the flow that a mist and not a spray is formed, until the surface of the concrete is covered with the curing medium. At the expiration of the curing period, the concrete surfaces shall be cleared of all curing mediums.

Concrete surfaces, other than floor slabs, shall be kept moist for a period of at least 5 days by leaving the forms in place or by covering the exposed surfaces using moist rugs, cotton mats or other curing materials approved by the Engineer.

PROTECTING CONCRETE.--

General.--Concrete shall not be placed on frozen or frost covered surfaces.

Concrete shall be protected from damage due to rain, freezing or inclement weather, and shall be maintained at a temperature of not less than 4°C for 72 hours. When required by the Engineer, the Contractor shall provide a written outline of his proposed methods of protecting concrete.

Vehicles, equipment, or concentrated loads weighing more than 140 kg individually and material stockpiles weighing more than 240 kg/m² will not be permitted on the concrete within 10 calendar days after placing.

SPECIAL TREATMENTS.--

Concrete hardener.--Chemical concrete hardener shall be applied to the floor surfaces shown on the plans, prior to the application of concrete sealer. Surfaces shall be clean and dry before the application of hardener.

The solution shall be applied in accordance with the manufacturer's instructions.

After the hardener has dried, the surface shall be mopped with water to remove encrusted salts.

Concrete sealer.--Concrete sealer shall be applied to the concrete surfaces designated on the plans in accordance with the manufacturer's instructions for heavy duty use. The sealer shall be applied to dry concrete surfaces.

3.02 COMPRESSIVE STRENGTH CONCRETE

PART 1.- GENERAL

SUMMARY.--

Scope.--This work consist of furnishing and testing compressive strength portland cement concrete in accordance with the details shown on the plans and these special provision.

Whenever the 28-day design strength shown on the plans is 25 MPa or greater, the concrete shall be considered to be designated by compressive strength.

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

Related work.--The requirements of this special provision are in addition to the applicable requirements for concrete (structural work) in "Cast-in-Place Concrete," elsewhere in this Division 3.

SUBMITTALS.--

Mix design.--Before using compressive strength concrete, the Contractor shall submit in writing to the Engineer a copy of the mix design.

Quality control submittals.--When concrete is specified by compressive strength, prequalification of materials, mix proportions, mixing equipment, and procedures proposed for use, will be required prior to the placement of such concrete. Prequalification shall be accomplished by the submission of acceptable certified test data or trial batch reports by the Contractor. Prequalification data shall be based on the use of materials, mix proportions, mixing equipment, procedures and size of batch proposed for use in the work.

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

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

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

When approved by the Engineer, concrete from trial batches may be used in the work at locations where concrete of a lower quality is required.

Certified test data.--Certified test data, in order to be acceptable, must indicate that not less than 90 percent of at least 20 consecutive 28-day tests exceed the specified strength, and none of said tests are less than 95 percent of the specified strength. Strength tests included in such data shall be the most recent tests made on concrete of the proposed mix design and all shall have been made within one year of the proposed use of the concrete.

Trial batch reports.--Trial batch test reports, in order to be acceptable, must indicate that the average compressive strength of 5 consecutive concrete cylinders, taken from a single batch at not more than 28 days after molding shall be at least 4 MPa greater than the specified 28-day compressive strength, and no individual cylinder shall have a strength less than the specified strength.

Data contained in the report shall be from trial batches which were produced within one year of the proposed use of the specified strength concrete in the project. Whenever air-entrainment is required, the air content of trial batches shall be equal to or greater than the air content specified for the concrete without reduction due to tolerances.

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

PART 2.- PRODUCTS (not applicable)

PART 3.- EXECUTION

FIELD QUALITY CONTROL.--

Testing.--The Contractor shall engage an independent testing agency to conduct field quality control testing in accordance with these special provisions.

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

When the concrete is designated by 28-day compressive strength rather than by cement content, the concrete strength to be used as a basis for acceptance will be determined from cylinders cured in accordance with Method 1 of California Test 540. If the result of a single 28-day compressive strength is below the specified strength but is 95 percent or more of the specified strength, the Contractor shall, at his expense, make corrective changes, subject to approval of the Engineer, in the mixing proportions or in the concrete fabrication procedures, before placing additional concrete, and shall pay to the State \$14.00 for each in-place cubic meter of concrete represented by the deficient test. If the result of a single 28-day test is below 95 percent of the specified strength but is 85 percent or more of the specified strength, the Contractor shall make the aforementioned corrections and pay to the State \$20.00 for each in place cubic meter of concrete represented by the deficient test. In addition, such corrective changes shall be made when the compressive strength of the concrete tested at 7 days indicates, in the judgment of the Engineer, that the concrete will not attain the required compressive strength at 28 days. All such concrete represented by a single test which indicates a compressive strength of less than 85 percent of the specified 28-day compressive strength shall be removed in accordance with the provisions in Section 2-1.10, "Removal of Rejected or Unauthorized Work," of the General Conditions.

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

No single 28-day strength test shall represent more than 230 m³.

3.03 PRECAST CONCRETE TILT-UP PANELS

PART 1.- GENERAL

SUMMARY.--

Scope.--This work consist of constructing and erecting precast concrete tilt-up panels in accordance with the details shown on the plans and these special provision.

The requirements of this special provision are in addition to the applicable requirements for concrete (structural work) and bar reinforcing steel in "Cast-in-Place Concrete," elsewhere in this Division 3.

Alternatives.--The Contractor may submit an alternative design for tilt-up panels using different details, concrete strengths or reinforcement for approval by the Engineer. Submittals for an alternative design must include detailed drawings of all elements of the design affected and complete design calculations signed by a Civil or Structural Engineer licensed in the State of California. Conformance with the details shown on the plans will preclude the necessity for the submittal of design calculations.

SUBMITTALS.--

Product data.--Manufacturer's data for bond breakers, inserts, lifting devices and bracing shall be submitted for approval.

Shop drawings.--Complete shop drawings showing panel dimensions, openings, location of items cast into panels for lifting and bracing, additional reinforcement required for lifting and bracing devices, construction loads and other pertinent information shall be submitted for approval.

Shop drawings shall also include a location plan which shows the location, identification and sequence of erection of each tilt-up panel.

QUALITY ASSURANCE.--

Codes and standards.--Welds at panel connections shall conform to the requirements in AWS D1.1, "Structural Welding Code - Steel," for steel shapes and AWS D1.4, "Structural Welding Code - Reinforcing Steel," for bar reinforcing steel.

PART 2.- PRODUCTS

MATERIALS.--

Embedded items.--

Embedded items such as reglets, pressed metal door or window frames and other such items shall conform to the details shown on the plans.

Bond breaker.--

Bond breaker shall be a commercial quality solution containing no oils, waxes, paraffins, or other material which could affect the bond of subsequent finishes or natural appearance of the exposed concrete surfaces.

Form liners.--

Form liners shall be commercial quality liners as required to produce a panel finish as shown on the plans.

PART 3.- EXECUTION

CASTING PANELS.--

General.--The installation of inserts and anchorages required to be set into the concrete panels prior to casting shall be coordinated with other work.

Curing base casting slabs.--Concrete surfaces upon which wall panels are to be cast, shall be cured as specified for other concrete except that paper or other curing sheets are not to be used.

The concrete shall be kept continuously wet by application of water for a minimum of 48 hours. Mats, rugs or sand blankets may be used to retain the moisture.

Upon completion of the water cure, a curing compound, certified to have qualities of a bond breaker, shall be applied in accordance with the manufacturer's instructions.

Forms.--Forms for precast units shall be mortar tight and well supported to prevent deformation or damage to the units. Form liners shall be accurately placed to provide a finished surface as shown on the plans.

Reinforcing steel and inserts.--Reinforcing steel shall be placed as for other concrete work. Anchorages, inserts and other cast-in-place items shall be located and firmly secured in position.

After placing reinforcing steel, inserts and other embedded items, the casting slab surface shall be checked for continuity of the bond breaker. Any damaged areas shall be repaired prior to placing the concrete.

Placing and curing concrete.--Concrete shall be placed, consolidated and cured as for other concrete work.

Curing may be completed with panels in the vertical position when sufficient strength is attained for lifting without damage.

ERECTION AND INSTALLATION.--

General.--Erection equipment shall be used with care to prevent damage to panels and floor slabs. Any damage shall be repaired prior to completion of the work.

Sequence of erection.--Sequence of erection and location of panels shall be as shown on the approved erection plan.

Erection.--Panels shall not be erected until at least 75 percent of the design strength shown on the plans has been attained and verified by the Contractor.

Panels shall be carefully lifted and tilted from the casting bed and erected plumb in accurate location and alignment. Wedges shall be used to accurately position panels. Panels shall be anchored in place as shown on the plans. Concrete mortar, grout or drypack shall be used to fill joints between the panels and foundation system.

Temporary bracing and supports shall be used to hold the panels in position. Braces and supports shall be maintained in position until closures, columns or other supporting structures are in place and capable of supporting the panels.

Welding.--Panels shall be welded to supports as shown on the plans.

PATCHING.--

General.--Holes in panels caused by lifting and bracing devices shall be patched as specified for other concrete work.

FIELD QUALITY CONTROL.--

Testing.--Concrete strength at the time of lifting shall be verified with tests conducted by the Contractor.

DIVISION 4. (BLANK)

DIVISION 5. METALS

5.01 STRUCTURAL STEEL FOR BUILDINGS

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of fabricating, assembling, furnishing and erecting structural steel in accordance with the details shown on the plans and these special provisions.

Structural steel consists of:

Roof beams, ledgers, ledger splice plates, blocking, and connections.

Source quality control.--Materials and fabrication procedures are subject to inspection and tests in mill, shop and field, conducted by the Engineer or a qualified inspection agency. The Contractor or fabricator shall provide access to the Engineer or testing agency to places where the structural steel work is being fabricated or produced so that the required inspection and testing can be accomplished. Such inspections and tests will not relieve the Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements. The testing agency may inspect the structural steel at the plant before shipment; however, the Engineer reserves the right, at any time before final acceptance to reject the material that does not conform to the contract requirements.

REFERENCES.--

General.--Structural steel shall be fabricated, assembled and erected in accordance with American Institute of Steel Construction (AISC), "Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings."

Welding shall be in accordance with American Welding Society (AWS) D1.1, "Structural Welding Code - Steel."

SUBMITTALS.--

Product data.--Product data for items to be incorporated into the work, including structural steel, bolts, nuts and washers and alternative connectors, shall be submitted for approval.

Shop drawings.--Shop drawings and calculations shall be submitted for approval.

Shop drawings shall show any changes proposed in the work, details of connections and joints exposed to the weather, details for connections not dimensioned on the plans, the sequence of shop and field assembly and erection, welding sequences and procedures. If required, the location of butt welded splices on a layout drawing of the entire structure, and the location and details of any temporary supports that are to be used.

CLOSEOUT SUBMITTALS.--

Final drawings.--At the completion of each building on the contract, one set of reduced prints on 27 kg (minimum) bond paper, 280 mm x 432 mm in size, of the corrected original tracings of all approved drawings for each building shall be furnished to the Engineer. An index prepared specifically for the drawings for each building containing sheet numbers and titles shall be included on the first reduced print in the set for each building. Reduced prints for each building shall be arranged in the order of drawing numbers shown in the index.

The edge of the corrected original tracing image shall be clearly visible and visually parallel with the edges of the page. A clear, legible symbol shall be provided on the upper left side of each page to show the amount of reduction and a horizontal and vertical scale shall be provided on each reduced print to facilitate enlargement to original scale.

QUALITY ASSURANCE.--

Qualifications for welding.--A certified copy of qualification test record for welders shall be submitted to the Engineer at the jobsite. Descriptive data for equipment for field welding structural steel, including type and electric power requirements, shall be submitted for approval.

Certificates of Compliance.--Certificate of Compliance shall be furnished for structural steel products in accordance with the requirements specified in Section 4-1.04, "Certificates of Compliance," of the General Conditions. Certificate of Compliance shall include mill test certificates for each heat number used in the work.

DELIVERY, HANDLING AND STORAGE.--

Structural materials shall be loaded, transported, unloaded and stored so that it is kept clean and undamaged. Material shall be stored above ground on platforms, skids, or other supports. Covers and protection shall be provided to protect the materials from corrosion.

Anchorage and anchor bolts, which are to be embedded in concrete or masonry, shall be delivered in ample time to not delay the work.

PART 2.- PRODUCTS

MATERIALS.--

Steel bars, plates and shapes.--

Steel bars, plates and shapes shall conform to ASTM Designation: A 572/A 572M, Grade 50 [345].

Machine bolts, nuts and washers.--

Machine bolts and nuts shall conform to ASTM Designation: A 307.

Washers for machine bolts shall be commercial quality.

Expansion anchors.--

Expansion anchors shall be ICBO approved for the purpose intended, integral stud type anchor or internally threaded type with independent stud, hex nut and washer.

FABRICATION.--

Shop fabrication and assembly.--Workmanship and finish shall be equal to the best general practice in modern shops.

Cuts shall not deviate more than 2 mm from the intended line. Roughness, notches or gouges shall be removed.

Bearing stiffeners at points of loading shall be square with the web and shall have at least 75 percent of the stiffener in contact with the flanges.

Finished members shall be true to line, shall have square corners and smooth bends and shall be free from twists, kinks, warps, dents and open joints.

Exposed edges and ends of metal shall be dressed smooth, with no sharp edges and with corners slightly rounded.

Connections.--Abutting surfaces at connections shall be clean.

Cutting and welding at the jobsite will not be allowed except as shown on the approved drawings or specifically approved by the Engineer.

Finished holes for bolts shall be cylindrical and perpendicular to the plane of the connection. Subpunched and subdrilled holes shall be 6 mm smaller in diameter than the diameter specified for the finished hole.

Bolted Connections.--Bolts for connecting steel to steel shall be machine bolts conforming to ASTM Designation: A 307 as shown on the plans.

High-strength structural steel bolts, or equivalent fasteners, other bolts attached to structural steel, nuts, and washers shall be galvanized by mechanically deposited coating.

Holes for other work.--Holes for securing other work to structural steel and passage of other work through steel framing members shall be as shown on the approved drawings.

Threaded nuts or specialty items for securing other work to steel members shall be as shown on the approved drawings.

Holes shall be cut, drilled or punched perpendicular to metal surfaces. Holes shall not be flame cut or enlarged by burning. Holes are to be drilled in bearing plates.

SHOP PAINTING.--

General.--Structural steel members, except those to receive sprayed-fireproofing, shall be painted.

Surface preparation.--Surfaces of structural steel to be painted shall be blast cleaned in accordance with Steel Structures Painting Council, SSPC-SP 6, "Commercial Blast Cleaning."

Painting.--Immediately after surface preparation, surfaces of structural steel shall receive an undercoat of red oxide primer designed for steel surfaces.

PART 3.- EXECUTION

ERECTION AND ASSEMBLY.--

Field splices.--Field splices shall be made only at the locations shown on approved shop drawings.

The parts shall be accurately assembled in their final position as shown on the plans and in true alignment with related and adjoining work before final fastening.

All parts shall be supported adequately and at locations to provide a vibration free, rigid, and secure installation.

Bolted connections.--The bolt head type and head location shall be consistent within a joint.

Nuts shall be on side of member least exposed to view.

FIELD PAINTING.--

Touch-up painting.--After erection, the Contractor shall clean field welds, bolted connections, and abraded areas of shop paint and apply the same materials as applied for shop painting.

Surfaces which are scheduled to receive finish coats shall be painted with an additional prime coat and finish coats in accordance with the requirements specified for shop primed steel under "Painting" in Division 9.

QUALITY CONTROL.--

Testing and inspection.--Ultrasonic examination shall be performed by the Contractor on at least 50 percent of all full penetration butt-welded splices in accordance with the requirements of AWS D1.1 and these special provisions.

Welding procedures and methods shall be subject to inspection for conformance with AWS D1.1.

Butt welds shall be tested in accordance with AWS D1.1, Chapter 6, Part C, Ultrasonic Testing of Groove Welds.

Examination, reporting and disposition of tests shall be in accordance with the provisions of 6.12, AWS D1.1.

In addition to ultrasonic examinations by the Contractor, welds may be subject to inspection or non-destructive testing by the Engineer.

When additional inspection or non-destructive testing is required by the Engineer, the Contractor shall provide sufficient access facilities in the shop and at the jobsite to permit the Engineer or his agent to perform such inspection and testing.

The Contractor shall correct all deficiencies in the structural steel work which inspections and laboratory test reports have indicated to be not in compliance with these special provisions. Additional tests shall be performed by the Contractor at his expense to reconfirm any non-compliance of original work, and to show compliance of the corrected work.

5.02 METAL DECK

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of furnishing and installing metal deck in accordance with the details shown on the plans and these special provisions.

Metal deck includes ribbed sheet steel decking units, bent plates, accessories, fasteners and such other components, not mentioned, but required for a rigid, secure and complete installation.

REFERENCES.--

General.--The design, fabrication and erection of metal deck shall conform to the applicable requirements of the American Iron and Steel Institute (AISI) publication, "Specifications for the Design of Light Gauge Cold Formed Steel Structural Members," and the applicable Steel Deck Institute Design Manual and these special provisions.

Welding shall be in accordance with American Welding Society (AWS) D1.3, "Structural Welding Code - Sheet Steel."

SUBMITTALS.--

Product data.--Manufacturer's descriptive data for each type of deck and accessories shall be submitted for approval.

Shop drawings.--Shop drawings showing complete erection layouts, details, dimensions, deck section properties shall be submitted for approval. Drawings shall show types and gages, fastening methods, including the location, type and sequence of connections, sump pans, cut openings, surface finishes and temporary supports or bracing.

QUALITY ASSURANCE.--

Qualification of field welding.--Welding processes and welding operators shall be qualified in accordance with "Welder Qualification," procedures in American Welding Society (AWS) D1.1, "Structural Welding Code - Steel."

Welding decking in place is subject to inspection and testing. Defective work shall be removed and replaced with acceptable work.

Certificates of Compliance.--Certificates of Compliance shall be furnished for the metal decking in accordance with the requirements specified in Section 4-1.04, "Certificates of Compliance," of the General Conditions.

DELIVERY, HANDLING AND STORAGE.--

General.--Metal deck units and accessories shall be transported, stored and erected in a manner that will prevent corrosion, distortion or other damage.

Deck units shall be stored off the ground with one end elevated to provide drainage.

PART 2.- PRODUCTS

MANUFACTURERS.--Acceptable manufacturers shall be; Verco Manufacturing Co.; BHP Co.; or equal.

MATERIALS.--

Deck units.--

Deck units, closures and plates shall be fabricated from galvanized sheet steel conforming to ASTM Designation: A 653/A 653M, Grade 33 [Z30].

Galvanizing shall conform to the requirements of ASTM Designation: A 924/A 924M, G60 [Z180].

Miscellaneous steel shapes.--

Miscellaneous steel shapes shall conform to ASTM Designation: A 36/A 36M.

Anchor clips, vent clips, flashing, saddle plates, flexible closure strips and other accessories.--

Anchor clips, vent clips, flashing, saddle plates, flexible closure strips and other accessories shall be as recommended by the decking manufacturer.

FABRICATION.--

General.--Deck units shall be formed to span 3 or more supports, with flush, telescoped or nested 50 mm laps at ends and interlocking or nested side laps unless otherwise shown on the plans.

Deck units shall conform to the configurations, metal thickness, depth and width and section properties shown on the plans.

End bearing shall be not less than 38 mm.

Metal closure strips.--Metal closure strips for opening between deck units and other construction shall be fabricated from the same gage and material as the adjacent deck units. Strips shall be formed to provide tight-fitting closures at end of cells or flutes and sides of decking.

PART 3.- EXECUTION

INSTALLATION.--

General.--Deck units and accessories shall be installed in accordance with the manufacturer's recommendations and approved drawings and these special provisions.

Units shall be placed on supporting steel framework, adjusted in place and properly aligned before being permanently fastened. Ends of units shall have positive bearing over structural supports.

Cutting and fitting shall present a neat and true appearance with exposed burrs removed. Openings through the decking shall be cut square and shall be reinforced as recommended by the decking manufacturer.

The metal deck shall not be used as a working platform before deck units are fastened in place. Supplies, equipment or other loads shall not be stored on the deck. Mechanical equipment or other loads shall not be hung from metal roof decking.

Welding.--Welding shall conform to AWS requirements (D1.1 and D1.3) and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work.

Welding washers shall be used where recommended by the manufacturer.

Fastening roof deck units.--Roof deck units shall be fastened to supporting steel members as shown on the structural plans.

Fastening side laps.--Side laps of adjacent deck units shall be fastened as shown on the plans.

Field painting:--Immediately following erection, field welds, bolted connections and abraded areas shall be cleaned with a wire brush.

Galvanized surfaces shall be touched-up with galvanizing repair paint recommended by the manufacturer.

5.03 BUILDING MISCELLANEOUS METAL

PART 1.- GENERAL

Scope.--This work shall consist of fabricating, furnishing and installing building miscellaneous metal in accordance with the details shown on the plans and these special provisions.

Building miscellaneous metal shall consist of the following:

Miscellaneous bars, plates, and shapes

including all anchors, fastenings, hardware, accessories and other supplementary parts necessary to complete the work.

REFERENCES.--

Codes and standards.--Welding of steel shall be in accordance with American Welding Society (AWS) D 1.1, "Structural Welding Code-Steel" and D 1.3, "Structural Welding Code-Sheet Steel."

SUBMITTALS.--

Product data.--Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications.

Shop drawings.--Shop drawings of fabricated items shall be submitted for approval.

QUALITY ASSURANCE.--

Shop assembly.--Preassemble items in shop to the greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark all units for reassembly and installation.

Inspection and tests.--Materials and fabrication procedures shall be subject to inspection and tests by the Engineer, in mill, shop and field. Such tests will not relieve the Contractor of responsibility of providing materials and fabrication procedures in compliance with specified requirements.

PART 2.- PRODUCTS

MATERIALS.--

Steel bars, plates and hot-rolled shapes.--

Steel bars, plates and hot-rolled shapes shall conform to ASTM Designation: A 36/A 36M.

Galvanized sheet steel.--

Galvanized sheet steel shall conform to ASTM Designation: A 653/A 653M, Grade 33 [230]. Galvanizing shall be G60 [Z180].

Pipe.--

Pipe shall be commercial quality standard steel pipe.

Bolts, studs, threaded rods, nuts and washers.--

Bolts, studs, threaded rods, and nuts for general application shall conform to ASTM Designation: A 307.

Washers shall be commercial quality.

Bolts, studs, threaded rods, nuts, and washer shall be stainless steel where shown on the plans.

Expansion anchors.--

Expansion anchors shall be ICBO approved for the purpose intended, integral stud type anchor or internally threaded type with independent stud, hex nut and washer.

Stud, hex nut and washer shall be stainless steel where shown on the plans.

FABRICATION.--

Workmanship and finish.--Workmanship and finish shall be equal to the best general practice in modern shops.

Miscellaneous metal shall be clean and free from loose mill scale, flake rust and rust pitting, and shall be well formed and finished to shape and size with sharp lines and angles. Bends from shearing or punching shall be straightened. The thickness of metal and details of assembly and support shall give ample strength and stiffness.

Built-up parts shall be true to line and without sharp bends, twists and kinks. Exposed ends and edges of metal shall be milled or ground smooth, with corners slightly rounded.

Galvanizing.--Items indicated on the plans to be galvanized shall be hot-dip galvanized after fabrication. The weight of galvanized coating shall be at least 460 grams per square meter of surface area.

Painting.--Building miscellaneous metal items not galvanized shall be cleaned and prime painted prior to erection in accordance with the requirements specified for steel and other ferrous metals under "Painting" in Division 9, "Finishes," of these special provisions.

PART 3.- EXECUTION

GENERAL.--

Anchorage.--Anchorage devices and fasteners shall be provided for securing miscellaneous metal in-place construction; including threaded fasteners for concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws and other connectors.

Cutting, drilling and fitting shall be performed as required for installation of miscellaneous metal fabrications. Work is to set accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels.

DAMAGED SURFACES.--

General.--Galvanized surfaces that are abraded or damaged at any time after the application of the zinc coating shall be repaired by thoroughly wire brushing the damaged areas and removing all loose and cracked coating, after which the clean areas shall be painted with 2 applications of unthinned zinc-rich primer (organic vehicle type). Aerosol cans shall not be used.

DIVISION 6. (BLANK)

DIVISION 7. THERMAL AND MOISTURE PROTECTION

7.01 INSULATION (GENERAL)

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of furnishing and installing insulation in accordance with the details shown on the plans and these special provisions.

Insulation materials shall be as specified in these special provisions, and shall be compatible with existing or new materials incorporated in the building.

SUBMITTALS.--

Product data.--A list of materials, manufacturer's descriptive data, location schedule, and time schedule shall be submitted for approval.

The list of materials to be used shall include the trade name, manufacturer's name, smoke developed and flame spread classification, resistance rating and thickness for the insulation materials and accessories.

Schedules.--A location schedule and time schedule shall be submitted for approval. The location schedule shall show where each material is to be installed.

The Contractor shall provide the Engineer at the jobsite with an accurate time schedule of the areas of the building to be insulated each day. The time schedule shall be submitted 3 working days in advance of the work.

Samples --Samples of insulation material shall be submitted to the Engineer at the jobsite.

QUALITY ASSURANCE.--

Codes and standards.--All insulating materials shall be certified to comply with the California Quality Standards for Insulating Materials and shall be listed in the Department of Consumer Affairs publication "Consumer Guide and Directory of Certified Insulation Material."

DELIVERY, STORAGE AND HANDLING.--

General.--Insulating materials shall be delivered to the jobsite and stored in a safe dry location with labels intact and legible.

Insulating materials shall be protected from physical damage and from becoming wet or soiled.

In the event of damage, materials shall be repaired or replaced as necessary to comply with these specifications.

PART 2.- PRODUCTS (Not applicable.)

PART 3.- EXECUTION (Not applicable.)

7.02 RIGID ROOF INSULATION

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of furnishing and installing rigid roof insulation in accordance with the details shown on the plans and these special provisions.

Rigid insulation shall include rigid insulation, underlayment, wood nailers, fasteners and such other materials, not mentioned, which are required for the complete installation of the rigid insulation system. Materials and installation shall be coordinated with the roof covering system to meet the requirements for a Class 1 Factory Mutual approved assembly.

PART 2.- PRODUCTS

Underlayment.--

Underlayment shall be building paper, Type I (No. 15) asphalt roofing felt, or rosin-sized paper.

Rigid roof insulation.--

Rigid roof insulation shall be multilayer, preformed board roof insulation having thermal conductance or resistance as shown on the plans. Glass fiber board conforming to ASTM Designation: C 726, or expanded perlite board conforming to ASTM Designation: C 728, or wood fiber board conforming to ASTM Designation: C 208.

Insulation tape.--

Insulation tape shall be as recommended by the insulation manufacturer.

Bitumen.--

Bitumen shall conform to ASTM Designation: D 312, for Type III roofing asphalt.

Wood nailers.--

Wood nailers shall be Douglas fir, hem-fir or equivalent western softwood pressure treated after fabrication. Wood preservatives shall be waterborne type.

Fastener (metal decking).--

Fastener (metal decking) shall be galvanized spring steel barbed clip driven through galvanized 25 mm minimum nominal diameter caps; galvanized hardened steel nail with 25 mm minimum nominal diameter head and serrated shank to provide backout resistance; or threaded self tapping screw driven through 75 mm minimum nominal diameter galvanized cap.

PART 3.-EXECUTION

Preparation.--The preparation of the deck surfaces shall conform to the manufacturer's recommendations and these special provisions.

The deck surface shall be made smooth and level.

Installation.--Underlayment shall be fastened to nailable decks with randomly located roofing nails.

Insulation panels shall be placed in at least 2 layers with end joints staggered and with joints of the second layer offset at least 150 mm from joints in the first layer.

Insulation panels shall be oriented with the long side perpendicular to the direction roofing felts are to be laid. End joints between panels shall be staggered.

Insulation clips and fasteners shall resist the wind uplift classification specified for the roof covering.

Wood nailers shall be thick enough so the tops are flush with surrounding insulation. Perimeter nailers shall extend at least 50 mm beyond flanges of metal flashings or gravel stops. On roofs that are steeper than 50 mm per 305 mm, perimeter wood nailers shall be supplemented by nominal 100 mm wide wood nailers installed parallel to eaves (horizontal) at a maximum spacing of 2.4 meter. Wood nailers shall be securely fastened using at least two 16d nails to each framing member.

The first layer of insulation shall be mechanically fastened as recommended by the manufacturer to meet the requirements of the Factory Mutual Loss Prevention Data 1-28. At least one fastener per 0.2 square meter of insulation panel shall be used. Panels that are cracked or broken by the installation of the mechanical fasteners shall be replaced.

Additional layers of insulation shall be secured with a solid uniform application of hot bitumen applied at the rate of 14.6 kilograms per 10 square meters.

The completed layer of insulation shall be smooth and level, and suitable for the proper bedding of succeeding layers of roofing material.

Insulation shall be laid just before application of roofing felts. Units shall be laid in parallel courses with transverse joints staggered, in moderate contact with adjoining surfaces.

No more insulation shall be laid than can be covered with roofing the same day. Cutoffs of 2 layers of hot mopped Type I (No. 15) asphalt saturated felt shall be installed, not less than 100 mm onto completed work and extended out not less than 150 mm onto the deck, at exposed edges of insulation at the end of each day's work. Cutoffs shall be removed when work is resumed.

Joints in the top layer of glass fiber roof insulation shall be taped with 150 mm wide felt stripping set in hot asphalt mopping.

Continuous joints between insulation units and parallel to decking flutes shall not occur over the flute openings. Both units shall have full edge bearing on rib tops.

Insulation panels with broken or crushed corners or edges shall be trimmed free of such defects or shall be discarded. Replacement boards less than 305 mm wide shall not be used.

Damaged insulation in the completed work shall be removed and replaced. Insulation that has been wet or is wet shall be considered damaged.

7.03 BUILT-UP ASPHALT ROOFING SYSTEM

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of furnishing and installing a minimum 4-ply asphalt built-up roof covering system in accordance with the details shown on the plans and these special provisions.

Built-up roofing shall be an asphalt/glass-fiber felt roof system with an aggregate surface (NAGA-BUR).

Related work.--Sheet metal flashing and counter-flashing shall conform to the requirements under "Sheet Metal Flashing" elsewhere in this Division 7.

SUBMITTALS.--

Product data.--Manufacturer's descriptive data and applicable roofing specifications shall be submitted for approval.

Descriptive data shall include flash point temperature and finish blowing temperature for bitumen.

Roofing specifications shall include materials to be used, details and methods of application of the various materials for the complete roofing system proposed for use by the roofing manufacturer.

Samples.--A color sample of roofing gravel, approximately 2.25 kilograms in weight, shall be submitted to the Engineer at the job site for approval.

QUALITY ASSURANCE.--

Manufacturer's qualifications.--Primary products, including each type of roofing felt, bitumen, composition flashing shall be from a single manufacturer, who has produced that type of product successfully for not less than 5 years. Secondary products shall only be used when recommended by the roofing manufacturer.

Field supervision.--The roofing installer shall provide full-time supervision at the jobsite when roofing work is in progress. The supervisor shall have not less than 5 years experience in roofing work similar in nature and scope to the roofing work specified.

Codes and standards.--Roofing materials shall conform to the rules for control of volatile organic emissions adopted by the air pollution control district that has jurisdiction.

Roofing products shall have been tested and listed by the Underwriters Laboratory, Factory Mutual, or other recognized testing agency, and shall bear those labels.

Certificates of Compliance.--Products or product containers shall be labeled to indicate compliance with ASTM specifications or shall be accompanied by Certificates of Compliance certifying that the materials comply with ASTM Designations or these special provisions. Certificates of Compliance shall be in accordance with the requirements specified in Section 4-1.04, "Certificates of Compliance," of the General Conditions.

Certificate of Compliance for bulk bituminous materials shall be submitted indicating that the materials comply with the required standards, and shall indicate flash point (FP), finished blowing temperature (FBT), softening point (SP), and equiviscous temperature (EVT).

Field samples.--Materials shall be delivered to the project in labeled containers or wrappings sufficiently ahead of their intended use to allow for sampling and testing by the State. Bitumen shall not be heated before sampling.

Pre-installation conference.--Approximately 2 weeks prior to the start of roofing work, the Contractor shall convene a pre-installation conference. The Contractor shall require attendance of all parties directly affecting the installation of the built-up roofing, including the roofing installer and materials supplier.

The Contractor shall notify the Engineer, in writing, not less than 5 working days prior to the pre-installation conference.

Agenda items shall include preparatory work by other trades, review roofing system requirements, construction schedule and tentative starting date, and procedures for unfavorable weather conditions, including temporary roofing.

DELIVERY, STORAGE AND HANDLING.--

Delivery.--Materials shall be delivered to the jobsite with labels in place.

Storage.--Stored or stockpiled roll roofing shall be set on end, stored on pallets or other raised surfaces, and shall be protected from the elements. Felt rolls compressed into an oval cross section shall not be used. Felts damaged from exposure to sunlight and felts that are torn or cut shall not be used.

Roofing products that are wet or have been wet will be considered damaged. Damaged products shall not be used.

PROJECT CONDITIONS.--

Weather condition limitations.--The Contractor shall proceed with the roofing work only when existing and forecasted weather conditions will permit work to be performed in accordance with the manufacturer's recommendations and warranty requirements.

Built-up roofing shall not be applied in wet weather or when ambient air temperature is below 10°C. All drainage fixtures shall be set at the proper level to permit free flow of water.

Temporary roofing.--At the option of the Contractor and when adverse job conditions or weather conditions prevent permanent roofing from being installed in accordance with the contract requirements, a temporary roof may be installed and removed prior to proceeding with the permanent roofing work. Temporary roofing shall be furnished, applied, and removed at no cost to the State.

WARRANTY.--

Manufacturer's warranty.--The Contractor shall submit the roofing manufacturer's standard limited warranty.

Built-up bituminous roofing and related flashing installations, including related metal work, shall be guaranteed against defective materials and workmanship and against leakage due to faulty or inferior materials, inept or careless installation work, inadequate installation supervision, and inadequate protection of the completed work.

Any such defects or leakage occurring during the period of the warranty shall be promptly and completely corrected, including all affected work or damaged substrate, at no additional cost to the State. Bulging or wrinkling of built-up roofing shall be interpreted as defects requiring correction.

Such warranty shall be in effect for a period of not less than ten (10) years from the date of acceptance of the contract and shall be signed by an agent of the manufacturer and countersigned by the Contractor, and shall be submitted to the Engineer prior to the completion of the work.

PART 2.- PRODUCTS

SHEET MATERIALS.--

Red rosin sheet.--

Red rosin sheet shall be commercial quality rosin-sized sheathing paper suitable for use on wood decks under base ply sheets.

Base sheet.--

Base sheet shall be heavy duty, asphalt coated, glass-fiber base sheet conforming to ASTM Designation: D 4601, Type II.

Venting base sheet.--

Venting base sheet shall be asphalt-coated, glass-fiber venting base sheet conforming to ASTM Designation: D4897, Type II, with coarse mineral aggregates or embossed venting channels in the bottom surface.

Ply felts.--

Ply felts shall be asphalt impregnated, glass-fiber roofing felts conforming to ASTM Designation: D 2178, Type IV.

BITUMINOUS MATERIALS.--

Bitumen.--

Bitumen shall be roofing asphalt conforming to ASTM Designation: D 312, type to be determined by the manufacturer of the roofing material.

Asphalt/cement primer.--

Asphalt/cement primer shall conform to ASTM Designation: D 41.

Asbestos-free cement.--

Asbestos-free cement shall conform to ASTM Designation: D 4586, type to be determined by the manufacturer of the roofing material.

FLASHING MATERIALS.--**Base flashing.--**

Base flashing shall be asphalt-impregnated glass fiber and coated with weathering grade asphalt and surfaced with inert non-combustible granules.

Flashing felt strips.--

Flashing felt strips shall be asphalt impregnated glass fiber felt conforming to ASTM Designation: D 2178, Type IV.

ACCESSORIES.--**Roofing fasteners.--**

Roofing fasteners shall be hot-dip galvanized or non-ferrous type, size and spacing as recommended by the roofing material manufacturer.

Gravel or slag.--

Gravel or slag shall be dry, clean, dust free, opaque to ultraviolet light, hard (but not brittle), roofing gravel or roofing slag, sized to all pass the 19 mm sieve and no more than 15 percent to pass the 4.75 mm sieve. Limestone or non opaque rocks shall not be used. Maximum moisture content shall be 0.5 percent for gravel and 5 percent for slag as determined by California Tests 226 or 370 or by the test method ASTM Designation: D 1864.

PART 3.- EXECUTION**PREPARATION.--**

Protection.--Provide protection to the building, its contents, grounds, and landscape from damage, providing guards and coverings as necessary.

Bituminous materials, aggregates, and debris shall be prevented from entering and clogging drains and downspouts.

Surface preparation.--Surfaces to be covered shall be smooth, hard, and dry; and shall be free from high spots, depressions, frost or defects from frost, dust, loosened material and debris. Openings, holes or crevices shall be filled or covered before any roofing materials are applied.

Roofing material shall not be applied to wet or damp surfaces. Moisture transfer to colored toilet tissue or Kleenex brought in contact with roof surfaces shall indicate that the surfaces are too wet to apply roofing material. Foaming of a pint of bitumen heated to 205°C and applied to the deck surface shall indicate that the deck is not dry enough to roof. If the applied hot bitumen can be chipped clean from the deck after it cools, the deck is not dry enough for the roofing application.

Asphalt bitumen heating.--Bitumen shall be heated and applied in accordance with the manufacturer's recommendations and as recommended by the National Roofing Contractors Association (NRCA).

Bitumen shall be within -3.8°C of the equiviscous temperature at the point of application on the roof. Bitumen shall not be heated above the finished blowing temperature for extended periods of time. The temperature of bitumen shall be kept at least -3.8°C below its flash point temperature.

To insure good adhesion at lower air temperatures, care shall be taken to maintain bitumen temperatures at a minimum of 175°C at the point of application or at the roofing asphalt equiviscous temperature (EVT) when supplied by an asphalt supplier.

Roofing work pumping equipment.--Pumping equipment located on the ground shall be at a safe distance from the buildings. The location shall be subject to the approval of the Engineer.

Operators shall be in attendance whenever pumping equipment is in use.

Pumping equipment to be set on roofs shall be subject to the approval of the Engineer regarding loading of structural elements and spillage. Pumping equipment shall not be set on building walkways or new roof coverings.

INSTALLATION.--

Cants.--Nominal 100 mm minimum sized cants shall be installed at all intersections of the roof deck and vertical walls or curbs, except as otherwise shown on the plans. Cants shall be tight fitting and shall be rigidly and securely attached to the decking or insulation.

When insulating board cants are installed, the faces of the cant contiguous with the deck shall be buttered with bituminous plastic cement and firmly set in a full bed of bituminous plastic cement.

APPLICATION.--

General.--Built-up roofing materials shall be applied in accordance with the manufacturer's installation instructions, specifications, and these special provisions to provide a watertight, non-leaking roof covering.

Built-up roofing work and work of other trades shall be coordinated and scheduled to minimize interference and to eliminate traffic on the completed built-up roof.

Roofing material shall not be applied to wet or damp surfaces. Moisture transfer to colored toilet tissue or Kleenex brought in contact with roof surfaces shall indicate that the surfaces are too wet to apply roofing material. Foaming of a pint of bitumen heated to 205°C and applied to the deck surface shall indicate that the deck is not dry enough to roof. If the applied hot bitumen can be chipped clean from the deck after it cools, the deck is not dry enough for the roofing application.

Membrane application.--Base plies shall be rolled out in strips and allowed to flatten before placing.

Concrete and masonry surfaces shall be primed as required prior to the application of the membrane and flashing.

Roofing membrane shall be applied in four plies with interply mopping of asphalt.

Felts shall be squeegeed during construction to minimize voids, fish mouths or wrinkles and to firmly embed the felts into the hot bitumen. Voids, fish mouths or wrinkles built into a ply shall be cut, remopped, and repaired with at least one ply of reinforcing material and hot bitumen before applying the next ply.

Roofing plies shall be solid mopped to cants and extended up vertical walls or curbs, without mopping, for a height not less than 75 mm above cants.

Two plies of felts shall be mopped and sealed around all penetrations.

Flashing application.--Flashing shall be installed in accordance with the details in the manufacturer's specifications.

All sheet metal accessories, pipes, expansion joints, area dividers, and any penetrations in the roofing shall be flashed weathertight.

Plastic cement shall be troweled to the top of flashing at the end of each day's operations to close joints and prevent water from entering behind flashing until counterflashing is placed.

Gravel or slag coating application.--A flood coat of hot bitumen shall be applied uniformly over the final ply of roofing felt at the rate of not less than 29 kilograms per 10 square meters.

While the flood coat is still hot, gravel shall be firmly embedded uniformly at the rate of at least 195 kilograms per 10 square meters or slag shall be applied uniformly at the rate of at least 29 kilograms per 10 square meters.

FIELD QUALITY CONTROL.--

Testing.--Upon completion, the Engineer may at his option, take at least one 305 mm x 305 mm sample including gravel, from each roof plane, not to exceed one sample per 100 square meters of roof plane.

Sample shall be cut as accurately as possible using metal template and knife.

The Contractor at his expense shall patch sample test areas with the same roofing materials as used for the rest of the roof to insure watertightness. The test cut panel shall be put back in place and readhered, and additional plies, equal to the original specification, shall be applied over the panel location before proceeding to install surfacing materials.

If any sample does not comply with these special provisions or the manufacturer's requirements, the entire roof or roofs shall be considered unacceptable and shall be replaced at the Contractor's expense.

CLEANING.--

General.--Upon completion of the roofing work, remove all tools and implements from the work area.

Bituminous markings shall be removed from surrounding surfaces. In areas where finished areas are soiled by roofing work, the manufacturer of the surfacing shall be consulted concerning removal of the asphalt products.

7.04 SHEET METAL FLASHING

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of fabricating, furnishing and installing sheet metal flashing in accordance with the details shown on the plans and these special provisions.

Sheet metal shall include metal flashings, counterflashings, straps, and reglets.

QUALITY ASSURANCE.--

Codes and standards.--Sheet metal work shall in accordance with the requirements in the latest edition of the Sheet Metal and Air Conditioning Contractors National Association "Standard Practice in Architectural Sheet Metal Work."

PART 2.- PRODUCTS

MATERIALS.--

Galvanized sheet steel.--

Galvanized sheet steel shall conform to ASTM Designation: A 361, not less than 0.71 mm (24-gage), unless otherwise shown on the plans. Surfaces to be painted shall not have factory coatings on galvanizing that cannot be removed by paint thinner.

Premolded roof flashing.--

Premolded flashing shall be premolded neoprene or ethylene propylene diene monomer (EPDM) flashing, resistant to ozone and ultraviolet. Units shall have overlapping tab to flash the seam.

Hardware and fastenings.--

Hardware and fastening for premolded roof flashings shall be stainless steel.

Solder.--

Solder shall conform to ASTM Designation: B 32, Alloy Grade Sn50.

Soldering flux.--

Soldering flux shall be acid type, conforming to Federal Specification: O-F-506C, Type I, Form A.

Lap joint sealant.--

Lap joint sealant for concealed locations shall be a non-drying butyl.

Flashing cement.--

Flashing cement shall be a bituminous plastic cement, asbestos free, conforming to ASTM Designation: D 4586, Type II.

Sealant.--

Sealant for exposed locations shall be a silicone sealant conforming to ASTM Designation: C 920.

Primer.--

Primer shall be as recommended by the sealant manufacturer.

FABRICATION.--

General.--Sheet metal shall be assembled to Sheet Metal and Air Conditioning Contractors National Association Standards.

Sheet metal shall be formed to the sizes, shapes and dimensions shown on the plans or as specified herein with angles and lines straight, sharp and in true alignment. The number of joints shall be kept to a minimum.

Angle bends and folds for interlocking the metal shall be made with full regard for expansion and contraction to avoid buckling or fullness in the metal after it is installed.

Joints in sheet metal work shall be closed watertight unless slip joints are specifically required. Watertight joints shall be mechanically interlocked and then thoroughly soldered for metals other than aluminum. Watertight joints in aluminum or between aluminum and other metals shall be sealed with acrylic sealant.

Sheet metal joints to be soldered shall be cleaned with steel wool or other means, pre-tinned and soldered watertight.

All joints shall be wiped clean of flux after soldering. Acid flux shall be neutralized by washing the joints with sodium bicarbonate.

Flashings shall have a 45 degree drip return at bottom edges. Unless otherwise shown on the plans, counterflashing shall extend not less than 100 mm over roofing or other materials protected by the counterflashing and shall be arranged so that roofing or materials can be repaired without damage to the counterflashing. Where reglets are indicated, counterflashing shall be fastened by lead wedges or snap-in flashing.

PART 3.- EXECUTION

PREPARATION.--Surfaces to receive sheet metal shall be clean, smooth and free from defects.

INSTALLATION.--

Roof penetration flashings.--All pipes, ducts, vents and flues passing through roofs shall be made waterproof with flashings of storm collars or counterflashings.

Roof penetration flashings shall be fabricated from galvanized sheet steel, not less than 0.71 mm (24-gage). Size and shape shall be as shown on the plans.

On built-up roofing, 2 flashings shall be furnished for each pipe, vent or flue through roof. Flashings shall be constructed so that the lower flashing shall sit directly on the roof deck, with the top flashing set over it on top of the roof felts.

The lower flashing shall be galvanized sheet metal, 0.71 mm (24-gage), and extend 150 mm minimum from outside of the pipe in all directions and 38 mm above the top of the roofing.

The top flashing shall be galvanized sheet steel as shown on the plans.

Premolded roof flashings.--Premolded roof flashings shall be installed in accordance with the manufacturer's instructions.

7.05 COMPRESSION SEALS

GENERAL.--This work shall consist of furnishing and installing compression seals in accordance with the details shown on the plans and these special provisions.

SUBMITTALS.--Manufacturer's descriptive data, samples, and installation instructions for compression seals shall be submitted for approval. Samples shall be at least 6 inches long.

PRODUCTS.--

Compression seals.--

Compression seals shall be a prefabricated preformed elastomeric joint seal conforming to the provisions of ASTM Designation: D 2628. The seal shall be a multi-channel nonporous, homogenous material furnished in a finished extruded form.

Compression seal width shall be a minimum of 1 1/4 times the width of the joint.

Lubricant-adhesive.--

Lubricant-adhesive shall be as recommended by the compression seal manufacture.

EXECUTION.--

INSTALLATION.--Compression seals shall be installed in accordance with the manufacturer's instructions.

The side contact surfaces shall be thoroughly cleaned just prior to applying the lubricant-adhesive.

Lubricant-adhesive shall be mixed and applied in accordance with the manufacturer's recommendations.

Lubricant-adhesive shall be liberally applied to the sides of the seal and the side contact surfaces immediately prior to installation.

The seal shall be installed in one continuous piece for the full length of each joint with equipment that will not twist or distort the seal, elongate the seal longitudinally, or otherwise cause damage to the seal or the contact surfaces.

7.06 SEALANTS AND CAULKING

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of furnishing and applying sealants and caulking which are required for this project, but not specified elsewhere, in accordance with the details shown on the plans and these special provisions.

QUALITY ASSURANCE.--

Certificates of Compliance.--Certificates of compliance shall be furnished for the sealants and caulking in accordance with the requirements specified in Section 4-1.04, "Certificates of Compliance," of the General Conditions.

SUBMITTALS.--

Product data.--Manufacturer's descriptive data and installation instructions for all sealants shall be submitted for approval.

Samples.--Color samples of all sealants shall be submitted for approval. Unless otherwise shown on the plans, colors will be selected by the Engineer from the manufacturer's standard colors.

PART 2.- PRODUCTS

MATERIALS.--

General.--All sealants, primers and accessories shall be non-staining to adjacent exposed surfaces. Products having similar applications and usage shall be of the same type and same manufacturer. Gun consistency compound shall be used unless otherwise required by the job conditions.

Acrylic sealant.--

Acrylic sealant shall be one compound, solvent release acrylic sealant.

Butyl sealant.--

Butyl sealant shall be one component, skinning type.

Silicone sealant.--

Silicone sealant shall be one component, low modulus building sealant. Sealant shall be tack-free in one hour, shall not sag or flow, shall be ozone resistant and capable of 100 percent extension without failure.

Backer rod.--

Backer rod shall be round, open or closed cell polyurethane. Backer rod shall be sized such that it must be compressed between 25 and 75 percent of its uncompressed diameter during installation in the joint.

PART 3.- EXECUTION**APPLICATION.--**

General.--Unless otherwise shown on the plans, sealants shall be applied in accordance with the manufacturer's instructions.

Silicone sealants shall not be used in locations where painting is required.

Butyl sealants shall not be used in exterior applications, and acrylic sealants shall not be used in interior applications.

Sealants shall be applied in a continuous operation for the full length of the joint. Immediately following the application of the sealant, the sealant shall be tooled smooth using a tool similar to that used to produce concave masonry joints. Following tooling, the sealant shall remain undisturbed for not less than 48 hours.

DIVISION 8. DOORS AND WINDOWS**8.01 HINGED DOORS**

GENERAL.--This work shall consist of furnishing and installing hinged doors and frames in accordance with the details shown on the plans and these special provisions.

SUBMITTALS.--Manufacturer's descriptive data, installation instructions for fire rated assemblies and a door schedule shall be submitted for approval. The door schedule shall include a description of the type, location and size of each door and frame.

PRODUCTS.--**Metal door.--**

Metal door shall be flush, seamless steel door factory prepared and reinforced to receive hardware and having cold rolled stretcher leveled sheet steel face sheets not less than 1.2 mm thick (18-gage). Face sheets shall be bonded with thermosetting adhesive to rigid board honeycomb or precured foam core; or face sheets shall be welded to all parts of an assembled grid of cold formed pressed metal stiffeners and framing members located around edges, ends, openings and at all locations necessary to prevent buckling of face sheets. Seams shall be tack welded, filled and ground smooth. Bottom edge and internal stiffeners of grid type core shall have moisture vents. Welds on exposed surfaces shall be ground smooth. Louvered or glazed openings shall be provided where shown on the plans.

Active leaf of double door shall have a full height astragal of 3 mm flat bar or folded sheet strip, not less than 1.5 mm thick (16-gage), welded on the outside of the active leaf.

Door shall be cleaned and treated by the bonderized process or approved phosphatizing process and then given one factory application of metal protective rust inhibitive primer. Primer shall not contain lead type pigments.

Pressed metal frame.--

Pressed metal frame shall be not less than 1.5 mm thick (16-gage) sheet steel with integral stop, mitered corners, face welded and ground smooth corners. Frames shall be reinforced for all hardware and shall be cleaned and treated by the bonderized process or an approved phosphatizing process and then given one factory application of metal protective rust inhibitive primer. Primer shall not contain lead type pigments.

Sealants.--

Sealants shall be ultraviolet and ozone resistant, gun grade polysulfide or polyurethane, multicomponent, Federal Specification: TT-S-227.

EXECUTION.--

INSTALLATION.--Doors and frames shall be installed rigidly, securely, plumb and true and in such a manner that the doors operate freely without rubbing or binding. Clearance between frame and door shall be not more than 3 mm. The exterior frame shall be sealed weathertight.

Pressed metal frames shall be secured with clips and anchors as shown on the plans.

PAINTING.--Except for the primer application specified herein, doors and frames shall be cleaned, prepared and painted in accordance with the requirements specified under "Painting" in Division-9, "Finishes," of these special provisions.

8.02 FINISH HARDWARE

PART 1.- GENERAL

SUMMARY.--

This work shall consist of furnishing and installing hardware items for doors in accordance with the details shown on the plans and these special provisions.

Hardware assemblies shall comply with the disabled accessibility requirements indicated on the plans and specified in these special provisions.

SUBMITTALS.—

Manufacturer's technical information and catalog cuts for each item of door hardware and a door hardware schedule shall be submitted for approval prior to installation.

Manufacturer's catalog cuts shall include catalog numbers, material, grade, type, size, function, design, quality and finish of hardware.

The door hardware schedule shall indicate the location and size of door opening, the door and frame material, and the size, style, finish and quantity of the hardware components required.

FINISHES.—

Hardware shall be provided with standard US 26D metal plated finish.

KEYING INSTRUCTIONS.—

New locks shall be compatible with the master key system of the existing facility and shall be keyed to the existing lock system in use.

Locks and cylinders shall be provided with seven pin "O" cylinders and blank keys. Cylinders and blank keys shall be delivered to the Engineer for combining of cylinders and cutting of keys.

The Contractor shall provide cylinders for use during construction. Construction cylinders shall remain in place until permanent cylinders are installed. Construction cylinders shall remain the property of the Contractor.

Key bows shall be stamped "State of California" and "Do Not Duplicate."

PART 2.- PRODUCTS.--

GENERAL.—

Door hardware equal in material, grade, type, size, function, design, quality and manufacture to that specified herein may be submitted for approval.

Butt hinges.--

Butt hinges shall be steel, 1 1/2-pair per door unless otherwise specified or shown on the plans. Nonremovable pins shall be provided at outswing exterior doors. Hinge size shall be 114 mm x 114 mm unless otherwise noted.

Standard weight hinges shall be:

Hager	BB 1279
McKinney	TB 2714
Stanley	BB 179
or equal.	

Mortise locksets.--

Mortise locksets shall be steel case with 32 mm x 203 mm face plate and 70 mm backset. Door and frame preparation for mortise locksets shall conform to ANSI A115.1.

Cylindrical dead locks.--

Cylindrical dead locks shall have 25 mm throw bolt with concealed hardened steel inserts and one inch diameter bolt housing, 70 mm backset.

Single cylinder dead lock with inside thumb turn shall be:

Best	83T 7K
Falcon	D441
Schlage	B460P
or equal.	

Flush bolts.--

Flush bolts shall be installed at the top and bottom of the inactive leaf of pairs of doors. Provide automatic bolts on UL rated pairs of doors.

Flush bolts for manual operation shall be:

Builders Brass	5020
Glynn Johnson	FB6
H.B. Ives	457
or equal.	

Floor mounted stops.--

Floor mounted stops shall be dome type. The height of the stop shall be determined by the clearance required when a threshold is used or not used.

Automatic door bottom.--

Automatic door bottom shall be heavy duty, full mortise.

Bottom shall be:

Pemko	434 AR
Zero	360
or equal.	

Thresholds and rain drips.--

Thresholds and rain drips shall conform to the sizes and configurations shown on plans. Thresholds at door openings with accessibility requirements shall not exceed 13 mm in height.

Threshold and rain drip manufacturers shall be Pemko, Reese, Zero, or equal.

Bronze spring seal.--

Bronze spring seal manufacturers shall be Pemko, Reese, Zero, or equal.

Threshold bedding sealant.--

Threshold bedding sealant shall conform to Federal Specification: SS-C-153.

Weatherstrip.--

Weatherstrip shall conform to the sizes and shapes shown on plans. Assemblies shall be UL listed and shall be provided where shown on the plans or as specified in these special provisions.

Weatherstrip manufacturers shall be Pemko, Reese, Zero, or equal.

PART 3.- EXECUTION

DOORS AND FRAMES.--Doors and frames shall be set square and plumb and be properly prepared before the installation of hardware.

INSTALLATION.--Hardware items shall be accurately fitted, securely applied, and adjusted and lubricated in accordance with the manufacturer's instructions. Installation shall provide proper operation without bind or excessive play.

Hinges shall be installed at equal spacing with the center of the end hinges not more than 244 mm from the top and bottom of the door. Locksets shall be 1024 mm from the finished floor.

Thresholds shall be set in a continuous bed of sealant material.

Door stops located on concrete surfaces shall be fastened rigidly and securely in place with expansion anchoring devices. Door stops mounted elsewhere shall be securely attached with wood screws or expansion devices as required.

Hardware, except hinges, shall be removed from surfaces to be painted before painting.

Upon completion of installation and adjustment, the Contractor shall deliver to the Engineer all dogging keys, closer valve keys, lock spanner wrenches, and other factory furnished installation aids, instructions and maintenance guides.

DOOR HARDWARE GROUPS AND SCHEDULE.--Hardware groups specified herein shall correspond to those shown on the plans:

GROUP 1

- 3-pair butt hinges
- 1 each mortise lever operated lockset
- 1 each cylindrical dead lock
- 1 each flush bolt
- 1 each threshold with saddle
- 1 each rain drip
- 1 each automatic door bottom
- 1 each weatherstripping
- 1 each bronze spring seal

DIVISION 9. FINISHES**9.01 ACOUSTICAL INSULATION PANEL****PART 1.- GENERAL****SUMMARY.--**

Scope.--This work shall consist of furnishing and installing acoustical insulation panels in accordance with the details shown on the plans and these special provisions.

Acoustical insulation panels shall include acoustical insulation, metal channels and Z-furring, fasteners and such other materials, not mentioned, which are required for the complete installation of the system.

QUALITY ASSURANCE.--

Codes and standards.--Acoustical insulation panels shall have a flame-spread rating not to exceed 75 and a smoke density not to exceed 450 when tested in accordance with UBC Standard No. 8-1.

PART 2.- PRODUCTS

Acoustical insulation panels.--

Acoustical insulation panels shall be nominal 50 mm thick, fiberglass or mineral absorption board with a factory applied white perforated sheet metal facing. Perforations shall be approximately 3 mm diameter and staggered with approximately 13 percent open area spaced approximately 8 mm on center. Panels shall have a minimum noise reduction coefficient (NRC) of 0.90.

Metal channels and Z-furring.--

Metal channels, angles, and Z-furring shall be commercial quality white galvanized metal. Gage shall be as recommended by the panel manufacturer.

Fasteners.--

Fasteners shall be concrete screws.

EXECUTION.--

Installation of acoustical insulation-The preparation of the wall surfaces and the installation of insulation panels shall conform to the manufacturer's recommendations and these special provisions.

Acoustical insulation panels shall be tight fitting between metal Z-furring, nominal 50 mm, spaced approximately one meter on center. Metal channels be placed at the top and bottom of the insulation panel. Adhesive, if required, shall be applied to the wall as recommended by the insulation panel manufacturer.

Insulation panels with broken or crushed corners or edges shall be trimmed free of such defects or shall be discarded. Replacement boards less than 300 mm wide shall not be used.

Damaged insulation in the completed work shall be removed and replaced. Insulation that has been wet or is wet shall be considered damaged.

9.02 PAINTING

PART 1.- GENERAL

SUMMARY.--This work shall consist of preparing surfaces to receive coatings, and furnishing and applying coatings, in accordance with the schedules and details shown on the plans, and these special provisions.

The coatings specified in this section are in addition to any factory finishes, shop priming, or surface treatment specified elsewhere in these special provisions.

SUBMITTALS.--Manufacturer's descriptive data, a materials list, and color samples shall be submitted for approval.

Product descriptive data shall include product description, manufacturer's recommendations for product mixing, thinning, tinting, handling, site environmental requirements, product application and drying time.

Materials list shall include manufacturer's name, trade name, and product numbers for each type coating to be applied.

Color samples shall be manufacturer's color cards, approximately 50 mm x 75 mm, for each color of coating shown on the plans. Color samples for stains shall be submitted on wood of the same species, color, and texture as the wood to receive the stain.

REGULATORY REQUIREMENTS.--Coatings and applications shall conform to the rules for control of volatile organic compound emissions adopted by the air quality control district in the air basin in which the coatings are applied.

SITE ENVIRONMENTAL REQUIREMENTS.--Coatings shall not be applied when the air temperature is below 10°C (20°C for varnishes) or when the relative humidity exceeds 75 percent.

The surface to be coated shall be maintained at a minimum temperature of 7°C for a period of 24 hours prior to, and 48 hours after the application of the coating. Heating facilities shall be provided when necessary.

Continuous ventilation shall be provided during application of the coatings.

A minimum lighting level of 865 lux, measured 1 m from the surface to be coated, shall be provided while surfaces are being prepared for coatings and during coating applications.

DELIVERY, STORAGE, AND HANDLING.--Products shall be delivered to the site in sealed, labeled containers and stored in a well ventilated area at an ambient air temperature of not less than 7°C. Container labeling shall include manufacturer's name, type of coating, trade name, color designation, drying time, and instructions for tinting, mixing, and thinning.

MAINTENANCE STOCK.--Upon completion of coating work, a full 3.8 liter container of each type and color of finish coat and stain used shall be delivered to the location at the project site designated by the Engineer. Containers shall be tightly sealed and labeled with color, texture, and room locations where used, in addition to the manufacturer's standard product label.

PART 2.- PRODUCTS

GENERAL.--The products shall be the best quality grade coatings of the specified types as regularly manufactured by nationally recognized paint and varnish manufacturers that have not less than 10 years experience in manufacturing paints and varnishes. Products that do not bear the manufacturer's identification as the best quality grade product shall not be used. Products for each coating system shall be by a single manufacturer and shall not contain lead type pigments.

Thinners, shellac, fillers, patching compounds, coloring tint, and other products required to achieve the specified finish shall be the manufacturer's best quality and shall be used as recommended.

PART 3.- EXECUTION

INSPECTION.--Surfaces to be coated at the jobsite shall be approved by the Engineer prior to the application of coatings. The Contractor shall notify the Engineer at least 3 working days prior to the application of coatings.

SURFACE PREPARATION.--Surfaces scheduled to be coated shall be prepared in accordance with the following, except that the surfaces not specified herein shall be prepared as recommended by the coating manufacturer.

GENERAL.--Hardware, cover plates, light fixture trim, and similar items shall be removed prior to preparing surfaces for coating. Following the application of the finish coating, the removed items shall be reinstalled in their original locations.

GALVANIZED METAL.--Oils, grease, and fabrication lubricants shall be removed by solvent wash. Surfaces shall be cleaned of remaining surface treatments by hand cleaning. New surfaces shall be roughened by hand cleaning or light abrasive blasting.

Abraded or corroded areas shall be hand cleaned and spot coated with one coat of vinyl wash pretreatment. Abraded or corroded areas on new surfaces not scheduled to be painted shall be cleaned by solvent wash, hand cleaned, and given 2 spot applications of zinc rich paint.

STEEL AND OTHER FERROUS METALS.--Oils, grease, and fabrication lubricants shall be removed by solvent wash. Dirt, water soluble chemicals, and similar surface contamination shall be removed by detergent wash or steam cleaning. Mill scale and rust shall be removed by hand cleaning or abrasive blasting.

CONCRETE.--New material shall be cured a minimum of 14 days before coating. Surface dirt and dust shall be removed by brooming, air blast, or vacuum cleaner. Oil and grease shall be removed by steam cleaning. Form release agents, weak concrete, surface laitance, dirt, and other deleterious material shall be removed by sandblasting. Cracks and voids shall be filled with cement mortar patching material.

SHOP PRIMED SURFACES.--Dirt, oil, grease, or other surface contaminants shall be removed by water blasting, steam cleaning, or TSP wash. Minor surface imperfections shall be filled as required for new work. Mildew shall be removed by mildew wash. Chalking paint shall be removed by hand cleaning. The surfaces of existing hard or glossy coatings shall be abraded to dull the finish by hand cleaning or light abrasive blasting. Abrasive blasting shall not be used on wood or non-ferrous metal surfaces.

Chipped, peeling, blistered, or loose coatings shall be removed by hand cleaning, water blasting, or abrasive blasting. Bare areas shall be pretreated and primed as required for new work.

DEFINITIONS.--

DETERGENT WASH.--Removal of dirt and water soluble chemicals by scrubbing with a solution of detergent and water, and removal of all solution and residues with clean water.

HAND CLEANING.--Removal of dirt, loose rust, mill scale, excess base material, filler, aluminum oxide, chalking paint, peeling paint, or paint which is not firmly bonded to the surfaces by using hand or powered wire brushes, hand scraping tools, power grinders, or sandpaper and removal of all loose particles and dust prior to coating.

ABRASIVE BLASTING.--Removal of oil, grease, form release agents, paint, dirt, rust, mill scale, efflorescence, weak concrete, or laitance, by the use of airborne abrasives, and removal of loose particles, dust, and abrasives by blasting with clean air.

Abrasives shall be limited to clean dry sand, mineral grit, steel grit, or steel shot, and shall be graded to produce satisfactory results. Unwashed beach sand containing salt or silt shall not be used.

Abrasive blasting shall conform to the requirements of SSPC-SP6-85, Commercial Blast Cleaning, as defined in the Steel Structures Painting Council Manual.

Light abrasive blasting shall conform to the requirements of SSPC-SP7-85, Brush-Off Blast Cleaning, as defined in the Steel Structures Painting Council Manual.

SOLVENT WASH.--Removal of oil, grease, wax, dirt, or other foreign matter by using solvents, such as mineral spirits or xylol, or other approved cleaning compounds.

STEAM CLEANING.--Removal of oil, grease, dirt, rust, scale, or other foreign matter by using steam generated by commercial steam cleaning equipment, from a solution of water and steam cleaning compounds, and removal of all residues and cleaning compounds with clean water.

TSP WASH.--Removal of oil, grease, dirt, paint gloss, and other foreign matter by scrubbing with a solution of trisodium phosphate and warm water, and removal of all solution and residues with clean water.

WATER BLASTING.--High pressure, low volume water stream for removing dirt, light scale, chalking or peeling paint. Water blasting equipment shall produce not less than a 13 800 MPa minimum output pressure when used. Heated water shall not exceed 66°C. If a detergent solution is used, it shall be biodegradable and shall be removed from all surfaces with clean water.

PROTECTION.--The Contractor shall provide protective devices, such as tarps, screens or covers, as necessary to prevent damage to the work and to other property or persons from all cleaning and painting operations.

Paint or paint stains on surfaces not designated to be painted shall be removed by the Contractor at his expense and the original surface restored to the satisfaction of the Engineer.

APPLICATION.--

GENERAL.--Coatings shall be applied in accordance with the printed instructions and at the application rates recommended by the manufacturer to achieve the dry film thickness specified in these special provisions.

Mixing, thinning and tinting shall conform to the manufacturer's printed instructions. Thinning will be allowed only when recommended by the manufacturer.

Coatings shall be applied only when surfaces are dry and properly prepared.

Cleaning and painting shall be scheduled so that dust and other contaminants from the cleaning process will not fall on wet, newly coated surfaces.

Materials required to be coated shall have coatings applied to all exposed surfaces, including the tops and bottoms of metal doors, and other surfaces not normally visible from eye level.

APPLICATION SURFACE FINISH.--Each coat shall be applied to a uniform finish. Finished surfaces shall be free of surface deviations and imperfections such as skips, cloudiness, spotting, holidays, laps, brush marks, runs, sags, curtains, ropiness, improper cutting in, overspray, drips, ridges, waves, and variations in color and texture.

Each application of a multiple application finish system shall closely resemble the final color coat, except each application shall provide enough contrast in shade to distinguish the separate applications.

WORK REQUIRED BETWEEN APPLICATIONS.--Each application of material shall be cured in accordance with the coating manufacturer's recommendations before applying the succeeding coating. Enamels and clear finishes shall be lightly sanded, dusted, and wiped clean between applications.

Stain blocking primer shall be spot applied whenever stains bleed through the previous application of a coating.

TIMING OF APPLICATIONS.--The first application of the specified coating system shall be applied prior to any deterioration of the newly prepared surface. Metal surfaces shall be prepared and prime coated the same day that cleaning of bare metal is performed. Additional prime coats shall be applied as soon as drying time of the preceding coat permits.

Metal surfaces shall be prime coated within 12 hours of application of vinyl wash pretreatment.

Drying time between applications of water borne coatings shall be at least 12 hours.

APPLICATION METHODS.--Coatings shall be applied by brush, roller or spray. Rollers shall be of a type which do not leave a stippled texture in the paint film. Extension handles for rollers shall not be greater than 2 m in length.

If spray methods are used, surface deviations and imperfections such as, overspray, thickness deviations, lap marks, and orange peel shall be considered as evidence that the work is unsatisfactory and the Contractor shall apply the remainder of the coating by brush or roller, as approved by the Engineer.

DRY FILM THICKNESS.--

Vinyl wash pretreatment	0.007 mm to 0.13 mm, maximum.
Bituminous paint	0.1 mm, minimum.
Epoxy polyamide primer	0.1 mm, minimum.
Aliphatic polyurethane enamel	0.05 mm, minimum.
Other primers, undercoats, sealers, and coatings	As recommended by the manufacturer.

All primed metal surfaces in contact with concrete or concrete block exterior walls shall be coated with a bituminous paint on those surfaces in contact with the wall.

PATCHES IN PREVIOUSLY COATED SURFACES.--Where patches are made on surfaces of previously coated walls or ceilings, the entire surface to corners on every side of the patch shall be coated with a minimum of one application of the finish coat.

FINISHING MECHANICAL AND ELECTRICAL COMPONENTS.--Shop primed mechanical and electrical components shall be finish coated in accordance with the coating system entitled, "Shop Primed Steel." Louvers, grilles, covers, and access panels on mechanical and electrical components shall be removed and coated separately.

Interior surfaces of air ducts which are visible through grilles or louvers shall be coated with one application of flat black enamel, to limit of the sight line.

Exposed conduit, piping, and other mechanical and electrical components visible in public areas shall be painted.

CLEANING.--Upon completion of all operations, the coated surfaces shall be thoroughly cleaned of dust, dirt, grease, or other unsightly materials or substances.

Surfaces marred or damaged as a result of the Contractor's operations shall be repaired, at his expense, to match the condition of the surfaces prior to the beginning of the Contractor's operations.

COATING SYSTEMS.--The surfaces to be coated shall be as shown on the plans and as specified elsewhere in these special provisions. When a coating system is not shown or specified for a surface to be finish coated, the coating system to be used shall be as specified for the substrate material. The number of applications specified for each coating system listed herein is a minimum. Additional coats shall be applied if necessary to obtain a uniform color, texture, appearance, or required dry film thickness.

SYSTEM 1- CONCRETE.--

- 1 prime coat: concrete and masonry primer
- 2 finish coats: acrylic, exterior enamel, semi-gloss

SYSTEM 2- GALVANIZED METAL.--

1 pretreat coat: vinyl wash pretreatment
1 prime coat: galvanized metal primer
2 finish coats: acrylic, exterior enamel, semi-gloss

SYSTEM 3- SHOP PRIMED STEEL.--

1 prime coat : red oxide ferrous metal primer
2 finish coats: alkyd, exterior enamel, semi-gloss

SYSTEM 4- STEEL AND OTHER FERROUS METALS.--

2 prime coats: red oxide ferrous metal primer
2 finish coats: alkyd, exterior enamel, semi-gloss

COLOR SCHEDULE.--Colors shall be as shown on the plans.

DIVISION 10. SPECIALTIES

10.01 LOUVERS

GENERAL.--This work consists of furnishing and installing louvers in accordance with the details shown on the plans and these special provisions.

SUBMITTALS.--Manufacturer's descriptive data and installation instructions shall be submitted for approval.

PRODUCTS.--

Louvers.--

Louvers shall be factory fabricated units of galvanized steel sheet not less than 1.63 mm thick (16-gage) with standard "Z" type blades, and removable bronze 16 x 16 mesh insect screens mounted on the inside of the units.

Gravity units shall have blades center pivoted on a 10 mm diameter aluminum rod set in stainless steel ball bearings with cadmium plated races. Blades of gravity louvers shall be equipped with vinyl bulb seals on the edges.

Louvers shall have integral caulking strips and retaining beads.

EXECUTION.--

INSTALLATION.--Louvers shall be installed in accordance with the manufacturer's instructions. The completed louver installation shall be weather tight.

PAINTING.--Louvers shall be cleaned, prepared and painted in accordance with the requirements specified under "Painting" in Division 9, "Finishes," of these special provisions.

10.02 FIRE EXTINGUISHERS

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of furnishing and installing fire extinguishers with mounting brackets in accordance with the details shown on the plans and these special provisions.

REFERENCES.--

General.--Fire Extinguishers shall conform to the requirements in California Code of Regulations, Title 19 Division 1, Chapter 3, "Portable Fire Extinguishers."

SUBMITTALS.--

Product data.--Manufacturer's descriptive data and installation instructions shall be submitted for approval.

QUALITY ASSURANCE.--

Codes and standards.--Fire extinguishers shall be Underwriters Laboratories or Factory Mutual Laboratories approved for the type, rating and classification of extinguisher specified.

PART 2.- PRODUCTS

MANUFACTURER'S.--

Acceptable manufacturers.--Subject to contract compliance, manufacturers shall be J. L. Industries; Larsen's Manufacturing; Potter-Roemer; or equal.

COMPONENTS.--

Fire extinguisher.--

Fire extinguisher shall be fully charged, multi-purpose dry chemical type, with charge indicator, hose and nozzle, and attached service record tag. Fire extinguisher shall be of the capacity and type rating shown on the plans.

Mounting bracket.--

Mounting bracket shall be the manufacturer's standard painted, surface mounted type.

PART 3.- EXECUTION

INSTALLATION.--

General.--Fire extinguishers shall be installed in locations and at mounting heights shown on the plans, or if not shown, at a height of 1220 mm from the finished floor to the top of the fire extinguisher.

Fire extinguisher mounting brackets and cabinets shall be attached to structure, square and plumb, in accordance with the manufacturer's recommendations.

IDENTIFICATION.--

Bracket-mounted.--Extinguishers shall be identified with red letter decals spelling "FIRE EXTINGUISHER" applied to wall surface. Letter size, style and location as selected by the Engineer.

SERVICING.--

General.--Fire extinguishers shall be serviced, charged, and tagged not more than 5 days prior to contract acceptance.

DIVISIONS 11 THRU 14. (BLANK) DIVISION 15. MECHANICAL

15.01 MECHANICAL WORK

GENERAL.--

Scope.--This work shall consist of performing mechanical work in accordance with the details shown on the plans and these special provisions.

Mechanical work shall include furnishing all labor, materials, equipment and services required for providing ventilation and air conditioning system, plumbing system, hydraulic piping modifications, and cooling water system.

Earthwork, foundations, sheet metal, painting, electrical, and such other work incidental and necessary to the proper installation and operation of the mechanical work shall be in accordance with the requirements specified for similar type work elsewhere in these special provisions.

System layouts are generally diagrammatic and location of equipment is approximate. Exact routing of pipes, ducts, etc., and location of equipment is to be governed by structural conditions and obstructions. Equipment requiring maintenance and inspection is to be readily accessible.

Roof penetrations shall be flashed and sealed watertight in accordance with the requirements specified under "Sheet Metal Flashing" in Division 7, "Thermal and Moisture Protection," of these special provisions.

SUBMITTALS.--

Product data.--A list of materials and equipment to be installed, manufacturer's descriptive data, and such other data requested by the Engineer shall be submitted for approval.

Manufacturer's descriptive data shall include complete description, performance data and installation instructions for the materials and equipment specified herein. Control and wiring diagrams, rough-in dimensions for plumbing fixtures, and component layout shall be included where applicable.

Complete data shall be furnished on the construction for all components including material specifications, assembly drawings, catalog cuts and the dimensions of principal elements.

Submittals shall be in a folder with an index. Separate items with dividers. All mechanical submittals shall be submitted together.

Shop drawings required for fabrication, arrangement, and installation of the hydraulic components and piping shall be submitted for approval.

Manufacturer's descriptive data shall be submitted for the following:

- Closed circuit cooler unit
- Cooling water pump
- Split system air conditioning unit
- Exhaust fan
- Cooling water piping system accessories
- Plumbing fixtures
- Backflow preventor
- Hydraulic piping system components and accessories
- Pot feeder

CLOSEOUT SUBMITTALS.--

Operation and maintenance manuals.--Prior to the completion of the contract, 3 identified copies of the operation and maintenance instructions with parts lists for the equipment specified herein shall be delivered to the Engineer at the jobsite. The instructions and parts lists shall be indexed and bound in a manual form and shall be complete and adequate for the equipment installed. Inadequate or incomplete material shall be returned. The Contractor shall resubmit adequate and complete manuals at no expense to the State.

Operation and maintenance manuals shall be submitted for the following equipment:

- Closed circuit cooler unit
- Cooling water pump
- Split system air conditioning unit
- Exhaust fan

QUALITY ASSURANCE.--

Codes and standards.--Mechanical work, including equipment, materials and installation, shall conform to the California Building Standards Code, Title 24, and to the California Code of Regulations, Title 8, Chapter 4, Division of Industrial Safety (DIS).

WARRANTY.--

Warranties and guarantees.--Manufacturer's warranties and guarantees for materials or equipment used in the work shall be delivered to the Engineer at the jobsite prior to acceptance of the contract.

SYSTEM IDENTIFICATION.--

Piping, valves and equipment.--Identification of piping and equipment shall be as shown on the plans or these special provisions:

Piping.--For piping systems, except drain, overflow, and vent lines, use pipe markers to indicate the fluid conveyed or its abbreviation and arrows to show the direction of flow. Colors shall comply with ANSI Standard: A13.1. Locate markers at ends of lines, near major branches and other interruptions including equipment in the line, where lines pass through penetrations in floors, walls or ceilings or otherwise pass into inaccessible spaces, and at 15 250 mm maximum intervals along exposed portions of the lines. Marking of short branches and repetitive branches for equipment connections is not required.

Equipment.--All equipment shall be identified with a plastic laminated, engraved nameplate which bears the unit mark number as indicated on the drawings (for example, CWP). Provide 13 mm high lettering, white on black background. Nameplates shall be permanently secured to the unit.

15.02 PIPE, FITTINGS AND VALVES

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of furnishing and installing pipes, fittings and valves in accordance with the details shown on the plans and these special provisions. Pipe, fittings and valves shall include such plumbing and piping accessories and appurtenances, not mentioned, that are required for the proper installation and operation of the plumbing and piping systems.

All piping insulation and associated material shall be in accordance with the requirements specified under "Mechanical Insulation," elsewhere in this Division 15.

The pipe sizes shown on the plans are nominal pipe size. No change in the pipe size shown on the plans shall be permitted without written permission from the Engineer.

The pipe and fitting classes and material descriptions shall be as specified herein. No change in class or description shall be permitted without written permission from the Engineer.

QUALITY ASSURANCE.--

Codes and standards.--Pipe, fittings and valves shall be installed in accordance with the requirements in the latest edition of the Uniform Plumbing Code, the manufacturer's recommendations and the requirements specified herein.

PART 2.- PRODUCTS

MATERIALS.--

PIPE AND FITTINGS --

Class	Description
--------------	--------------------

A1.--

Schedule 40 galvanized steel pipe conforming to ASTM Designation: A 53, with 1040 kPa galvanized malleable iron banded screwed fittings and galvanized steel couplings. The weight of the zinc coating shall be not less than 90 percent of that specified in ASTM Designation: A 53.

A2.--

Schedule 40 galvanized steel pipe conforming to ASTM Designation: A 53, with black cast iron recessed drainage fittings. For rainwater leaders, neoprene-gasket compression couplings, Smith Blair, Dresser, or equal, may be used. The weight of the zinc coating shall be not less than 90 percent of that specified in ASTM Designation: A 53.

B1.--

Schedule 40 black steel pipe conforming to ASTM Designation: A 53, with screwed, welded, or flanged fittings suitable for working pressure involved, but not less than 1040 kPa.

B2.--

Schedule 40 black steel pipe conforming to ASTM Designation: A 53, with weldable fittings suitable for working pressure involved, but not less than 1040 kPa.

Steel pipe coating, where required, shall be factory applied plastic.--Pipe coating shall be Standard Pipe Protection, X-Tru-Coat (0.50 mm thick); Pipe Line Service Corporation, Republic; 3M Company, Scotchkote 205 (0.30 mm thick); or equal.

C1.--

Hub and plain end cast iron soil pipe with neoprene gaskets conforming to Cast Iron Soil Pipe Institute's Standard 301. Pipe, fittings and gaskets shall be of one manufacturer.

C2.--

Hubless cast iron soil pipe with neoprene gaskets, corrugated stainless steel shields and stainless steel clamps conforming to Cast Iron Soil Pipe Institute's Standard 301. Joint materials shall be furnished by pipe manufacturer.

H2.--

Type K hard copper tubing conforming to ASTM Designation: B 88, with wrought copper or cast bronze solder joint pressure fittings, stop type couplings and threaded adapters. Solder shall be lead-free.

H3.--

Type L hard copper tubing conforming to ASTM Designation: B 88, with wrought copper or cast bronze solder joint pressure fittings, stop type couplings and threaded adapters. Solder shall be lead-free.

Unions (for steel pipe).--

Unions (for steel pipe) shall be 1730 kPa, threaded malleable iron, ground joint, brass to iron seat, galvanized or black to match piping.

Unions (for copper or brass pipe).--

Unions (for copper or brass pipe) shall be 1040 kPa cast bronze, ground joint, bronze to bronze seat with silver brazing threadless ends or 860 kPa cast brass, ground joint, brass to brass seat with threaded ends.

Dielectric waterway.--

Dielectric waterway shall be a premanufactured unit that incorporates an insulated interior lining at least 75 mm in length between the 2 pipes being connected while maintaining metal to metal contact on the exterior surface. Dielectric water way shall be listed by IAPMO (International Association of Plumbing and Mechanical Officials).

Insulating union.--

Insulating union or flange as applicable shall be suitable for the service on which used. Connections shall be constructed such that the 2 pipes being connected are completely insulated from each other with no metal to metal contact. Insulating couplings shall not be used. Insulating union shall be F. H. Maloney; Central Plastics; EPCO; or equal.

Hydraulic piping and fittings.--

Hardline systems consist of pressure, return, and drain lines which convey hydraulic power requirements from the Hydraulic Power Supply (HPS) to the systems.

All tubing material is to be seamless Type 304 stainless steel per ASTM Designation: A-269, fully annealed and suitable for bending and flaring.

Tube end connections are to be 37-degree flare per SAE J514. All tube fittings are to be carbon steel zinc plated as manufactured by Parker Hannifin, Weatherhead, or equal.

All tubing and fittings used on pressure and return hardline systems are to be rated for minimum of 20 700 kPa continuous pressure with a minimum burst pressure of 82 740 kPa. The following table defines the standard tubing wall thickness that will meet this requirement for the range of sizes from 19 mm O.D. to 51 mm O.D.:

Tube O.D.	Wall Thickness
19 mm	1.65 mm
25 mm	2.41 mm
32 mm	3.05 mm
38 mm	3.05 mm
51 mm	4.19 mm

Tubing used on the drain hardline is to be rated for a minimum of 6900 kPa continuous pressure with a minimum burst pressure of 2760 kPa. In cases where a shutoff valve is installed between the drain line and the HPS reservoir, the drain line shall be rated as a pressure line as noted above.

Each hardline is to be clamped at intervals of approximately 1830 mm with polypropylene clamps or equivalent. Unistrut hangers may be used as a clamp base as long as flow forces along the axis of the tubing are reacted to limit tube motion to less than 3 mm. Simple pipe hangers are insufficient.

Hoses are to be used as the final connection between the HPS and the hardline and between the hardline and the accumulator/press connections. Hose working and burst pressure requirements are to be the same as the specific hardline with which they are connected. At least one end fitting shall be a swivel type.

VALVES.—

Ball valve.--

Ball valve shall be two piece, minimum 2760 kPa WOG, bronze body and chrome plated or brass ball with full size port. Valve shall be Nibco Scott, T-580; Watts, B-6000; Kitz, 56; or equal.

Balancing valve.--

Balancing valves shall be the calibrated type with “chart” for flow determination. Valve shall have adjustment knob, calibrated nameplate, integral valved read-out ports, and memory stop. Valve shall be Bell & Gossett, circuit setter; Watts, CSM; or equal.

Butterfly valve.--

Butterfly valve shall be wafer or lug style, minimum 1030 kPa, resilient seat, iron body with stainless steel disk and stem. Actuator shall be lever handle with notch plate. Valve shall be Keystone, 100; Milwaukee, M series; or equal.

Gage cock.--

Gage cock shall be a ball valve as indicated in this section. Plug open end of valve.

Check valve (40 mm and smaller).--

Check valve (40 mm and smaller) shall be silent spring loaded type, threaded bronze body, nylon or teflon disc, beryllium or stainless steel helical spring and shaft, Class 125 and same size as pipe in which installed. Check valve shall be Nibco/Scott, T-480; CPV, 36; Watts, 600; or equal.

Check valve (50 mm and larger).--

Check valve (50 mm and larger) shall be silent wafer type, full faced for installation between 860 kPa flanges, iron body with bronze trim, nylon or teflon disc, stainless steel helical spring and shaft, Class 125 and same size as pipe in which installed. Check valve shall be APCO, Series 300; CPV, 10D; Metraflex, Series 900; or equal.

Pressure reducing valve (PRV).--

Pressure reducing valve (PRV) shall be direct acting, spring loaded diaphragm type control valve with balanced single seat, bronze body, bronze trim and screwed connection. PRV shall be completely self-contained and shall require no external sensing pipes or outside control medium. The outlet pressure of the PRV shall be adjustable within a range of 80 kPa to 400 kPa.

Relief valve.--

Relief valve shall be ASME compliant pressure relief valve with test lever. Relief valve shall have pressure rating as indicated on the drawings. Terminate valve outlet as indicated on the drawings.

FAUCET AND HYDRANTS.—**Hose bibb.--**

Hose bibb shall be angle pattern, 20 mm female thread with hose end, rough brass finish. Hose bibb shall be supplied with an integral or nonremovable threaded outlet vacuum breaker which meets the requirements of the American Society of Sanitary Engineering (ASSE) Standard: 1011. Hose bibb shall be Nibco, No. 74VB; Chicago, No. 13T; or equal.

MISCELLANEOUS ITEMS.--**Flexible connector.--**

Flexible connectors shall be molded non-metallic twin sphere type. Connections shall be flanged or screwed as the application requires. 1030 kPa minimum. Flexible connectors shall be Proco, series 240 or 315 as required; General Rubber Corporation, style 1020 or 1030 as required; or equal.

Automatic air vent.--

Automatic air vent shall be the float type with cast iron body and stainless steel internal workings with removable cover. 1030 kPa minimum. Inlet and outlet shall be threaded connections. Automatic air vent shall be Metraflex, MV-15A; Amtrol, 706; or equal.

Air purger.--

Air purger shall be one-piece construction designed to continuously separate air from circulating water so that it may be removed by an air vent.

Expansion tank.--

Expansion tank shall be of the replaceable bladder type with fitting for system connection and charging valve. The steel tank shall be 57 liter. The tank shall be Wessels, NLA 35; Watts, ET-15; or equal.

Pot feeder.--

Pot feeder shall be carbon steel flat bottom type with a capacity of 7.6L and 20mm inlet/outlet fittings, 89mm diameter lid, 1380 kPa maximum pressure, and 93 degrees Celsius maximum temperature. Pot feeder dimensions shall be approximately 150mm in diameter and 610mm height. Verify capacity with water treatment requirements. Pot feeder shall have manufacturer's standard finish.

Pressure gages.--

Pressure gages shall have 0 to 700 kPa scale with 80 mm minimum diameter dial. Gages shall be installed within 150 mm of the inlet and outlet sides of the pressure reducing valve and as indicated on the drawings. Pressure gages shall be provided with a brass gage cock.

Thermometers.--

Thermometers shall have a dual scale ranging from 0°C to 70°C in 1° increments, 80 mm minimum diameter dial, and adjustable head. Thermometer shall be stainless steel construction. Provide appropriate mounting hardware for thermometer type.

Wye strainer.--

Wye strainer shall be wye pattern, cast iron body and Type 304 stainless steel or monel strainer screen. The strainer screen shall have an open area equal to at least 3 times the cross sectional area of the pipe in which it is installed and shall be woven wire fabric with 20 mesh or perforated sheet with 850 micron maximum diameter holes.

Backflow preventer.--

Backflow preventer shall be factory assembled with 2 check valves, one pressure differential relief valve, 2 ball valves and 4 test cocks. Backflow preventers shall be of the approved type reduced pressure principle devices listed by the County of Los Angeles Department of Health Services, Cross-Connection and Water Pollution Control Section, 2525 Corporate Place, Monterey Park, California 91754, Telephone (213) 881-4140. Backflow preventer shall have supports and freeze protection "blanket".

Pipe hanger (for piping supported from overhead).--

Pipe hanger (for piping supported from overhead) shall be Grinnell, Model 269; Super Struct, C711; or equal.

Pipe wrapping tape and primer.--

Pipe wrapping tape shall be pressure sensitive polyvinyl chloride or pressure sensitive polyethylene tape having nominal thickness of 0.50 mm. Wrapping tape shall be Polyken, 922; Manville, Trantex VID-20; Scotchrap, 51; or equal.

Pipe wrapping primer shall be compatible with the pipe wrapping tape used.

Floor, wall, and ceiling plates.--

Floor, wall, and ceiling plates shall be chromium plated steel or plastic plates having screw or spring clamping devices and concealed hinges. Plates shall be sized to completely cover the hole.

Valve box.--

Valve box shall be precast high density concrete with polyethylene face and cast iron traffic rated cover marked as indicated on the plan. Extension shall be provided as required. Valve box shall be Christy, B3; Brooks Products Company, 3TL; Frazer, 3; or equal.

Roof drain.--

Roof drain shall be cast iron body, with integral flashing clamp and gravel stop with seepage openings, 400 mm nominal polyethylene low profile dome, 75 mm caulk or no-hub outlet and underdeck clamp. Roof drain shall be J. R. Smith, 1010; Zurn, Z-100; Wade, W-3500; or equal.

Floor sink.--

Floor sink shall be cast iron body 150 mm strainer head with seepage openings, half grate top, and caulk or no-hub outlet. Floor sink shall be square as shown on the plans. Floor sink shall be Wade, W9140; Zurn, Z-1901; or equal.

PART 3.- EXECUTION**INSTALLATION.--****INSTALLATION OF PIPES AND FITTINGS.--**

Pipe and fittings.--Pipe and fittings shall be installed in accordance with the following designated uses:

Designated Use	Pipe and Fitting Class
Domestic water in buildings	H3 or A1
Domestic water underground	A1 or H2
Cooling water piping above ground	B1
Cooling water piping below ground	B2(Plastic coated)
Sanitary drain and vent piping underground	C1 or C2
Sanitary vent piping above ground	A1
Rainwater leaders	A2
Equipment drains and relief valve discharge	H3 or A1

Installing piping.--Water piping shall be installed generally level, free of traps and bends, and arranged to conform to the building requirements.

Piping installed underground shall be tested as specified elsewhere in these special provisions before backfilling.

Mechanical rooms and equipment areas shall have exposed piping.

Piping shall not be run in floor fill, except as shown on the plans.

Piping shall be installed parallel to walls. All obstructions shall be cleared, headroom preserved and openings and passageways kept clear whether shown or not. Piping shall not interfere with other work.

Where pipes pass through exterior walls, a clear space around pipe shall be provided. Space shall be caulked water tight with silicone caulk.

Underground copper pipe shall have brazed joints. Forty-five degree bends shall be used where offsets are required in venting. Vent pipe shall be sloped to eliminate any water or condensation.

Drainage pipe shall be run as straight as possible and shall have easy bends with long turns.

Wye fittings and 1/8 or 1/16 bends shall be used where possible. Long sweep bends and combination Wye and 1/8 bends may be used only for the connection of pipes to fixtures and on vertical runs of pipe.

Water pipe near sewers.--Water pipe shall not be installed below sewer pipe in the same trench or at any crossing, or below sewer pipe in parallel trenches less than 3 m apart.

When a water pipe crosses above a sewer pipe, a vertical separation of at least 300 mm between the top of the sewer and the bottom of the water pipe shall be maintained.

When water and sewer pipe is installed in the same trench, the water pipe shall be on a solid shelf at least 300 mm above the top of the sewer pipe and 300 mm to one side.

Pipe sleeves.--The Contractor shall provide sleeves, inserts and openings necessary for the installation of pipe, fittings and valves. Damage to surrounding surfaces shall be patched to match existing.

PVC pipe sleeves shall be provided where each pipe passes through concrete floors, footings, walls or ceilings. Inside diameter of sleeves shall be at least 20 mm larger than outside diameter of pipe. Sleeves shall be installed to provide at least 10 mm space all around pipe the full depth of concrete. Space between pipes and pipe sleeves shall be caulked watertight.

Cutting pipe.--All pipe shall be cut straight and true and the ends shall be reamed to the full inside diameter of the pipe after cutting.

Damaged pipe.--Pipe that is cracked, bent or otherwise damaged shall be removed from the work.

Pipe joints and connections.--Joints in threaded steel pipe shall be made with teflon tape or a pipe joint compound that is nonhardening and noncorrosive, placed on the pipe and not in the fittings.

The use of thread cement or caulking on threaded joints will not be permitted. Threaded joints shall be made tight. Long screw or other packed joints will not be permitted. Any leaky joints shall be remade with new material.

Exposed polished or enameled connections to fixtures or equipment shall be made with special care, showing no tool marks or threads.

Cleaning and closing pipe.--The interior of all pipe shall be cleaned before installation. All openings shall be capped or plugged as soon as the pipe is installed to prevent the entrance of any materials. The caps or plugs shall remain in place until their removal is necessary for completion of the installation.

Securing pipe.--Pipe in the buildings shall be held in place by iron hangers, supports, pipe rests, anchors, sway braces, guides or other special hangers. Material for hangers and supports shall be compatible with the piping or neoprene isolators shall be used. Allowances shall be made for expansion and contraction. Steel pipe shall have hangers or supports every 3 m. Copper pipe 25 mm or smaller shall have hangers or supports every 2 m and sizes larger than 25 mm shall have hangers or supports every 3 m. Cast iron soil pipe with neoprene gaskets shall be supported at each joint. Vertical pipes shall be supported with clamps or straps. Horizontal and vertical piping shall be securely supported and braced to prevent swaying, sagging or flexing of joints.

Hangers and supports.--Hangers and supports shall be selected to withstand all conditions of loading to which the piping and associated equipment may be subjected and within the manufacturer's load ratings. Hangers and supports shall be spaced and distributed so as to avoid load concentrations and to minimize the loading effect on the building structure.

Hangers and supports shall be sized to fit the outside diameter of pipe or pipe insulation. Hangers shall be removable from around pipe and shall have provisions for vertical adjustment after erection. Turnbuckles may be used.

Materials for holding pipe in place shall be compatible with piping material.

Hanger rods shall be provided with locknuts at all threaded connections. Hanger rods shall be sized as follows:

Pipe Size	Minimum Hanger Rod Diameter
15 mm to 50 mm	10 mm
65 mm to 87 mm	13 mm
100 mm to 125 mm	16 mm
150 mm	19 mm

Wrapping and coating steel pipe.--Steel pipe buried in the ground shall be wrapped or shall be plastic coated as specified herein:

1. Wrapped steel pipe shall be thoroughly cleaned and primed as recommended by the tape manufacturer.
2. Tapes shall be tightly applied with 1/2 uniform lap, free from wrinkles and voids with approved wrapping machines and experienced operators to provide not less than 1.00 mm thickness.
3. Plastic coating on steel pipe shall be factory applied. Coating imperfections and damage shall be repaired to the satisfaction of the Engineer.
4. Field joints, fittings and valves for wrapped and plastic coated steel pipe shall be covered to provide continuous protection by puttying and double wrapping with 0.50 mm thick tape. Wrapping at joints shall extend a minimum of

150 mm over the adjacent pipe covering. Width of tape for wrapping fittings shall not exceed 50 mm. Adequate tension shall be applied so tape will conform closely to contours of fittings. Putty tape insulation compounds approved by the Engineer shall be used to fill voids and provide a smooth even surface for the application of the tape wrap.

Wrapped or coated pipe, fittings, and field joints shall be approved by the Engineer after assembly. Piping shall be placed on temporary blocks to allow for inspection. Deficiencies shall be repaired to the satisfaction of the Engineer before backfilling or closing in.

Thrust blocks.--Thrust blocks shall be formed by pouring concrete between pipe and trench wall. Thrust blocks shall be sized and so placed as to take all thrusts created by maximum internal water pressure.

Union.--Unions shall be installed where shown and at each threaded or soldered connection to equipment and tanks. Unions shall be located so piping can be easily disconnected for removal of equipment or tanks. Unions shall be omitted at compression stops.

Dielectric waterway.--Dielectric waterway shall be provided between metal pipes of different material, and between brass or bronze valves and steel piping.

Insulating union and insulating connection.--Insulating union and insulating connection shall be provided where shown and at the following locations:

1. In metallic water service connections. Insulating connections shall be installed on the exterior of the building, above ground and after shut-off valve.
2. In water connections in ground at point where new metallic pipes connect to existing metallic pipes. Install valve box above insulating connection.
3. At points of connections of copper or steel water pipes to steel domestic water heaters and tanks.

Bonding at insulating connections.--Interior water piping and other interior piping that may be electrically energized and are connected with insulating connections shall be bonded in accordance with the National Electrical Code. Bonding shall all be coordinated with electrical work.

INSTALLATION OF HYDRAULIC PIPING AND FITTINGS.--

Qualifications.--The hydraulic system demolition and modification shall be performed by a firm specializing in work of this nature, and shall have a minimum of 5 years experience.

Installation.--Hardline fabrication is to be performed either at the vendors facility or onsite, as dictated by the specific job requirements.

After flaring, all tube sections are to be thoroughly cleaned to remove machining chips, burrs, and other debris. Prior to installation, all flares are to be visually inspected for flaws so as to insure a leaktight joint.

Prior to installation, all piping components must be cleaned, inspected and plugged to avoid system contamination.

Minimum bend radius for hydraulic hoses is 460 mm.

Leave slack in hydraulic hoses for all moving parts.

The hydraulic system shall be cleaned, flushed, and proof tested. Provide all necessary materials/equipment to complete these tasks.

INSTALLATION OF VALVES.--

Pressure reducing valve.--A capped tee connection and strainer shall be installed ahead of the pressure reducing valve.

Exterior valves.--Exterior valves located underground shall be installed in a valve box marked to indicate the service. Extensions shall be provided as required.

INSTALLATION OF HOSE BIBB.--

Hose bibb.--Hose bibb shall be installed with outlets 0.5 m minimum above finished grade.

INSTALLATION OF MISCELLANEOUS ITEMS.--

Backflow preventer.--Backflow preventer assembly shall include a wye strainer, backflow preventer, fittings, pipe, and supports. Assembly components shall be the same size as the pipe in which they are installed unless otherwise shown on the plans.

Backflow preventer shall be installed a minimum of 300 mm above ground and shall be the same size as the pipe in which it is installed unless otherwise shown on the plans.

Flushing completed systems.--After complete installation and testing, all piping systems shall be flushed and cleaned prior to being placed in service.

Chlorination.--The Contractor shall flush and chlorinate all domestic water piping and fixtures.

Calcium hypochlorite granules or tablets, if used, shall not be applied in the dry form, but shall first be dissolved into a solution before application.

The Contractor shall take adequate precautions in handling chlorine so as not to endanger workmen or damage materials. All pipes and fittings shall be completely filled with water containing a minimum of 50 ppm available chlorine. Each outlet in the system shall be opened and water run to waste until a strong chlorine test is obtained. The line shall then be closed and the chlorine solution allowed to remain in the system for a minimum of 24 hours so that the line shall contain no less than 25 ppm chlorine throughout. After the retention period, the system shall be drained, flushed and refilled with fresh water.

Water treatment.--Water treatment shall be performed on both the closed and open circuit cooler unit water systems to guard against scale deposition, corrosion, microbiological growth, and sludge formation and fouling. Water treatment shall be performed by a firm specializing in treatment for the above mentioned systems. The water treatment firm shall determine the type of treatment needed for both the open and closed systems. The water treatment firm shall submit schematics of the treatment system being proposed, cut sheets of the proposed components, cut sheets/MSDS of the treatment materials used, and a written outline detailing the treatment procedure. The following data shall be recorded and reported for each treatment: the type and quantity of treatment material used, the beginning and end conditions of the system being treated. All materials used for the water treatment shall be compatible with all of the components of the treated systems. In addition, materials used for the water treatment shall be non-hazardous and non-toxic as much as is possible.

FIELD QUALITY CONTROL.--

Testing.--The Contractor shall test piping at completion of roughing in, before backfilling, and at other times as directed by the Engineer.

The system shall be tested as a single unit, or in sections as approved by the Engineer. The Contractor shall furnish necessary materials, test pumps, instruments and labor and notify the Engineer at least 3 working days in advance of testing. After testing, the Contractor shall repair all leaks and retest to determine that leaks have been stopped. Surplus water shall be disposed of after testing as directed by the Engineer.

The Contractor shall take precautions to prevent joints from drawing while pipes and appurtenances are being tested. The Contractor shall repair damage to pipes and appurtenances or to other structures resulting from or caused by tests.

General tests.--All piping shall be tested after assembly and prior to backfill, pipe wrapping, connecting fixtures, wrapping joints and covering the pipe. Systems shall show no loss in pressure or visible leaks.

The Contractor shall test systems according to the following schedule for a period of not less than 4 hours:

Test Schedule		
Piping System	Test Pressure	Test Media
Sanitary sewer and vent	3050 mm head	Water
Water	860 kPa	Water
Cooling water piping	860 kPa	Water

During testing of water systems, valves shall be closed and pipeline filled with water. Provide manual air vents at system high points to remove air trapped in piping system.

Sanitary sewers shall be cleared of obstructions before testing for leakage. The pipe shall be proved clear of obstructions by pulling an appropriate size inflatable plug through the pipe. The plug shall be moved slowly through the pipe with a tag line. The Contractor shall remove or repair any obstructions or irregularities.

Prior to connection to existing sanitary sewer new sanitary sewer pipes beyond 1.5 m perpendicular to the building shall be tested for leakage for a period of not less than 4 hours by filling with water to an elevation of 1.2 m above average invert of sewer or to top of manholes where less than 1.2 m deep. The system shall show no visible leaks. The sewer may be tested in sections with testing water progressively passed down the sewer as feasible. Water shall be released at a rate that will not create water hammer or surge in plugged sections of sewer.

Testing of hydraulic piping.--The contractor shall submit detailed shop and field test procedures for approval.

Testing backflow preventers.--Backflow preventers installed by the Contractor shall be tested at the completion of the supply system installation for proper operation by a certified Backflow Preventer Tester

The tester shall hold a valid certificate as a Backflow Preventer Tester from the county in which the device to be tested is located or, if the county does not have a certification program for Backflow Preventer Testers, the tester shall have a certificate from one of the following:

1. The American Water Works Association.
2. A county which has a certification program for Backflow Preventer Testers. The certification under which the tester has been certified shall be acceptable to the water purveyor and the local agency having jurisdiction.

Testing for proper operation shall conform to the procedures of the county in which the testing is being performed, or, if such procedures are not available in the county, such tests shall conform to the provisions in the latest edition of the Guidance Manual For Cross Connection Control Program, which is available from the California Department of Health Services, Division of Drinking Water and Environmental Management, 601 N 7th Street, P.O. Box 942732, Sacramento, CA 94234.

The Contractor shall notify the Engineer at least 5 days prior to testing backflow preventers. Such tests shall be satisfactorily completed after installation of the backflow preventer assemblies and before operation of the systems.

One copy of all test results for each backflow preventer shall be furnished to the Engineer.

Full compensation for providing the certified Backflow Preventer Tester and for testing the backflow preventers shall be considered as included in the lump sum price paid for building work and no additional compensation will be allowed therefor.

15.03 MECHANICAL INSULATION

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of furnishing and installing mechanical insulation, as a means of freeze protection, in accordance with the details shown on the plans and these special provisions.

Piping insulation shall be installed on all water piping 25mm and smaller, above grade, in non-conditioned spaces.

QUALITY ASSURANCE.--

Codes and standards.--Mechanical insulation shall conform to California State Energy Commission regulations and, where applicable, shall meet American Society of Testing and Materials (ASTM) standards.

All materials shall bear the label of the Underwriters Laboratory (UL) or other approved testing laboratory indicating that the materials proposed for use conform to the required fire hazard ratings.

Pipe safety insulation shall conform to Section 1504(b) of Title 24, Part 5, California Plumbing Code.

PART 2.- PRODUCTS

MATERIAL.--

General.--All pipe insulation and wrapping material, including adhesives and jackets, located within buildings shall be certified to have a composite flame spread rating of not more than 25 and smoke development rating of not more than 450 when tested in accordance with ASTM Designation: E 84.

Piping insulation cement.--

Insulation cement shall be Fenco, All Purpose Cement; Manville, JM375; or equal.

Freeze protection piping insulation.--

Piping insulation shall be polyurethane foam insulation with a service temperature range of 0°C to 120°C. A 0.15 mm vapor barrier shall be applied over the top off the insulation. The vapor barrier shall be installed with an adhesive as recommended by the manufacturer.

PVC jacket.--

PCV jacket shall be rated for a service temperature of 80°C. PVC jacket shall include covers specifically designed to cover pipe fittings.

Insulation inserts.--

Insulation inserts at pipe hangers supports for pipes NPS 2 or larger shall be calcium silicate, cellular glass, or other acceptable material of the same thickness-as the adjacent insulation and not less than 6 kg density.

PART 3.- EXECUTION

INSTALLATION.--

General.--Insulation materials shall be neatly installed with smooth and even surfaces, jackets drawn tight and smoothly cemented down. Full length pieces shall be used. Do not use scrap pieces where full length pieces will work.

Insulation material shall not be installed until all pipes or surfaces to be covered are tested for leaks, cleaned and dried, and foreign materials, such as rust, have been removed.

Piping insulation.--Piping insulation shall be in accordance with the following, except that unions, unless integral with valves, and flexible connections shall not be insulated.

- a. Where insulation butts against flanges or is discontinued, insulation shall be tapered to pipe to allow for covering jacket to completely seal off end of insulation.

Insulation shall be extended on the valve bodies up to the valve bonnet.

Extend insulation continuous through pipe hangers and pipe sleeves. At hangers where pipe is supported, provide an insulated protection shield.

Insulating cement shall be applied to fittings, valves, and strainers and troweled smooth to thickness of adjacent covering. Strainer cleanout plugs shall remain accessible. Covers fabricated from molded pipe covering may be used in lieu of cement, provided covers are neat and well secured.

- b. Jacket flap shall be sealed down with factory applied self-sealing lap. Seams shall be lapped not less than 40 mm. Jacket shall be secured with aluminum bands installed at 300 mm centers.
- c. Exposed outdoor insulation shall have an additional 0.40 mm minimum thickness aluminum jacket applied over the completed insulation. The jacket shall have a factory applied moisture barrier and shall be Childers; Smith; or equal.

End joints shall be lapped with aluminum holding traps located directly over the lap. Additional aluminum holding straps shall be placed at 200 mm centers. Jacket at ells and tees shall be mitered, or premanufactured fitting jackets shall be provided, with additional aluminum holding bands, as required. All joints shall be sealed watertight using silicon type, heat resistant sealant.

15.04 VENTILATING AND AIR CONDITIONING EQUIPMENT AND MECHANICAL SYSTEMS

PART 1.- GENERAL

Scope.--This work shall consist of furnishing, installing and testing, ventilating and air conditioning equipment and mechanical systems in accordance with the details shown on the plans and these special provisions.

The performance rating and electric service of the ventilating and air conditioning equipment shall be as shown on the plans.

Temperature controls.--Thermostats, relays, time switches, and other sensor type control devices required for this work shall be furnished and installed by the supplier of the ventilating and air conditioning equipment. All temperature control wiring shall be furnished and installed in accordance with the requirements specified in Division 16, "Electrical," of these special provisions.

Codes and standards.--Equipment and systems shall conform to California State Energy Commission Regulations and, where applicable, shall be American Refrigeration Institute (ARI), Cooling Tower Institute (CTI), Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), and Air Movement and Control Association (AMCA) approved for performance ratings and application shown on the plans.

Any appliance for which there is a California standard established in the Appliance Efficiency Standards may be installed only if the manufacturer has certified to the Commission, as specified in those regulations, that the appliance complies with the applicable standards for that appliance. Space conditioning equipment may be installed only if the manufacturer has certified that the equipment meets or exceeds all applicable efficiency requirements listed in the Energy Efficiency Standards.

PART 2.- PRODUCTS

Closed circuit cooler unit.--

The closed circuit cooler unit shall be an induced draft counterflow closed circuit cooler capable of the values indicated on the drawings. The unit casing shall be constructed of minimum 2.66mm (12-gage) hot dip galvanized sheet steel conforming to ASTM Designation: A 653/A 653M, Grade 33 [230] with G235 [Z700] coating. The spray pump shall be factory installed close coupled centrifugal pump with mechanical seals. The fan shall be a balanced axial propeller fan. The heat transfer coil shall be encased in steel frame work and hot dip galvanized after fabrication as a complete assembly. The tubes shall be staggered. The water distribution system shall provide a flow rate of 4 L/s per square meter of unit plan area. The distribution header shall be Schedule 40 PVC and the ABS spray nozzles shall have an internal sludge ring, the louvers and eliminators shall be constructed of PCV. In addition, the unit shall have the following manufacturer's accessories: service ladder complete with mounting hardware, a stainless steel basin, heat transfer coil cross over pipe, and an immersion heater capable of maintaining the sump water at 4.5°C when the ambient is at -18°C. The heater shall come complete with immersion heater, low water cut-off/ thermostat, control panel, and fused disconnect. All heater components shall be factory mounted and wired. Manufacturer's start-up service shall be provided.

Closed circuit cooler unit shall be Evapco, B.A.C., or equal.

Cooling water pump.--

The cooling water pump shall be close coupled, end suction, single stage, vertical split case design, bronze fitted. The pump shall be capable of pumping water at the flow rate and total head shown on the plans. The pump internals shall be capable of being serviced without disturbing the piping connections. The pump shall have gauge tapings, bolted flanged connections, and standard seals. Pump motor shall be a high efficiency TEFC motor. The pump as installed shall not load the motor beyond the nameplate rating.

Cooling water pump shall be Bell and Gossett, Paco Pumps, or equal.

COOLING UNITS.--**Split system air conditioning unit.--**

Split system AC unit shall be factory matched unit consisting of indoor fan coil unit and outdoor condensing unit.

Refrigerant lines and condensate drain piping shall be as specified elsewhere in these special provisions.

Outdoor condensing unit shall be factory-assembled, air-cooled, charged and tested, factory-wired for single point power and control connections, and shall be enclosed in a weatherproof acoustically lined cabinet with convenient access panels and a baked-on enamel finish. The compressor shall be the hermetically sealed type, pressure relief valve, high and low pressure switches, liquid-line filter-dryer, crankcase heater, short cycling protection, and service valves.

Indoor fan coil unit shall be adjustable V-belt drive type or the multi-speed direct drive type. The motor shall be provided with thermal overload protection.

Indoor fan coil shall be provided with the following manufacturer's accessories: discharge plenum with grille, return air grille, floor mount base, programmable thermostat.

The indoor coils shall be provided with refrigerant metering devices, check valves, and filter-dryers.

Cabinet shall be fabricated of heavy-gage, mill galvanized steel, and shall be lined with fire retardant insulation, with baked-on enamel finish and condensate drain pan.

Fan-coil unit shall provide the required air flow against the external static pressure shown on the plans.

Split system air conditioning unit shall be Carrier, Trane, or equal.

FANS AND VENTILATORS.—**Exhaust fan (roof mounted).--**

Exhaust fan shall be roof mounted, belt drive, upblast configuration, AMCA certified and shall be equipped with a motorized backdraft damper set to open when fan is on, bird screen and manufacturer's prefabricated mounting curb. Exhaust fan motor shall have integral thermal overload protection. Exhaust fan shall be Penn, FX14B; Greenheck, CUE160; or equal.

HVAC CONTROLS.--**Thermostat (Split system air conditioning unit).--**

Thermostat shall be 24-volt, 7-day programmable, electronic thermostat, with the ability to program the fan-on mode during normal working hours, and fan-off mode during unoccupied periods. Thermostat shall be provided with sub-base selector switches for "AUTO-HEAT-OFF-COOL" and fan "AUTO-ON". Thermostat shall have full temperature range setback capacity. Thermostat shall be provided by the split system air conditioning unit manufacturer.

AUXILIARY HVAC COMPONENTS.--

Unless specified herein, all components shall be sized and have the characteristics as shown on the plans.

Air filter (for split system air conditioning unit).--

Air filter for AC unit shall be throwaway type, 50 mm minimum thickness, shall have an average efficiency rating of between 30 and 35 percent as determined when tested in accordance with ASHRAE Test Standard 52, and shall be mounted in AC unit holding frames.

Refrigerant and condensate drain piping.--

Refrigerant and condensate drain piping shall be rigid, Type L copper tubing with brazed solder fittings. Refrigerant piping shall be AC unit manufacturer's "line set" size in accordance with the manufacturer's instructions. The suction line shall be insulated, with vapor barrier and shall be weatherproofed for exterior installation. Factory sealed tubing shall not be used.

PART 3.- EXECUTION

INSTALLATION.--

Exhaust fan shall be curb mounted.

Condensate drains.--Air conditioning unit shall be provided with condensate drain trap and piping. Air gap shall be installed where required by code.

Mounting heights.--Thermostats shall be installed as shown on the plans.

FIELD QUALITY CONTROL.--

Pre-test requirements.--Before starting or operating systems, equipment shall be cleaned and checked for proper installation, lubrication and servicing.

Final adjustments and balancing of the systems shall be performed in such a manner that the systems will operate as specified and as shown on the plans.

The Contractor shall replace or revise any equipment, systems or work found deficient during tests.

Project completion tests.--The Engineer shall be notified at least 3 working days in advance of starting project completion tests.

Upon completion of mechanical work and pre-test requirements, or at such time prior to completion as determined by the Engineer, the Contractor shall operate and test installed mechanical systems for at least 3 consecutive 8-hour days to demonstrate satisfactory overall operation.

The project completion tests shall consist of the following:

1. **Air Systems.--**All air systems shall be tested and balanced to the conditions set forth on the plans and in these special provisions. This work shall be performed by an Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB) certified contractor. The air systems include, but are not necessarily limited to, the following:
 - a. Supply air systems
 - b. Return air systems
 - c. Exhaust air systems
2. **Air Systems Operational Data.--**The tests shall include operation of the cooling and ventilating systems for not less than two 8-hour days, each system shall operate at not less than 90 percent of their full specified capacities.

The required data shall be accurately measured. The data shall be measured during one operational cycle in the presence of the Engineer and shall be submitted for approval.

The following data shall be measured and tabulated:

- a. Ambient temperatures and conditions, °C
- b. Supply and return air quantities, m³/sec, each room
- c. Thermostat set point, °C
- d. Air temperatures at room center, °C
- e. Fan motor amperages and voltages
- f. System static pressures, Pa

DIVISION 16. ELECTRICAL

16.01 ELECTRICAL WORK

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of performing electrical work in accordance with the details shown on the plans and these special provisions.

Electrical work shall include furnishing all labor, materials, equipment and services required to construct and install the complete electrical system shown on the plans and the work of installing electrical connections for the thermostats, motors, and controls specified elsewhere in these special provisions.

System layouts are generally diagrammatic and location of equipment is approximate. Exact routing of conduits and other facilities and location of equipment is to be governed by structural conditions and other obstructions, and shall be coordinated with the work of other trades. Equipment requiring maintenance and inspection shall be located where it is readily accessible for the performance of such maintenance and inspection.

Related work.--Earthwork, foundations, sheet metal, painting, mechanical and such other work incidental to and necessary for the proper installation and operation of the electrical work shall be done in accordance with the requirements specified for similar work elsewhere in these special provisions.

QUALITY ASSURANCE.--

Codes and standards.--All work performed and materials installed shall be in accordance with the National Electrical Code; the California Building Standards Code, Title 24, Part 3, "California Electrical Code," and the California Code of Regulations, Title 8, Chapter 4, "Electrical Safety Orders," and all local ordinances.

Warranties and guarantees.--Manufacturer's warranties and guarantees for materials or equipment used in the work shall be delivered to the Engineer at the jobsite prior to acceptance of the contract.

TESTING.--

After the electrical system installation work has been completed, the electrical system shall be tested in the presence of the Engineer to demonstrate that the electrical system functions properly. The Contractor shall make necessary repairs, replacements, adjustments and retests at his expense.

16.02 BASIC MATERIALS AND METHODS

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of furnishing and installing conduits, conductors, fittings, and wiring devices in accordance with the details shown on the plans and these special provisions.

Conduits, conductors, fittings, and wiring devices shall include those accessories and appurtenances, not mentioned, that are required for the proper installation and operation of the electrical system.

Related work.--Roof penetrations shall be flashed and sealed watertight conforming to the requirements specified under "Sheet Metal Flashing" in Division 7, "Thermal and Moisture Protection," of these special provisions.

SUBMITTALS.--

Product data.--A list of materials and equipment to be installed, manufacturer's descriptive data, and such other data as may be requested by the Engineer shall be submitted for approval.

Manufacturer's descriptive data shall include complete description, performance data and installation instructions for the materials and equipment specified herein. Control and wiring diagrams, rough-in dimensions for recessed junction and pull boxes, and component layout shall be included where applicable. All control and power conductors on the shop drawings shall be identified with wire numbers.

PART 2.- PRODUCTS

CONDUITS AND FITTINGS.--

Rigid steel conduit and fittings.--

Rigid steel conduit shall be threaded, full weight rigid steel, hot-dip galvanized inside and outside with steel or malleable iron fittings. Fittings shall be threaded unless otherwise specified or shown on the plans.

Split or three-piece couplings shall be electroplated, malleable cast iron couplings.

Insulated grounding bushings shall be threaded malleable cast iron body with plastic insulated throat and steel, lay-in ground lug with compression screw.

Insulated metallic bushings shall be threaded malleable cast iron body with plastic insulated throat.

Electrical metallic tubing (EMT) and fittings.--

Electrical metallic tubing shall be formed of cold rolled strip steel, electrical resistance welded continuously along the longitudinal seam with zinc coating outside and enamel or lacquer coating inside.

Couplings shall be electroplated, rain and concrete tight, gland compression type, steel body couplings with malleable iron nuts.

Connectors shall be electroplated, rain and concrete tight, gland compression type, steel body connectors with male hub, malleable iron nut and insulated plastic throat.

Flexible metallic conduit and fittings.--

Flexible metallic conduit shall be fabricated in continuous lengths from galvanized steel strip, spirally wound and formed to provide an interlocking design.

Fittings shall be electroplated screw-in type with malleable cast iron body and threaded male hub with insulated throat.

Liquid tight flexible metallic conduit and fittings.--

Liquid tight flexible metallic conduit shall be fabricated in continuous length from galvanized sheet steel, spirally wound and formed to provide an interlocking design with an extruded polyvinyl chloride cover.

Fittings shall be electroplated, malleable cast iron body, with cap nut, grounding ferrule, and connector body with insulated throat.

Rigid non-metallic conduit and fittings.--

Rigid non-metallic conduit shall be Schedule 40, high impact, nonconducting, self-extinguishing polyvinyl chloride (PVC) rigid non-metallic conduit for direct underground burial.

Couplings shall be PVC, socket type or thread on one end and socket type on the other end as required for the particular application.

Terminal adapters for adapting PVC conduit to boxes, threaded fittings, or metallic conduit system shall be PVC adapters with threads on one end and socket type on the other end.

CONDUCTORS.--**Conductors.--**

Conductors shall be stranded copper wire.

Conductor insulation types unless otherwise shown or specified, shall be as follows:

1. Conductors across hinges of control panel enclosures shall be Type MTW.
2. Conductors shall be type XHHW-2 in wet and outdoor locations.
3. Conductors shall be type THHN in dry locations.

Wire connections and devices.--

Wire connections and devices shall be pressure or compression type, except that connectors for No. 10 AWG and smaller conductors in dry locations may be preinsulated spring-pressure type.

ELECTRICAL BOXES.--**Outlet, device and junction boxes.--**

Cast metal boxes shall be cast iron boxes with threaded hubs and shall be of the size and configuration best suited to the application shown on the plans.

Unless otherwise shown or specified, surface-mounted boxes shall have galvanized steel covers with metal screws.

Weatherproof junction boxes shall have cast metal covers with gaskets.

Weatherproof switch and receptacle boxes shall have gasketed covers with gasketed hinged flaps to cover switches and receptacles.

Sectional device plates will not be permitted.

Underground pull boxes.--

Pull boxes shall be high density reinforced concrete box with ultraviolet inhibitor polyethylene etched face anchored in concrete and fiberglass cover with hold down bolts. The polyethylene and fiberglass material shall be fire resistant and show no appreciable change in physical properties with exposure to the weather.

Pull box minimum dimensions shall be as shown on the plans.

Traffic rated pull boxes shall be high density reinforced concrete box with steel cover with hold down bolts and bonding strap. Pull box and cover shall be-designed for H20 loading.

RECEPTACLES AND SWITCHES.--**Duplex receptacles.--**

Duplex receptacles shall be NEMA Type 5 20R, 3-wire, 20 A, 125 V (ac), safety grounding, ivory color, specification grade receptacle suitable for wiring with stranded conductors.

Snap switches shall be 20-A, 120/277-V (ac), quiet type, specification grade, ivory color switch with silver cadmium alloy contacts. Switch shall be suitable for wiring with stranded conductors.

MISCELLANEOUS MATERIALS.--

Warning Tape.--

Warning tape shall be 100 mm wide and contain the printed warning "CAUTION ELECTRICAL CONDUIT" in bold 19 mm black letters at 760 mm intervals on bright orange or yellow background. The printed warning shall be non-erasable when submerged under water and resistant to insects, acids, alkali, and other corrosive elements in the soil. The tape shall have a tensile strength of not less than 70 kg per 100 mm wide strip and shall have a minimum elongation of 700 percent before breaking.

Pull ropes.--

Pull ropes shall be nylon or polypropylene with a minimum tensile strength of 225 kg.

Watertight conduit plugs.--

Watertight conduit plugs shall be a hollow or solid stem expansion plugs complete with inner and outer white polypropylene compression plates and red thermoplastic rubber seal. Seal material shall be non-stick type rubber resistant to oils, salt, and alkaline substances normally available at the construction sites.

Anchorage devices.--

Anchorage devices shall be corrosion resistant, toggle bolts, wood screws, bolts, machine screws, studs, expansion shields, and expansion anchors and inserts.

Electrical supporting devices.--

Electrical supporting devices shall be one hole conduit clamps with clamp backs, hot-dipped galvanized, malleable cast iron.

Construction channel shall be 41 mm x 41 mm, 2.66 mm (12-gage) galvanized steel channel with 13 mm diameter bolt holes, 40 mm on center in the base of the channel.

Ground rod(s).--

Ground rod(s) shall be a 19 mm (minimum) galvanized or copper clad steel rod, 3 meters long.

PART 3.- EXECUTION

INSTALLATION.--

Conduit, general.--Rigid steel conduit shall be used unless otherwise shown on the plans or specified in these special provisions.

Electrical metallic tubing may be used in furred spaces and for exposed work indoors above the switch height.

Unless otherwise specified or shown on the plans, liquid-tight flexible metal conduit shall be used to connect motors, HVAC equipment, and other equipment subject to vibration in wet locations.

Rigid non-metallic conduit shall be used at the locations shown on the plans for direct underground burial outside the building foundation.

Conduit installation.--Conduit trade sizes are shown on the plans. No deviation from the conduit size shown on the plans will be permitted without written permission from the Engineer.

Conduit shall be concealed unless otherwise shown on the plans.

Conduits shall be tightly covered and well protected during construction using metallic bushings and bushing "pennies" to seal open ends.

Rigid non-metallic conduit bends of 30 degrees or greater shall be factory-made long radius sweeps. Bends less than 30 degrees shall be made using an approved heat box.

A pull rope shall be installed in all empty conduits. At least one meter of pull rope shall be doubled back into the conduit at each termination.

Locations of conduit runs shall be planned in advance of the installation and coordinated with the ductwork, plumbing, ceiling and wall construction in the same areas and shall not unnecessarily cross other conduits or pipe, nor prevent removal of ceiling tiles or panels, nor block access to mechanical or electrical equipment.

Where practical, conduits shall be installed in groups in parallel, vertical or horizontal runs and at elevations that avoid unnecessary offsets.

Exposed conduit shall be installed parallel and at right angles to the building lines.

Conduits shall not be placed closer than 300 mm from a parallel hot water or steam pipe or 75 mm from such lines crossing perpendicular to the runs.

All raceway systems shall be secured to the building structures using specified fasteners, clamps and hangers.

Single conduit runs shall be supported by using one hole pipe clamps. Where run horizontally on walls in damp or wet locations, conduit shall be installed with "clamp backs" to space conduit off the surface.

Multiple conduit runs shall be supported with construction channel secured to the building structure. Conduits shall be fastened to construction channel with channel compatible pipe clamps.

Raceways of different types shall be joined using approved couplings or transition fittings.

Expansion couplings shall be installed where conduit crosses a building separation or expansion joint.

All floor and wall penetrations shall be sealed water-tight.

Conduit terminations.--Rigid steel conduits shall be securely fastened to cabinets, boxes and gutters using 2 locknuts and specified insulating metallic bushing. Electrical metallic tubing shall be securely fastened to cabinets, boxes and gutters using specified connectors. Conduit terminations at exposed weatherproof enclosures and cast outlet boxes shall be made watertight using specified hubs.

Grounding bushings with bonding jumpers shall be installed on all type of conduits terminating at concentric knockouts and on all conduits containing service conductors, grounding electrode conductor, and conductors feeding separate buildings.

Rigid non-metallic conduits shall be terminated inside the underground pull boxes with an approved conduit bushings or fittings. All conduits shall enter the pull box at an angle of 45 degrees or more.

All future conduits terminated in underground pull boxes or exposed indoor and outdoor shall be provided with watertight conduit plugs.

Warning Tape.--Warning tape shall be placed over each conduit in a trench. Each warning tape shall be centered over the conduit and shall be placed over the 150 mm layer of sand covering the conduit as described elsewhere in these special provisions.

Conductor installation.--Conductors shall not be installed in conduit until all work of any nature that may cause injury is completed. Care shall be taken in pulling conductors that insulation is not damaged. An approved non-petroleum base and insulating type pulling compound shall be used as needed.

All cables shall be installed and tested in accordance with manufacturer's recommendations.

Splices and joints shall be insulated with insulation equivalent to that of the conductor.

Provide 155 mm of slack at each outlet and device connection. If the outlet or device is not at the end of a run of wire, connection shall be made with correctly colored pigtails tapped to the runs with splices as specified herein.

Branch circuit conductors in panelboards and switchboards --shall be neatly trained along a path from the breaker terminals to their exit point. The conductors shall have ample length to transverse the path without strain, but shall not be so long as to require coiling, doubling back, or cramming. The path shall transverse the panelboard gutter spaces without entering a gutter containing service conductors and, unless otherwise shown on the plans, without entering the gutter space of any panelboard feeder.

All pressure type connectors and lugs shall be retightened after the initial set.

Splices in underground pull boxes and similar locations shall be made watertight.

Junction boxes in furred or accessible ceiling spaces shall be identified with felt-tip pen denoting the circuits contained in the box.

Conductor identification.--The neutral and equipment grounding conductors shall be identified as follows:

Neutral conductor shall have a white or natural gray insulation except that conductors No. 4 and larger may be identified by distinctive white marker such as paint or white tape at each termination.

Equipment grounding conductor shall be bare or insulated. If insulated, equipment grounding conductors shall have green or green with one or more yellow stripes insulation over its entire length except that conductors No. 4 and larger may be permanently identified by distinctive green markers such as paint or green tape over its entire exposed insulation.

Feeder and branch circuit ungrounded conductors shall be color coded by continuously colored insulation, except conductors No. 6 AWG or larger may be color coded by colored tape at each connection and where accessible. Ungrounded conductor color coding shall be as follows:

SYSTEM	COLOR CODE
120/208V-Three phase	Black, red, blue
277/480V-Three phase	Brown, orange, yellow

Where more than one branch circuit enters or leaves a conduit, panel, switchboard, gutter, or junction box, each conductor shall be identified by its panelboard and circuit number. All control conductors including control conductors of manufacturer supplied and field wired control devices shall be identified at each termination with the wire numbers shown on the plans, approved shop drawings, and as directed by the Engineer where deemed necessary. Identification shall be made with one of the following:

1. Adhesive backed paper or cloth wrap-around markers with clear, heat shrinkable tubing sealed over either type of marker.
2. Self-laminating wrap around type, printable, transparent, permanent heat bonding type thermoplastic film markers.
3. Pre-printed, white, heat-shrinkable tubing.

Each terminal block shall have a molded marking strip attached with screws. The identifying numbers of the terminating conductors, as shown on the plans or on the submittal drawings, shall be engraved in the marking strip.

Outlet, device and junction box installation.--Where one or more threaded steel conduits are required to connect to an outlet, device, or junction box, the box shall be a cast metal box with threaded hubs. Weatherproof outlet, device and junction boxes shall have cast metal covers with gaskets. Raised device covers (plaster rings) shall be installed on all boxes concealed in concrete, masonry or stud walls.

No unused openings shall be left in any box. Knockout seals shall be installed as required to close openings.

Outlet, device, and junction boxes shall be installed at the locations and elevations shown on the plans or specified herein. Adjustments to locations may be made as required by structural conditions and to suit coordination requirements of other trades.

Fixture outlet boxes for pendant-mounted fixtures installed in suspended ceilings supporting acoustical tiles or panels shall be supported directly from the structures above.

Underground pull box installation.--Electrical pull box covers or lids shall be marked "ELECTRICAL."

The bottom of pull boxes shall be bedded in 155 mm of clean, crushed rock or gravel and shall be grouted with 40 mm thick grout prior to installation of conductors. Grout shall be sloped to a 25 mm PVC pipe drain hole. Conduit shall be sealed in place with grout.

Top of pull boxes shall be flush with surrounding grade or top of curb. In unpaved areas where pull box is not immediately adjacent to and protected by a concrete foundation, pole or other protective construction, the top of pull box shall be set at plus 30 mm above surrounding grade. Pull boxes shown on the plans in the vicinity of curbs shall be placed adjacent to the back of curb. Pull boxes shown on the plans adjacent to lighting standards shall be placed on the side of foundation facing away from traffic.

Ground rod(s) installation.--The ground rod(s) shall be driven vertically until the top is 155 mm above the surrounding surface. When vertical penetration of the ground rod cannot be obtained, an equivalent horizontal grounding system, approved by the Engineer, shall be installed.

Anchorage.--Hangers, brackets, conduit straps, supports, and electrical equipment shall be rigidly and securely fastened to surfaces by means of toggle bolts on hollow masonry; expansion shields and machine screws, or expansion anchors and studs or standard preset inserts on concrete or solid masonry; machine screws or bolts on metal surfaces; and wood or lag screws on wood construction.

Anchorage devices shall be installed in accordance with the anchorage manufacturer's recommendations.

Mounting heights.--Electrical system components shall be mounted at the following mounting heights, unless otherwise shown on the plans. The mounting height dimensions shall be measured above the finished floor to the bottom of the device or component.

Thermostats	1.25 m maximum
Wall switches	1.0 m maximum
Convenience outlets	1.25 m minimum, all other areas

16.03 SERVICE AND DISTRIBUTION

PART 1.- GENERAL

SUMMARY.--

Scope.--This work shall consist of furnishing and installing service and distribution equipment in accordance with the requirements of the serving utilities, the details shown on the plans and these special provisions.

Attention is directed to "Utility Connection" in Division 1, "General Requirements," of these special provisions regarding arrangements, permits, licenses, charges, fees and costs for utility connections and extensions.

Related work.--Concrete and reinforcement for main switchboard shall conform to the requirements specified for minor work under "Cast-in-Place Concrete," in Division 3, "Concrete and Reinforcement," of these special provisions.

SUBMITTALS.--

Installation details.--The Contractor shall submit complete service installation details to the serving utilities for approval. Prior to submitting installation details to the serving utility, the Contractor shall have said drawings reviewed and stamped "APPROVED" by the Engineer. Submittals shall be approved by the serving utility prior to commencing work.

Product data.--A list of materials and equipment to be installed, manufacturer's descriptive data, and such other data as may be requested by the Engineer shall be submitted for approval.

Manufacturer's descriptive data shall include complete description, performance data and installation instructions for the materials and equipment specified herein. Control and wiring diagrams, rough-in dimensions, and component layout shall be included where applicable. All control and power conductors on the shop drawings shall be identified with wire numbers.

Manufacturer's descriptive data shall be submitted for the following:

Main switchboard

PART 2.- PRODUCTS

Main Switchboard.--

Main switchboard shall be a group of a vertical sections suitable for housing incoming service conductors, utility instrumentation's, metering, power monitoring system main disconnect and power distribution circuit breakers. Sections shall be bolted together to form a rigid, free standing complete assembly as shown on the plans. Main switchboard shall be outdoor Type NEMA-3R enclosure, suitable for 480/277-volt, 2000 Ampere, 3-phase, and 4-wire service.

The main switchboard bus bars shall be of copper with silver at all joints. Each phase bus shall be identified with colored paint. Bus bars shall be mounted on insulator supports of high impact, high quality insulation material and adequately braced to withstand fault current of 42000 symmetrical Amperes at 480 volts.

All sections shall be bussed to accept devices in marked spaces.

The main bus shall be not less than the frame rating of the largest overcurrent device connected.

The ground bus shall be continuous through all sections and shall be connected to all section structures by welding or bolting. The capacity of the ground bus shall be not less than 50 percent of the main phase bussing.

The neutral bus shall be provided through all sections with the capacity equal to the capacity of the main phase bussing.

The following equipment shall be mounted inside the main switchboard:

Circuit Breakers.--

Main Circuit Breaker shall be 3-pole, 2000 Amperes, 600-volt circuit breaker with a shunt trip.

The distribution circuit breakers shall be 3-pole, 600-volt, bolt-on type circuit breakers with the trip rating as shown on the plans.

The interrupting capacity of the main and distribution circuit breakers shall be 50 000 RMS symmetrical at 480-volts.

Main circuit breaker shall be provided with ground fault protection system as follows:

The system shall consist of a current sensor enclosing all phase conductors and neutral with appropriate relaying equipment to provide the desired ground current sensitivity and time current response characteristics. The system shall be installed in accordance with the manufacturer's instructions.

Current sensor shall be of sufficient size to encircle phase and neutral conductors. Current sensor output shall be coordinated with the required input to the relay. The ground fault sensor shall have a ground fault current pick-up range of 100 to 1200 Amperes. The ground fault sensor shall have a test winding to simulate the flow of ground fault current through the current sensor to provide a means for testing the operation of ground fault protection system, including sensor pick up relay and circuit protection device operation.

The ground fault relay shall be solid-state suitable to operate on 120 V (ac). The ground fault relay shall have an adjustable pick up current sensitivity for ground fault current range of 100 to 1200 Amperes. The ground fault relay shall have a calibrated dial for setting the current pick up point in the field. The ground fault relay shall have adjustable time delay from 0.1 to 0.5 seconds.

A test panel for testing the equipment ground fault system shall be provided. The test panel shall include a bypass, so that the ground fault protection system may be tested without causing the circuit protective device to operate. The test panel shall be suitable to operate on 120 V (ac).

120-V (ac) shall be provided in the main switchboard.

PART 3.- EXECUTION

Foundation for main switchboard shall be as shown on the plans.

Installation of service and distribution equipment shall be in accordance with the requirements of the serving utilities as shown on the approved installation details.

16.04 ELECTRICAL EQUIPMENT

PART 1.- GENERAL

SUMMARY--

Scope.--This work shall consist of furnishing and installing hydraulic pump building switchboard, panelboard, starters, disconnect switches, transformers, and related accessories in accordance with the details shown on the plans and these special provisions.

Related work.--Anchorage devices shall be as specified under "Basic Materials and Methods" elsewhere in this Division 16.

SUBMITTALS--

Product data.--A list of materials and equipment to be installed, manufacturer's descriptive data, and such other data as may be requested by the Engineer shall be submitted for approval.

Manufacturer's descriptive data shall include complete description, performance data and installation instructions for the materials and equipment specified herein. Control and wiring diagrams, rough-in dimensions, and component layout shall be included where applicable. All control and power conductors on the shop drawings shall be identified with wire numbers.

Manufacturer's descriptive data shall be submitted for the following:

Hydraulic building switchboard

PART 2.- PRODUCTS

Hydraulic pump building switchboard.--

Hydraulic pump building switchboard shall be a group of a vertical sections suitable for housing incoming service conductors, main disconnect, power distribution circuit breakers, and motor starters. Sections shall be bolted together to form a rigid, free standing complete assembly as shown on the plans. Main switchboard shall be indoor Type NEMA-12 enclosure, suitable for 480/277-volt, 1200 Ampere, 3-phase, and 4-wire service.

The hydraulic building switchboard bus bars shall be of copper with silver at all joints. Each phase bus shall be identified with colored paint. Bus bars shall be mounted on insulator supports of high impact, high quality insulation material and adequately braced to withstand fault current of 42 000 symmetrical Amperes at 480 volts.

All sections shall be bussed to accept devices in marked spaces.

The main bus shall be not less than the frame rating of the largest overcurrent device connected.

The ground bus shall be continuous through all sections and shall be connected to all section structures by welding or bolting. The capacity of the ground bus shall be not less than 50 percent of the main phase bussing.

The neutral bus shall be provided through all sections with the capacity equal to the capacity of the main phase bussing.

The following equipment shall be mounted inside the hydraulic pump building switchboard:

Circuit breakers.--

Main circuit breaker shall be 3-pole, 1200 Amperes trip, 600-volt circuit breaker with a shunt trip.

The distribution circuit breakers shall be 3-pole, 600-volt, bolt-on type circuit breakers with the trip rating as shown on the plans.

The interrupting capacity of the main and distribution circuit breakers shall be 42 000 RMS symmetrical at 480-volt.

Main circuit breaker shall be provided with ground fault protection system as follows:

The system shall consist of a current sensor enclosing all phase conductors and neutral with appropriate relaying equipment to provide the desired ground current sensitivity and time current response characteristics. The system shall be installed in accordance with the manufacturer's instructions.

Current sensor shall be of sufficient size to encircle phase and neutral conductors. Current sensor output shall be coordinated with the required input to the relay. The ground fault sensor shall have a ground fault current pick-up range of 100 to 1200 Amperes. The ground fault sensor shall have a test winding to simulate the flow of ground fault current through the current sensor to provide a means for testing the operation of ground fault protection system, including sensor pick up relay and circuit protection device operation.

The ground fault relay shall be solid-state suitable to operate on 120 V (ac). The ground fault relay shall have an adjustable pick up current sensitivity for ground fault current range of 100 to 1200 Amperes. The ground fault relay shall have a calibrated dial for setting the current pick up point in the field. The ground fault relay shall have adjustable time delay from 0.1 to 0.5 seconds.

A test panel for testing the equipment ground fault system shall be provided. The test panel shall include a bypass, so that the ground fault protection system may be tested without causing the circuit protective device to operate. The test panel shall be suitable to operate on 120 V (ac).

120 V (ac) shall be provided in the main switchboard.

Motor starters section:

The following equipment shall be mounted in the motor starters section:

Starter ST-1.--

Exhaust fan starter, ST-1, shall be combination 3-pole, 480-volt, NEMA Size 0, NEMA rated, line voltage starter and motor circuit. Exhaust fan starter, ST-1, 120-volt coil, double-break silver contacts and 3 manual reset, non-adjustable thermal overloads, set to trip between 115 and 125 percent of full load motor current, as quoted on the nameplate by the motor manufacturer. Reset button shall be externally operable and shall be installed on the front door.

Starter ST-2.--

Fluid cooler spray pump starter, ST-2, shall be the same as starter ST-1.

Starter ST-3--

Cooler water circulating pump starter, ST-3, shall be combination 3-pole, 480-volt, NEMA Size 2, NEMA rated, line voltage starter and motor circuit. Cooler water circulating pump starter, ST-3, 120-volt coil, double-break silver contacts and 3 manual reset, non-adjustable thermal overloads, set to trip between 115 and 125 percent of full load motor current, as quoted on the nameplate by the motor manufacturer. Reset button shall be externally operable and shall be installed on the front door.

Starter ST-4--

Fluid cooler fan starter, ST-4, shall be the same as starter ST-3.

The following equipment shall be mounted on the door of the motor starter section:

Selector switch, SS1 through SS4.--

Selector switch shall be rotary action, double-pole, 2-position, 10-Ampere, 120-volt switch. Switch contacts shall have an inductive pilot duty rating of 60 Amperes (make), 6 Amperes (break) and 10 Amperes (continuous) at 120 volts and 35 percent power factor. Selector switch shall have legend plate marked HAND-AUTO.

Indicating lights, IL1 through IL3.--

Indicating lights shall be panel mounted indicating light with 120-V (ac), LED lamp with green domed cap and candelabra screw base.

PANELBOARDS.--

Panelboard A.--

Panelboard A shall be indoor type, surface-mounted, factory assembled, 3-phase, 4-wire, 120/208-V (ac) panelboard at least 500 mm wide with 100-Ampere main lugs, insulated groundable neutral, hinged door and molded case branch circuit breakers as shown on the plans. Panel shall be Square D Company, General Electric, or equal.

SWITCHES.--

Exhaust fan disconnect switch.--

Exhaust fan disconnect switch shall be 3-pole, 600-V (ac), 30-Ampere, fused, general duty safety switch in a NEMA-3R enclosure. The fuses shall be sized to suit the exhaust fan unit furnished.

Fluid cooler spray pump disconnect switch shall be the same as exhaust fan disconnect switch.

Fluid cooler fan disconnect switch.--

Fluid cooler fan disconnect switch shall be 3-pole, 600-V (ac), 60-Ampere, fused, general duty safety switch in a NEMA-3R enclosure. The fuses shall be sized to suit the fluid cooler fan unit furnished.

TRANSFORMER.--

Transformer.--

Transformer shall be indoor, dry type, wall mounted, 3-phase, 480-volt primary, 120/208-volt secondary, 15-KVA transformer in NEMA-1 enclosure. Transformer shall have two 2 1/2 percent full capacity taps above and four 2 1/2 percent full capacity taps below normal primary voltage.

MISCELLANEOUS MATERIALS.--

Temperature controller T1, T2.--

Temperature controller T1, T2 shall be ON/OFF controller with 2 temperature inputs and 4 SPDT output relays. Temperature set point range shall be between -40°C to 104°C and accuracy of $\pm 2^\circ\text{C}$. Differential range shall be adjustable from 1°C to 10°C. Controller shall have the capability to be programmed for heating and cooling mode. Controller shall be equipped with a keypad for programming and operation and a LCD screen display to indicate the temperature, mode of operation and output status. A matching input sensor shall be provided with a remote sensing range of up to 300 meters. Controller shall be suitable for 120 volt, 60 Hz operation. Output relays shall have 8.0 Ampere contacts rated at 120-V (ac).

Nameplates.--

Nameplates shall be laminated phenolic plastic with white core and black front and back. Nameplate inscription shall be in capitals letters etched through the outer layer of the nameplate material.

Warning plates.--

Warning plates shall be laminated phenolic plastic with white core and red front and back. Warning plates inscription shall be in capitals letters etched through the outer layer of the nameplate material.

Plywood backing panels.--

Plywood backing panels for mounting electrical or telephone equipment shall be 19 mm, APA plywood panels, C-D PLUGGED and touch-sanded, Exposure 1.

Paint.--

Plywood backing panels shall receive the following paint system: one prime coat, alkyd, interior wood primer and 2 finish coats, acrylic, interior enamel, semi-gloss.

PART 3.- EXECUTION

INSTALLATION.--

Plywood backing board.--Plywood backing board shall be securely fastened to walls or other vertical framing.

Surface to be coated shall be cleaned of all dirt, excess materials, of filler by hand cleaning.

Coatings shall be applied in accordance with the manufacturer's instructions. Each coat shall be applied to a uniform finish, free of skips, brush marks, laps or other imperfections.

Hydraulic pump building switchboard.--The hydraulic pump building switchboard enclosure shall be factory prewired in conformance with NEMA Class IIC wiring. All wires entering the enclosure shall be terminated on terminal blocks. All interior control wires shall be 19-strand No.14 MTW. Wires shall be neatly trained and bundled, and wiring troughs shall be provided as necessary. Wiring shall be arranged so that any piece of apparatus may be removed without disconnecting any wires except the leads to that piece of apparatus.

A wiring diagram encased between 2 heat-fused laminated plastic sheets shall be provided with brass mounting eyelets and attached to the inside of the enclosure.

Panelboard installation.--Set cabinets plumb and symmetrical with building lines. Train interior wiring as specified under "Conductor and Cable Installation" in "Basic Materials and Methods" of these special provisions. Touch-up paint any marks, blemishes, or other finish damage suffered during installation. Replace cabinets, doors or trim exhibiting dents, bends, warps or poor fit which may impede ready access, security or integrity.

Mounting height shall be 1.4 meters to the highest circuit breaker handle, measured above the finished floor.

Where "Future" or "Space" is indicated on the plans, branch connectors, mounting brackets, and other hardware shall be furnished and installed for future breaker.

A typewritten directory under transparent protective cover shall be provided and set in metal frame inside each cabinet door. Directory panel designation for each circuit breaker shall include complete information concerning equipment controlled, including room number or area designated on the plans.

Transformer installation.--Connect primary to minimum value taps during construction period and prior to initial building start-up. Make voltage readings and adjust tap connections to nominal voltage during final construction review and prior to building occupancy. Install conduit connections which will prevent transmission of the transformer vibrations to the conduit system. Transformers shall be bolted to floor when floor mounted and bolted to wall with support brackets when wall mounted. Pad mounted transformers (unit substation) shall be installed as shown on the plans.

Temperature sensor installation.—Temperature sensor installation shall be as recommended by the manufacturer.

Equipment identification.--Equipment shall be identified with nameplates fastened with self-tapping, cadmium-plated screws or nickel-plated bolts.

Nameplate inscriptions shall be as shown on the plans.

16.05 LIGHTING

GENERAL.--This work shall consist of furnishing, installing and connecting all lighting equipment in accordance with the details shown on the plans and these special provisions.

SUBMITTALS.--Manufacturer's descriptive information, photometric curves, catalog cuts, and installation instructions shall be submitted for approval.

PRODUCTS.--

Lighting fixture lamps.--

Lighting fixture lamps shall be type and size as shown on the plans. Lamps shall be General Electric, Phillips, Sylvania, or equal. Fluorescent lamps, unless otherwise noted, shall be 4100K tri-phosphor with a CRI of 70 or greater.

Ballasts.--

All fixtures shall be equipped with high power factor ballasts suitable for the line voltage and for the type, size and number of lamps required by the fixture. Fluorescent ballasts shall be UL Listed, Class P and ETL Certified ballasts with sound rating A. Fluorescent ballasts shall be high-frequency electronic ballasts with power factor greater than 0.95, nominal ballast factor of 0.88 unless specified otherwise, total harmonic distortion less than 20 percent, crest factor less than or equal to 1.7, complying with ANSI C 62.41 Category A for surge protection, and FCC Part 18 for interference. Dimming ballasts shall be high frequency ballasts as specified above and shall be capable of dimming the light output from 100 percent to 20 percent of the rated light output.

Lighting fixtures.--

Lighting fixtures shall be as shown on the plans and as specified herein. Outdoor luminaires shall be listed and labeled "Fixture Suitable For Wet Locations."

Ceiling-mounted fluorescent fixture with two-32 Watts lamps, electronic ballast and one-piece, clear acrylic, diffuser. The fixture shall have reinforced polyester housing. Diffuser shall be secured to housing by captive, cam-action latches. Fixture shall be suitable for damp location. The fixture shall be Day Brite, Catalog No. VWLE 232; Lithonia, Catalog No. DM 240; or equal.

EXECUTION.--

Lighting fixtures.--Lighting fixtures shall be mounted securely in accordance with the manufacturer's recommendations. Mounting methods shall be suitable for the particular type of ceiling or support at each location.

The Contractor shall provide all supports, hangers, spacers, channels, fasteners and other hardware necessary to support the fixtures.

Fixtures shall be set at the mounting heights shown on the plans, except heights shown shall be adjusted to meet conditions.

Ballasts.--All fluorescent fixtures shall be equipped with high power factor ballasts suitable for the line voltage and for the type, size and number of lamps required by fixture. The Contractor has the option to install low voltage dimming control provided that the Contractor submit plans and specifications with appropriate revisions for the low voltage dimming control to the Engineers for approval prior to installation.

All ballasts used in unheated areas inside the building shall be -20°C ballasts or less.