83E

10/9 4pm

PROJECT MANUAL

for

KENSINGTON FIRE STATION / PUBLIC SAFETY BUILDING RENOVATION

215 Arlington Avenue
Kensington, CA 94707

Prepared for

KENSINGTON FIRE PROTECTION DISTRICT
Kensington, CA

Prepared by

MARCY LI WONG ARCHITECTS
2251 Fifth Street
Berkeley, CA 94710
Phone: (510) 843-0916
Fax: (510) 843-0949

10 September 1998

TABLE OF CONTENTS

DIVISION 0 – BIDDING REQUIREMENTS
00100 Instructions to Bidders
00300 Bid Form

DIVISION 1 - GENERAL REQUIREMENTS
01010 Summary of Work
01035 Alternates
01041 Project Coordination
01045 Cutting and Patching
01060 Regulatory Requirements
01090 Industry Standard Abbreviations
01106 Hazardous Materials
01200 Inspection of Work
01300 Shop Drawings, Product Data, and Samples
01305 Contract Schedules
01320 Change Order Procedures
01330 Project Meetings
01400 Quality Control
01510 Contractor's Use of the Project Site
01640 Product Options and Substitutions
01700 Project Record Documents
01705 Guarantees
01710 Clean-Up and Disposal

DIVISION 2 - SITE WORK
02072 Minor Demolition
02080 Asbestos and Lead Paint Abatement Specification (Prepared by RGA)
02250 Termite Control

DIVISION 3 - CONCRETE
03100 Concrete Formwork
03200 Concrete Reinforcement
03300 Cast-in-Place Concrete
03305 Concrete Testing and Inspection

DIVISION 4 - MASONRY (Not Used)

DIVISION 5 - METALS
05120 Structural Steel
05500 Metal Fabrications

DIVISION 6 - WOOD AND PLASTICS
06100 Rough Carpentry
06200 Finish Carpentry

DIVISION 7 - THERMAL AND MOISTURE PROTECTI0N
07200 Building Insulation
07620 Flashing & Sheet Metal
07900 Joint Sealers

DIVISION 8 - DOORS AND WINDOWS
08210 Wood Doors
08500 Aluminum Windows
08710 Door Hardware
08800 Glass and Glazing

DIVISION 9 - FINISHES
09250 Gypsum Board
09251 Gypsum Board - Resilient Channel Installation Instructions For Walls
09252 Gypsum Board - Acoustic Ceiling Reconstruction
09300 Ceramic Tile
09650 Resilient Flooring and Base
09680 Carpet
09900 Painting

DIVISION 10 - SPECIALTIES
10200 Louvers
10800 Toilet and Bath Accessories
10824 Shower Compartments and Accessories

DIVISION 11 - EQUIPMENT (Not Used)

DIVISION 12 – FURNISHINGS
12505 Window Blinds

DIVISION 13 - SPECIAL CONSTRUCTION (Not Used)

DIVISION 14 - CONVEYING SYSTEMS (Not Used)

DIVISION 15 - MECHANICAL AND PLUMBING
15000 General Requirements - Mechanical
15100 Plumbing
15200 Heating, Ventilating and Air Conditioning

DIVISION 16 - ELECTRICAL
16010 Electrical General Requirements
16020 Basic Construction Methods and Materials
16450 Grounding
16500 Lighting

SECTION 00100
INSTRUCTIONS TO BIDDERS

1. SECURING DOCUMENTS: Copies of the Contract Documents are on file at:

The Contra Costa Plans Room
The Alameda County Plans Room

One (1) set of half sized drawings and specifications may be obtained by Contractors at the Office of the Board Member stated below:

Mr. Don Dommer
KFD Building Committee
1144 65th Street, Suite G
Oakland, CA 94608
Phone: 510-655-7793
Fax: 510-655-7225

Any full sized sets requested by Contractor shall be at the Contractor's expense and can be ordered directly from:

BPS Reprographic Services
1700 Jefferson Street
Oakland, CA
Phone: 510-287-5485
Fax: 510-444-1262

2. BID OPENINGS: A sealed bid for furnishing all labor and materials for all branches of the work, except items indicated as furnished and/or installed by others, for the erection and completion of:

Kensington Fire Station / Public Safety Building Renovation
215 Arlington Ave., Kensington, CA

in accordance with plans and specifications similarly entitled, will be received until Tuesday, the 6th day of October, 1998 at 4:00 p.m , at the second floor reception area, office of The Kensington Police Department, 215 Arlington Ave., Kensington, CA, 94707, at which time all bids received will be opened in public.

Submit bids on the Bid Form furnished is Section 00300 of this specification; only a bid so tendered will receive consideration.

3. BID FORM: In order to receive consideration, all bids must be made in strict accordance with the following:

A. All bids must be made upon the forms provided, properly executed and with all items filled out. Do not change the wording of the Bid Form. Unauthorized conditions, limitations, or provisions attached to the proposal shall be cause for rejection of the proposal. Alterations by erasure or interlineation must be explained or noted in the bid over the signature of the bidder.

B. No fax bid or fax modifications of a bid will be considered. No bids received after the time fixed for receiving them will be considered. Late bids will be returned to the bidder unopened.

C. Each bid shall be addressed to the Owner and shall be delivered to the Owner at the address given in item 2 above on or before the day and hour set for openings of bids. Each bid shall be enclosed in a sealed envelope bearing the title of the Work, the name of the bidder, and the date and hour of the opening. It is the sole responsibility of the bidder to see that his or her bid is received on time.

4. BONDS:

A. Prior to signing the Contract, the Owner will require the selected Contractor to secure and post a Labor and Materials Payment Bond and a Performance Bond, each in the amount of 100% of the Contract Sum, and each on the forms provided in the Project Manual. All such bonds shall be issued by Surety acceptable to the Owner. Include the costs of all such bonds in the proposed Contract Sum.

B. AIA Standard Construction Bond forms will be used for this project. If other forms are contemplated they shall be reviewed and approved by the Architect and Owner before being completed and submitted.

5. EXAMINATION OF DRAWINGS, SPECIFICATIONS, AND SITE OF WORK:
Before submitting a bid, each bidder shall carefully examine the Drawings, read the Specifications and all other Contract Documents, and visit the site of the Work. Each bidder shall fully inform him or herself prior to the bidding as to all existing conditions and limitations under which the Work is to be performed and the bidder shall include in the bid a sum to cover all costs of all items necessary to perform the Work as set forth in the Contract Documents. No allowance will be made to any bidder because of lack of such examination or knowledge. The submission of a bid shall be construed as conclusive evidence that the bidder has made such examination.

6. PROOF OF COMPETENCY OF BIDDER:

A. Any bidder may be required to furnish evidence satisfactory to the Owner the he or she and the proposed subcontractors have sufficient means and experience in the types of work called for to assure completion of the Contract in a satisfactory manner.

B. Bidder shall accept proposals from only those subcontractors who have demonstrated to the Bidder's satisfaction that they are financially capable of handling the work, have the technical ability, personnel, plant, past experience, and reputation to carry out their portions of the work. It will be assumed that the question of bonding subcontractors, where considered desirable and/or necessary by the Bidder, and the cost of such bonds has been resolved before proposals have been submitted to the Owner.

7. WITHDRAWAL OF BIDS:

A. Any bidder may withdraw his or her bid, either personally or by written request, at any time prior to scheduled time for opening bids.

B. No bidder may withdraw his or her bid for a period of 60 days after the date set for opening thereof, and all bids shall be subject to acceptance by the Owner during this period.

8. AWARD OR REJECTION OF BID: The Contract, if awarded, will be awarded to the selected bidder on the basis of contract sum.

9. EXECUTION OF AGREEMENT:

A. The form of Agreement which the successful bidder, as Contractor, will be required to execute shall be A.I.A. Document A107 Abbreviated Standard Form of Agreement Between Owner and Contractor, 1987 Edition, provided by the Architect.

B. The Bidder to whom the Contract is awarded by the Owner shall, within seven (7) calendar days after notice of award and receipt of Agreement forms from the Owner, sign and deliver to the Owner all required copies.

C. At or prior to delivery of the signed Agreement, the Contractor shall deliver to the Owner the Labor and Materials Payment Bond, the Performance Bond, and the policies of insurance or insurance certificates as required by the Contract Documents. All bonds and policies or certificates of insurance shall be approved by the Owner before the successful bidder may proceed with the Work.

D. Failure or refusal to furnish bonds or insurance policies or certificates in a form satisfactory to the Owner shall subject the bidder to loss of time from the allowable construction period equal to the time of delay in furnishing the required material.

10. INTERPRETATION OF CONTRACT DOCUMENTS PRIOR TO BIDDING:

A. If any person contemplating submitting a bid for construction of the Work is in doubt as to the true meaning of any part of the Contract Documents, or finds errors, discrepancies in, or omissions from any part of the Contract Documents, he or she shall submit to the Architect a request for interpretation or correction thereof not later than seven days before bids will be opened. ANY INTERPRETATIONS OR CORRECTION WILL BE MADE ONLY BY WRITTEN ADDENDUM DULY ISSUED BY THE ARCHITECT.

B. Any interpretation or correction of the Contract Documents will be made only by Addendum and will be mailed or faxed to or picked up by each bidder of record. The Owner will not be responsible for any other explanations or interpretations of the Contract Documents.

C. Should discrepancies appear in the Contract Documents which are not resolved by addendum, then it is expressly understood that the Contractor has used the most expensive method and/or material in his bid.

11. CONSTRUCTION TIME:

A. It shall be understood that the Contractor shall render his or her work ready for final inspection at least two (2) full weeks ahead of the proposed completion date stated on the Bid Form. This two (2) week period shall be used by the Owner for the final inspection, and in turn, by the Contractor, for completion of all work requiring completion and/or remedy as called to his or her attention through said inspection by the Owner.

12. ADDENDA:

A. Any addenda issued during the time of bidding, or forming a part of the Contract Documents, loaned to the Bidder for the preparation of his or her proposal, shall be covered in the proposal and shall be made a part of the contract.

B. An Addendum, if required, is anticipated to be issued Tuesday, 29 September and will be on file at the locations indicated in item 1 above and mailed or faxed to Contractors who request plans from Board Member as noted in item 1 above.

13. PRE-BID CONFERENCE: an optional pre-bid conference will be held at the project site Tuesday, September 22 at 10 AM.

4. Whenever a material, article or piece of equipment is identified on the Drawings or in the Specifications by reference to manufacturers' or vendors' names, trade names, catalogue numbers, or the like, it is so identified

for the purpose of establishing a standard, and any material, article, or piece of equipment so proposed is, in the opinion of the Architect, of equal substance, appearance and function. Post-contract substitutions shall be processed per SECTION 01010 SUMMARY OF WORK. No substitution shall be purchased or installed by the Contractor without the Architect's written approval. The burden of proof as to the comparative quality and suitability of alternative equipment, article or material shall be upon the Contractor and he or she shall furnish at his or her own expense all information necessary or related thereto as required by the Architect. When an item is so approved, it is with the understanding that the Contractor guarantees the substituted equipment or process to be equal to or better than the article or process originally specified.

15. REQUIREMENT UPON SIGNING THE CONTRACT: At or prior to entering into a contract with the Owner, the Contractor shall furnish the following:

A. An executed performance bond and an executed labor and materials payment bond, each in an amount equal to 100% of the contract sum as called for in Items 3 and 8 above.

B. Insurance certificates as called for in the General Conditions and/or Supplemental Conditions and as mutually agreed between the Owner and the Contractor (including A.I.A. Document G705).

C. A cost breakdown of the total proposal into its various components of the work which may serve as a basis for making monthly payments to the Contractor (A.I.A. Document G703).

D. Evidence of compliance with local licensing requirements.

F. The Contractor shall furnish to the Owner's Representative and to the Architect a progress schedule as to how he or she intends to construct the project. This must be a realistic method of analyzing and scheduling of each component part of the work as it pertains to the whole. This must be so organized as to show all trades or crafts when they are to start and finish their work. This schedule must be reviewed at least semi-monthly and updated if the schedule does not accurately reflect the condition or progress of work. This schedule must be received and approved by the Owner prior to the Contractor submitting the first monthly progress estimate.

END OF SECTION

SECTION 00300
BID FORM

PROJECT NAME: **Kensington Fire Station / Public Safety Building Renovation**
215 Arlington Avenue, Kensington, CA

BIDS WILL BE RECEIVED UNTIL Tuesday, the 6th day of October, 1998 at 4:00 p.m , at the second floor reception area, Office of The Kensington Police Department, 215 Arlington Ave., Kensington, CA, 94707, at which time all bids received will be opened in public.

TO: Kensington Fire Protection District
c/o Kensington Police Station
215 Arlington Ave.,
Kensington, CA 94707
(Herein called "Owner")

Name of Contractor: _____
(Herein called "Bidder")

Date of Proposal: _____

1. The undersigned Bidder, certifies that the following facts and/or circumstances have occurred or exist relating to the proposed work for construction of **Kensington Fire Safety/Public Safety Building Renovation**

   A. That pursuant to and in compliance with the Owner's Instructions to Bidders, Bidder has received the contract documents for the above project.

   B. That Bidder is familiar with such documents, has examined the site of the proposed work, including availability of access, utilities, and other similar items relating to performance of the work and is thoroughly familiar with all general and local conditions which could in any way affect this work.

   C. That no verbal agreements or representations with or by any officer, agent, or employee of the Owner exist, or have been made to the Bidder, and the Bidder in submitting this proposal is in no way relying thereon.

   D. That if this proposal is accepted, Bidder will enter into a contract with the Owner in substantially the form contained in the Contract Documents, and will provide the bonds, insurance coverage and all other items required by the contract documents.

   E. The term "base bid" shall be understood to include all work contained in Contract Documents excluding any alternates. The contract will be awarded on the basis of "base bid" or combination of "base bid" and alternates.

   F. The Bidder acknowledges receipt of addenda No(s). __ to ___ inclusive and has considered the same in preparation of this proposal.

   G. The Bidder is a licensed contractor with the State of California. The Contractor's license number is _____.

2. Bidder hereby proposes to furnish all materials, labor, equipment, plant, tools, transportation, services, licenses and permits necessary for the completion of all the work set forth in the Contract Documents except for those items specifically identified as alternates, for the sum of:

A. Base Bid of

_____(_____)

Not including Alternates 1-3. (See Section 01035 - Alternates.)

B. For Alternates Add the following sum to the Base Bid:

B.1 For Alternate Number 1: (Reroofing of building) Add: _____

B.2 For Alternate Number 2: (Casework specifically identified) Add: _____

B.3 For Alternate Number 3: (Lockers, Mini Blinds) Add: _____

B.4 For Change Orders issued during construction, we will charge the following percentages: Overhead % plus profit _____%.

B.5 Our subcontractors will charge the following percentages: Overhead ____% plus profit _____%.

C. Construction Time:

C.1 The undersigned agrees to complete the work ready for the Owner's acceptance no later than April 15, 1999. The Owner shall issue a written Notice To Proceed no later than November 1, 1998, provided that the Contractor provides all of the required documents outlined in item 15 of "Specification Section 00100 Instructions to Bidders" prior to that date.

C.2 It is understood, with due allowances made for unavoidable delays, that if the Contractor should fail to complete the work of the contract within the stipulated time, then he or she shall be liable to the Public Agency in the amount of $300 per day for liquidated damages and not as a penalty.

C.3 If the Contractor should complete the Contract in advance of the stipulated completion date, he or she shall receive a bonus in the amount of $300 per day above the contract sum.

D. It is understood that the Owner reserves the right to reject this bid but that this bid shall remain open and shall not be withdrawn for a period of 60 days after the date of its opening.

E. If written notice of the acceptance of this bid is mailed or delivered personally to the undersigned within 60 days after the date set for hearing of this bid, or at any time thereafter before it is withdrawn, the undersigned bidder will execute and deliver the Contract Documents to the Owner in accordance with this bid as accepted, and will also furnish and deliver to the Owner all required bonds, insurance, certificates, etc. all within Fifteen (15) days after personal delivery or deposit in the mail of a notification of acceptance of this bid.

F. Notice of acceptance or request for additional information may be addressed to the undersigned at the address set forth below.

G. Whenever in this proposal an amount is stated in both words and figures, in case of discrepancy between words and figures, the words shall prevail.

UNIT PRICES FOR HAZARDOUS MATERIALS ABATEMENT PER SPECIFICATION SECTION 02080

(Contractor to complete the following form)

Project Unit Prices

Work Description Removal and Disposal		Cost Per Work Scope/Units	
Vinyl floor tile (VFT) and mastic on concrete floor	$	_____	/Square Foot
Vinyl floor tile (VFT) and mastic on wood floor	$	_____	/Square Foot
mastic on concrete floor	$	_____	/Square Foot
mastic on wood floor	$	_____	/Square Foot
Carpet and mastic on concrete floor	$	_____	/Square Foot
Carpet and mastic on wood floor	$	_____	/Square Foot
Sheetrock wall/ceiling with joint compound/mud	$	_____	/Square Foot
Transite wall panels	$	_____	/Square Foot
Sanding wall/ceiling	$	_____	/Square Foot

BIDDER'S ORGANIZATION

_____
Official Name of Organization

_____
Corporation, Copartnership, Individual, or Other

_____
_Address Phone No.

Names of Individual Members of Firm:

_____

_____

_____

_____
Name of President of Corporation

_____
Name of Secretary of Corporation

Corporation is organized under the laws of the State of:

_____

SIGNATURE MUST BE AFFIXED HERE:

SEAL

(If a Corporation)

_____
Signature

_____
Title of Office

_____
Legal Address

END OF SECTION

SECTION 01010
SUMMARY OF WORK

PART 1 GENERAL

1.01 NAME, LOCATION AND ACCESS TO PROJECT

A. Project Location: 215 Arlington Avenue, Kensington, California.

B. Access: All Contractor's personnel, operations affiliates and delivery personnel shall comply at all times with city traffic regulations.

1.02 DESCRIPTION OF WORK

A. General Requirements: The Contractor shall provide qualified supervision, lead personnel, workers and shall supply all labor, materials, equipment, services, transportation, insurance, licenses, and all other items and work required to properly execute the intentions of the Contract.

B. Scope of work consists, in general, of building and site improvements for the renovation of the Kensington Fire Station and Public Safety Building and all related work as described in the Drawings and Specifications.

C. Intent of Document:

1. It is the intent of the Contract Documents to include all labor and materials necessary for the proper completion of the project. Work necessary for completion or implied by the Documents, even though not specifically shown or specified, shall be supplied by General Contractor.

2. Where removal of existing construction, landscaping, utilities, etc. is required for performance of any work under this Contract, removal and replacement will be accomplished whether shown or not.

1.03 INTERPRETATIONS OF TERMS

A. "As directed," "as required," "as permitted," "approved," "acceptable," "satisfactory," means by or to the designated Owner's Representative.

1.04 DEFINITION OF TERMS USED

A. Owner: Kensington Fire Protection District

B. Project Architect:

Kent Royle, representing
Marcy Li Wong Architects
2251 Fifth Street
Berkeley, CA 94710

(510) 843-0916

C. Contractor: The successful bidder, to whom the Contract is awarded.

1.05 DEFINITIONS

The following terms, when used on the Drawings or in the Specifications, shall have the following meanings:

TERM	MEANING
Adequate; Careful; Proper; Sufficient; Suitable; Satisfactory	These terms refer to interpretation by Owner's Representative, and are subject to approval by Owner's Representative upon request.
Applicable Codes	"Codes listed on Sheet T-1 of the Drawings and in Section 01060."
Approved	"As approved by Owner's Representative."
As Directed	"As directed by Owner's Representative."
As Required	"As required by Applicable Code Requirements; by good building practice; by the conditions prevailing; by the Contract Documents; by Owner, or by Owner's Representative."
As Selected	"As selected by Owner's Representative."
By Others	Work on this Project that is outside the scope of Work to be performed by Contractor under this Contract, but that will be performed by Owner, other contractors, or other means.
Equal	Of same quality, appearance, and utility to that specified, as determined by Owner's Representative. Contractor bears the burden of proof of equality.
Furnish	"Supply only, not install (unless required to be provided or installed elsewhere in the Contract Documents)."
Include/Including	"Include/including, without limitation."
Install	"Install or apply only, not furnish (unless required to be provided or furnished elsewhere in the Contract Documents)."
Manufacturer's Directions, Instructions, Recommendations, Specifications	Manufacturer's written directions, instruction, recommendations, specifications.
Must; shall; to; will	When used as a directive to Contractor, these terms indicate a mandatory action.
Necessary	"Essential to completion of Work."
Owner-Furnished, Contractor Installed	"To be furnished by Owner at its cost and installed by Contractor as part of the Work."

Project Site; Job Site	Geographical location of the Project.
Provide	"Furnish and install."
Shown	"As indicated on the Drawings".
Specified	"As written in the Contract Documents."
Submit	"Submit to Owner's Representative."

1.06 BUILDING PERMITS

A. Owner will apply and pay for Building Permit. Contractor is responsible for Business license fees, any other permits, taxes and charges for operating in the City of Kensington and in Contra Costa County.

1.07 PARKING AND ACCESS TO SITE

A. Parking Construction Staging Areas: Parking in construction staging areas is limited to construction vehicles that are required to be in the immediate proximity to the construction in order to perform the Work. All construction vehicles must be clearly identified with the name of the Contractor.

1.08 NOTIFICATION

A. Notify Owner's Representative not less than 72 hours in advance of any inspection, meeting or consultation requiring the Representative's presence.

1.09 WORK HOURS

A. The Work of this project shall be accomplished during the following hours only:

Monday through Friday, 6:00 a.m. to 4:00 p.m., unless otherwise approved by the Owner's Representative.

B. Work may be performed on Saturdays, Sundays or Holidays at General Contractor's discretion and at no extra cost to the Owner.

C. All roto-hammering, chipping, or other activity that will cause excessive noise and vibration shall be performed no earlier in the work day than 8:00 a.m., and must be scheduled with the Owner's Representative.

1.10 WEATHER-CAUSED DELAYS

A. Claims for additional time due to adverse weather conditions shall conform to the General Conditions of the Contract. For purposes of determining abnormal weather conditions, the applicable time span shall include the full period of the project during which weather is a factor in completion.

B. The average number of rain days shall be based on the data published for Oakland, California, in the most recent edition of the "NCD Summary of the Day", by EarthInfo, Inc. of Boulder, Colorado.

1.11 SUPERINTENDENT

A. In addition to the requirements of the General Conditions:

1. Submit qualifications showing five (5) years minimum experience as Superintendent.

2. Failure to maintain a Superintendent on the Project site at all times work is in progress shall be considered a material breach of this Contract, entitling Owner to terminate the Contract or, alternatively, issue a Stop Work order until the Superintendent is on Project site.

3. Superintendent approved for this Project shall be able to read, write and verbally communicate fluently in English.

1.12 SITE DECORUM

A. Contractor shall control the conduct of its employees so as to prevent unwanted interaction initiated by Contractor's employees with individuals (except those associated with the Project), adjacent to the Project site. Without limitation, unwanted interaction by Contractor employees would include whistling at or initiating conversation with passersby. In the event that any Contractor employee initiates such unwanted interaction, Contractor shall, either upon request of Owner's Representative or on its own initiative, replace said employee with another of equivalent technical skill, at no additional cost to Owner.

1.13 NO SMOKING IN BUILDINGS

A. There shall be no smoking within the project building. The Contractor, his forces, and his employees will observe this requirement while performing work on this Project.

1.14 RADIOS

A. The playing of radios on the project site is prohibited at all times. The Contractor, his forces, and his employees will observe this requirement while performing Work on the project site.

1.15 SANITARY FACILITIES

A. Contractor shall make arrangements for Sanitary Facilities for Contractor's use. Contractor shall be responsible for cleanliness.

B. Contractor shall make arrangements for separate Sanitary Facilities for the Police Department's use during periods that the building's sanitary facilities are not operational.

1.16 PROJECT SIGN AND PUBLICITY RELEASES

A. Project Sign:

1. Provide 4' w. x 3' h. project sign of ¾-inch thick exterior A-C grade plywood and wood frame construction, painted, with lettering by a professional sign painter. Design and layout shall be coordinated with Owner's Representative.

2. Sign colors shall be as follows:

a. Sign Background: Coordinate with Owner
b. Project Name: Coordinate with Owner
c. Lettering: Coordinate with Owner

d. Border: Coordinate with Owner

3. Sign Copy: Coordinate with Owner

4. Submittal: Submit 1/4 scale drawing indicating copy and colors.

5. Advertising Signage: The use of Contractor or subcontractor advertising signage is prohibited. Do not display such advertising or job signs except as may be required for identification and deliveries.

B. Warning Signs: Provide signs for traffic direction and warnings such as "Construction Project" or "Keep Out", etc., to help facilitate control of personal vehicles. Use only the minimum number necessary. Keep size to 2' x 4' maximum. Quality of sign material and printed text shall be approved by the Owner's Representative.

C. Maintain signs in good condition throughout the construction period and remove upon completion.

D. Do not release any information, story, photograph, plan or drawing relating information about the project to anyone, including press or other public communications medium.

1.17 PROJECT SECURITY

A. The Contractor is responsible for project security of materials, tools, equipment, supplies and partially completed construction.

1.18 CLEAN-UP DURING CONSTRUCTION

A. Maintain job in a clean, orderly fashion. Pick up and remove debris daily if required but not less frequently than weekly. If work under this Contract creates dusty, dirty or unsightly conditions in adjacent areas, the Contractor will immediately clean up the affected areas.

1.19 NOISE AND DUST CONTROL

A. Existing police department facility shall remain in operation during construction of the project. Contractor shall provide dust proof enclosures to protect the police department's equipment and personnel from dust.

B. Contractor shall submit a dust control and mitigation plan for approval, 72 hours prior to start of dust-producing operations. The Contractor shall take all reasonable precautions to eliminate dust and minimize noise.

C. Erect temporary partitions to confine noise and dust as required.

1.20 ACCESS AND EXIT-WAYS

A. Existing police department facility shall remain in operation during construction of the project.

B. Do not interfere with use of or access to existing police department facility, parking, adjacent property, or public streets.

1.21 WELDING AND BURNING

A. Welding and burning of steel shall be eliminated as much as possible. Where unavoidable, welding and burning shall be done with all possible precaution to avoid fire hazard. Contractor shall provide a fire watch for one-half (1/2) hour after burning stops. Contractor shall provide protection for all adjacent surfaces.

1.22 SURROUNDING SITE CONDITION SURVEY

A. Prior to commencing the Work, Contractor and Owner's Representative shall tour the Project site together to examine and record the damage to existing adjacent improvements. This record shall serve as a basis for determination of subsequent damage due to Contractor's operations, and shall be signed by all parties making the tour. Any cracks, sags, or damage to the adjacent improvements not noted in the original survey, but subsequently discovered, shall be reported to Owner's Representative.

1.23 MATERIAL AND EQUIPMENT

A. General:

1. All material and equipment incorporated in the Work shall be:

   a. New.
   b. In condition acceptable to Owner's Representative.
   c. Suitable for intended use.

2. Keep materials clean, dry, and undamaged.

B. UL Label: Materials and equipment, for which UL standards have been established and their label service is available, shall bear the appropriate UL Label.

C. Manufacturer's Trade Marks and Names: Owner's Representative reserves the right to review and request the removal or redesign of manufacturers' trade marks and names on items of materials and equipment which will be exposed to view in the completed Work. Such removal or redesign shall be at no increase in Contract Sum.

D. Delivery of Materials: Deliver all materials in the original packages, containers or bundles bearing the name, brand, type and grade of material of the manufacturer or the supplier for whom the product is manufactured.

1.24 LAYING OUT OF THE WORK

A. Actual field conditions deviating from the Drawings shall be reported to Owner's Representative before proceeding, and Contractor shall bear the expense of corrective work necessitated by its failure to so report. Before beginning the Work, locate general reference points, establish monuments, and take action as is necessary to prevent their destruction; then lay out all lines, elevations, and measurements for buildings, grading, paving, utilities, and other parts of the Work. Verify figures and dimensions shown on the Drawings and accept responsibility for any error resulting from failure to so verify, including the cost of any additional re-surveying. Establish permanent monuments on curbs, manholes, or pavements, or with concrete-embedded steel pipe with lead plug and brass nail, as approved.

1.25 APPARATUS AND EQUIPMENT LOCATIONS

A. Locations of apparatus and equipment indicated on the Drawings (if any) are approximate only, and are subject to change to suit operational service as approved by Owner's Representative.

B. Furnish and install apparatus and equipment in a manner and in locations which keep openings and passageways clear. Make changes in locations of equipment and materials which may be necessary to accomplish these purposes as approved by Owner's Representative.

1.26 EXAMINATION OF EXISTING CONDITIONS

A. Verify measurements in field, as required, for work fabricated to fit job conditions. Before starting work, examine adjoining work on which installment is in any way dependent for perfect workmanship and fit. Give written description of any existing deficiencies detrimental to proper and timely installation of work.

1.27 CARE OF EXISTING FACILITIES

A. The Contractor shall be responsible for repair or replacement of existing facilities including any landscaping, paving, roads and sidewalks damaged as a result of the performance of this work. Any facilities or finishes damaged shall be repaired or replaced with materials and workmanship equivalent to that employed in executing the original work and to the satisfaction of the Owner's Representative.

B. The Contractor shall take care not to overload existing facilities by storing material, erecting shoring, placing equipment or other materials upon or against these facilities.

C. Do not park trucks, store materials or cross over landscaped areas. Any plant materials damaged as a result of the performance of this work will either be replaced with new plant materials equal in size to those damaged or by payment of an amount representing the value of the damaged material as determined by the Owner's Representative.

1.28 REPAIR OF EXISTING WORK

A. Whenever any cutting, removal, or alterations of existing work is required to form connections with new work or otherwise meet the requirements of the Contract Documents, perform such work so as not to damage the work that will remain in place. Perform patching and repairs occasioned thereby using materials, construction details, and finishes matching those of the existing work as closely as possible and to the approval of Owner's Representative.

1.29 TEMPORARY CONSTRUCTION UTILITIES

A. The Owner will supply connection points for water service free of charge. The Contractor shall provide and pay for the hookup and temporary facilities required to deliver water from their existing location to point of intended use during construction. The supply of all other services and utilities needed during construction will be the responsibility of the Contractor.

B. Contractor to provide separate temporary power for all construction related activities as noted in Division 16 of these specifications and on the drawings. Contractor shall maintain continuous power to the police occupancy. Contractor shall not interrupt power to the police occupancy with out written permission of the police department and scheduled a minimum of 48 hours in advance.

C. Work to be done in accordance with applicable California Administrative Codes.

D. The Contractor shall furnish, wire, install and maintain temporary electric lights wherever it is necessary to provide illumination for the proper performance and observation of the Work.

E. The Contractor shall use backflow preventers on water lines at point of connection to water supply. Backflow preventers shall comply with requirements of the Uniform Plumbing Code.

1.30 TEMPORARY JOB OFFICE

A. In the Contractor's temporary job office, maintain complete set of Contract Documents, all reviewed shop drawings, submittals, samples, and all executed Change Orders.

1.31 PROJECT RECORD DOCUMENTS, "AS BUILT" DRAWINGS

A. Maintain at the job site, a complete record set of up-to-date Contract Documents. The prints shall show actual installation by dimension, elevation or other reference, where changed from the original Contract Bid Documents.

B. The Contractor shall cross-reference all changes approved by the Owner's Representative on the record set of Contract Documents, noting the type and number of the document authorizing the change.

C. Mechanical, Plumbing and Electrical work is shown diagrammatically on the Contract Drawings. The Contractor shall make "as-built" drawings showing the exact measured location of concealed piping, duct work and major electrical conduits.

1.32 CONTRACTOR'S SUBMITTALS

A. Project Schedule: Submit detailed project schedule to Owner's Representative for approval as required in Specification Section 01305, General Conditions and Supplementary Conditions.

B. Schedule of Values (Cost Breakdown): Submit detailed project Schedule of Values to Owner's Representative for approval as required in Specification Section 01010 and in the General Conditions.

C. Submittal Schedule: Submit detailed Submittal Schedule to Owner's Representative for approval per Specification Section 01300.

D. Product Literature: Submit detailed technical literature fully describing every product or item proposed for use including manufacturer's literature and items specified per Section 01300 within 30 days of Notice to Proceed.

E. Samples: Submit samples of materials specified to permit full evaluation of work or items proposed.

F. Shop Drawings: For detailed requirements refer to individual sections.

1.33 CORRESPONDENCE

A. Contractor's correspondence (any written document other than a full-size drawing) directed to Owner's Representative shall be distributed as follows:

1. Original to Owner's Representative

B. Owner's Representative's correspondence (any written document other than a full-size drawing) directed to Contractor shall be distributed as follows:

1. Original to Contractor

2. Copy to Architect

1.34 COST BREAKDOWN

A. Within ten (10) days from the date of commencement shown in the Notice to Proceed, the Contractor shall submit to the Owner's Representative a breakdown of cost of the contract price, itemizing the estimated costs of each class of work, together with his total allowance for profit, insurance and overhead expense. This breakdown, approved by the Owner's Representative, shall become the basis for determining the value of work performed for the purpose of making payments.

B. The Contractor shall include a separate allowance (or line item) identified as "Project Close-out" with a corresponding value attributed to this item.

C. The Contractor shall also include a separate allowance (or line item) identified as "building commissioning" or "systems commissioning" with a corresponding value attributed to this item.

D. The Contractor shall not submit an Application for Payment to the Owner's Representative prior to the Owner's Representative's approval of the Cost Breakdown submittal.

1.35 PAYMENT BY OWNER

A. Summarize quantities and percentages of completion, agreed upon by Contractor and Owner's Representative, on AIA Documents G702 and G703.

1. Contractor will submit billings on the Contractor Application for Payment.

2. Contractor shall include, as an attachment to the Contractor Application for Payment, a Monthly Report duly verified by him or her, showing in his or her own personal knowledge, that the work during the period covered by the report has been performed and that the materials used and installed are in accordance with the approved Drawings and Specifications, setting forth any detailed statements of fact required by the enforcement agency.

3. Five originals (i.e., ink-signed) and complete copies of the Payment Request will be submitted by Contractor to Owner's Representative.

4. Owner's Representative will submit five original (i.e., ink-signed) and complete copies of the Contractor's Application for Payment to Owner.

B. In accordance with Article 9 of the General Conditions of the Contract, the Owner will make payments within thirty (30) days after Owner's receipt of an original valid Application for Payment, an original valid Certificate for Payment, and all required supporting data.

C. Application for Payment

1. Prior to the date for each progress payment review established at the Pre-Construction Conference, Contractor shall submit to the Construction Manager a copy of its proposed request for payment, marked to show the value of the work completed and the payment proposed by Contractor for each line item. The work shall be broken down by site location, and, where appropriate, by labor and material.

2. At a meeting held on or before the last day of each month, the Owner's Representative and Contractor will review Contractor's proposed values and agree on a final amount to be paid for that month. Thereafter, Contractor shall submit a Progress Payment Application, which shall include the following:

(a) Payment Application
(b) Release of Liens
- Conditional for Current Application
- Unconditional for Previous Application

(c) Materials in Storage Report
- Material Certifications Prior to Material Payment

(d) Retention Accounting and Escrow Certificates
(e) Owner's Representative Project Record Documents Review/Certification
- As-Built Documents maintained up to date

(f) Schedule Update

Failure of Contractor to submit any of this information will result in the Payment Application being returned to Contractor. The Payment Application will not be processed until all information is submitted.

3. Lien Waivers: Contractor shall obtain and submit statutory "Conditional Waiver and Release Upon Progress Payment" forms from all subcontractors, material suppliers, and equipment lessors for all work performed for Owner for the current month. Within thirty (30) days of the payment by the Owner, Contractor shall obtain and submit "Unconditional Waiver and Release Upon Progress Payment" forms from the same subcontractors, suppliers, and equipment lessors prior to the release of the next payment.

4. Retention

1. Owner shall retain ten percent (10%) of the amount of each progress estimate, and the accumulated retention, to the extent unencumbered, will be paid to Contractor in no less than thirty-five (35) calendar days after the completion and acceptance of the Project by Owner.

2. Upon Contractor's request, Owner will make payment of funds withheld from progress payments pursuant to the requirements of Public Contract Code section 22300 if Contractor deposits in escrow with Owner, or with a bank acceptable to Owner, securities eligible for the investment of State funds under Government Code section 16430 or bank or savings and loan certificates of deposit.

3. Alternatively, the Contractor may request and the Owner shall make payment of retentions earned directly to the escrow agent at the expense of the Contractor. At the expense of the Contractor, 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 in this section 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 Owner, pursuant to the terms of this section. The Contractor shall pay to each subcontractor, not later than 20 days of receipt of the payment, the respective amount of interest earned, net of costs attributed to retention withheld from each subcontractor, on the amount of retention withheld to insure the performance of the Contractor.

4. Contractor shall obtain written consent of the surety to any such arrangement.

1.36 OWNER BACK-CHARGES

A. The Contractor will be cognizant of costs to the Owner caused by execution of the Work of this contract. The following activities are costs to the Owner:

1. Inspections

2. Owner's Representative

3. Consultants

B. Excessive or repeat scheduling and canceling of activities may result in back-charges to the Contractor. If excessive or repeat scheduling of Owner activities occurs, the Owner's Representative will notify the Contractor in writing, and allow five days notice for the Contractor to "cure." Failure of the Contractor to "cure" excessive or repeat scheduling of activities beyond the five-day notice period may cause the Owner to back-charge the Contractor for costs of these activities. Back-charges will be deducted from amounts owing to the Contractor.

1.37 FINAL CLEAN-UP

A. Clean up the entire construction area and adjacent areas affected by the performance of work under this Contract. Remove all temporary construction, tools, equipment, excess materials and debris.

1.38 PREPARATION FOR ACCEPTANCE (PRIOR TO FINAL INSPECTION)

A. Temporary facilities and utilities shall be properly disconnected, removed and disposed of off-site.

B. All systems, equipment and devices shall be in full and proper adjustment and operation and properly labeled and identified.

C. All materials and finishes shall be neat, clean and unmarred.

D. All broken or damaged work, including glass, curbs, slabs, paving, landscape sprinklers, etc., shall be replaced or properly repaired.

E. Clean-up of the site shall be complete.

F. All guarantees, service manuals, record documents and other submittals as specified in the body of the Specifications, shall be assembled in an orderly manner and delivered to the Owner's Representative.

1.39 SYSTEMS COMMISSIONING (PRIOR TO FINAL ACCEPTANCE)

A. Prior to final inspection, the Contractor will schedule, through the Owner's Representative, training sessions, programs, manuals and documentation as required to educate and familiarize maintenance and operations staff with equipment and system's operations. At minimum, one session per system or major piece of equipment is required. Final inspection will not be scheduled until training sessions for all building systems and major pieces of equipment have been conducted.

1.40 FINAL INSPECTION

A. Upon receipt of written notice from the Contractor that the work is ready for final inspection and acceptance, the Owner's Representative and Contractor shall promptly make a joint inspection of the work and note deficiencies, if any. When noted deficiencies have been removed and the Owner's Representative finds the work to be complete in every respect of the Contract Documents, the Owner's Representative will advise the Owner to file a Notice of Completion.

B. The Notice of Completion shall be prepared and recorded in the County Recorder's Office. The date of final acceptance in the Notice of Completion will start the Guarantee period.

C. The Contractor shall not submit a Payment Request representing the work of the project to be one hundred percent (100%) complete prior to the recordation of the Notice of Completion.

END OF SECTION

SECTION 01035
ALTERNATES

PART 1 - GENERAL

1.01 WORK INCLUDED

This Section specifies administrative and procedural requirements for Alternates.

A. Definition: An Alternate is an amount proposed by Bidders and stated on the Bid Form for certain construction activities defined in the Bidding Requirements that may be added to the Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems or installation methods described in Contract Documents.

B. Coordination: Coordinate related Work and modify or adjust adjacent Work as necessary to ensure that Work affected by each accepted Alternate is complete and fully integrated into the project.

C. Notification: Immediately following the award of the Contract, prepare and distribute to each party involved, notification of the status of each Alternate. Indicate whether Alternates have been accepted, rejected or deferred for consideration at a later date. Include a complete description of negotiated modifications to Alternates.

D. Schedule: A "Schedule of Alternates" is included at the end of this Section. Specification Sections contain requirements for materials and methods necessary to achieve and Work described under each Alternate.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.01 SCHEDULE OF ALTERNATES:

A. Alternate No. 1: Includes tear-off, removal and replacement of the entire built-up roof area above the second floor.

B. Alternate No. 2: Includes fabrication and installation of casework as noted on sheet A-9 including all casework in Reception Area 101, wall-mounted cabinets (but not base cabinets) in Kitchenette 105, all casework in Training 111.

C. Alternate No. 3: Includes furnishing and installation of 1" horizontal blinds at all exterior windows for the entire building; furnishing and installation of lockers in rooms 201, 204, 209 and 210; furnishing and installation of ceiling-mounted pull-down projection screen in Training Room 111.

END OF SECTION

SECTION 01041
PROJECT COORDINATION

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section describes coordination of work under the Contract and coordination of the various parts of the Work, including scheduling and coordination with temporary police department facility in the northern portion of the second floor of the building (approximately Gridlines 1-4).

B. The Contractor shall take the responsibility for coordination of all work called for herein.

1.02 WORK INCLUDED

A. Schedule and coordinate work included in the Contract for the temporary police department facility as indicated on the Drawings.

B. Coordinate scheduling, submittals, and Work of the various Sections of the Specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

C. Coordinate completion and clean-up of work of separate Sections in preparation for Substantial Completion.

D. Coordinate the Work and do not delegate responsibility for coordination to any subcontractor.

E. Anticipate the interrelationship of all subcontractors and their relationship with the Work.

F. Resolve differences or disputes between subcontractors concerning coordination, interference or extent of the Work between sections.

G. Coordinate the Work of subcontractors so that portions of the work are performed in a manner that minimizes interference with the progress of the work.

H. Do not obstruct spaces and installations that are required to be clear by Applicable Code Requirements.

I. Do not cover any piping, wiring, ducts or other installations until they have been inspected and approved and required certificates of inspection issued.

J. Remove and replace all work which does not comply with the Contract Documents. Repair or replace any other work or property damaged by these operations with no adjustment of Contract Sum.

K. Coordinate all portions of the Work requiring careful coordination in order to fit in space available. Before commencing such portions of the Work, prepare supplementary Drawings for review by the Owner's Representative.

END OF SECTION

SECTION 01045
CUTTING AND PATCHING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Contractor shall be responsible for all cutting, fitting and patching required to complete the work and to:

1. Make its several parts fit together properly.
2. Uncover portions of the Work to provide for installation of ill-timed work.
3. Remove and replace work not conforming to requirements of Contract Documents.
4. Provide routine penetrations of nonstructural surfaces for installation of electrical conduit, plumbing and ductwork.

1.02 SUBMITTALS

A. Submit a written request to Owner's Representative well in advance of executing any cutting or alteration which affects:

1. The work of the Owner or any separate contractor.
2. The structural value or integrity of any element of any existing facilities.
3. The integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
4. The efficiency, operational life, maintenance or safety of operational elements.
5. The visual qualities of sight exposed elements.

B. The request shall include:

1. Identification of the project.
2. Description of the affected work.
3. The necessity for cutting alteration.
4. The effect of the Work on the Owner or any separate Contractor and on the structural or weatherproof integrity of the existing building.
5. Description of the proposed work:
   a. The scope of cutting, patching or alteration;
   b. The trades who will execute the work;
   c. Products proposed to be used;
   d. The extent of refinishing to be done.
6. Alternatives to cutting and patching.

7. Cost proposal, when applicable.

8. Written permission of any separate contractor whose work will be affected.

C. Should conditions of the work or the schedule indicate a change of products, submit a request for substitution.

D. Submit a written notice to Owner's Representative designating the date and the time the Work will be uncovered.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Comply with Contract Documents for each specific product involved.

PART 3 – EXECUTION

3.01 INSPECTION

A. Inspect existing conditions of the project, including elements subject to damage or to movement during cutting and patching.

B. After uncovering work, inspect the conditions affecting the installation of products or performance of the work.

C. Report unsatisfactory or questionable conditions to the Owner's Representative in writing; do not proceed with the work until the Owner's Representative has provided further instructions.

3.02 PREPARATION

A. Provide adequate temporary support as necessary to assure the structural value or integrity of the affected portion of the work.

B. Provide devices and methods to protect other portions of the project from damage.

C. Provide protection from the elements for that portion of the project which may be exposed by cutting and patching work.

3.03 PERFORMANCE

A. Execute cutting and demolition by methods which will prevent damage to other work and will provide proper surfaces to receive installation of reports.

B. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.

C. Restore work which has been cut or removed; install new products to provide completed work in accordance with requirements of Contract Documents.

D. Fit work airtight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.

E. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes.

1. For continuous surfaces, refinish to nearest intersection.
2. For an assembly, refinish the entire unit.

END OF SECTION

SECTION 01060
REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Perform all Work in compliance with requirements of:

1. Applicable codes and regulations indicated on Drawings
2. Occupational Safety and Health Act (OSHA)
3. National Fire Protection Association Codes and Standards (NFPA)
4. All other applicable health and safety requirements, codes and regulations.

B. Unless otherwise specified, specific references to codes, regulations, standards, manufacturers' instructions, or requirements of regulatory agencies, when used to specify requirements for materials or design elements, shall mean the latest edition of each in effect at the date of submission of bids, or the date of the Change Order or Field Order, as applicable.

1.02 CONFLICTS

A. If a conflict exists between referenced regulatory requirements and the Contract Documents, Contractor shall notify Owner's Representative and request that the conflict be resolved. The fact that the Contract Documents may establish higher or more costly requirements than the minimum Code or other regulatory requirements referenced above shall not constitute a "conflict".

END OF SECTION

SECTION 01090
INDUSTRY STANDARD ABBREVIATIONS

PART 1 – GENERAL

1.01 ABBREVIATIONS

A. The following abbreviations may be used in the Contract Documents.

AA	Aluminum Association
AABC	Associated Air Balance Council
AAMA	Architectural Aluminum Manufacturers Association
AAN	American Association of Nurserymen, Inc.
AASHTO	American Association of State Highway and Transportation Officials
ABPA	Acoustical and Board Products Association
ACI	American Concrete Institute
ACIL	American Council of Independent Laboratories
ACPA	American Concrete Pipe Association
ADC	Air Diffusion Council
AFBMA	Anti-Friction Bearing Manufacturers Association
AFI	Air Filter Institute
AGA	American Gas Association
AGC	Associated General Contractors of America
AI	The Asphalt Institute
AIA	American Institute of Architects
AIMA	Acoustical Insulating Material Association
AISC	American Institute of Steel Construction, Inc.
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
ALSC	American Lumber Standards Committee
AMCA	Air Moving and Conditioning Association
ANSI	American National Standards Institute
AOAC	Association of Official Analytical Chemists
APA	American Plywood Association
API	American Petroleum Institute
AQMD	Air Quality Management District
ARI	Air-Conditioning and Refrigeration Institute
ASA	American Standards Association
ASC	Adhesive and Sealant Council
ASAHC	American Society of Architectural Hardware Consultants
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
ASME	American Society of Mechanical Engineers Association, Inc.
ASSE	American Society of Sanitary Engineering
ASTM	American Society for Testing and Materials
AWCI	Association of Wall and Ceiling Industries
AWI	Architectural Woodwork Institute
AWPA	American Wood-Preservers' Association
AWPB	American Wood Preservers Bureau
AWPI	American Wood Preservers Institute
AWS	American Welding Society, Inc.
AWWA	American Water Works Association, Inc.
BHMA	Builders Hardware Manufacturers Association
BIA	Brick Institute of America

BOCA	Building Officials and Code Administrators
CAC	California Administrative Code
CARB	California Air Resources Board
CBM	Certified Ballast Manufacturers Association
CCR	California Code of Regulations
CDA	Copper Development Association, Inc.
CE	Corps of Engineers (U. S. Dept. of the Army)
CEC	California Energy Commission
CESO	California Elevator Safety Order
CGA	Compressed Gas Association
CPSC	Consumer Product Safety Commission
CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standards of NBS (U.S. Dept. of Commerce)
CTI	Cooling Tower Institute
DHI	Door & Hardware Institute
DISS	Diameter Index Safety System
EPA	Environmental Protection Agency
ETL	Electrical Testing Laboratories
FFDA	Federal Food and Drug Administration
FGMA	Flat Glass Marketing Association
FIA	Factory Insurance Association
FM	Factory Mutual Engineering Corp.
FS	Federal Specification
GA	Gypsum Association
GFI	Ground Fault Interrupter
HEPA	High Efficiency Particulate Air
HI	Hydronics Institute
HMI	Hoists Manufacturers Institute
HMMA	Hollow Metal Manufacturers Association
HPMA	Hardwood Plywood Manufacturers Association
IBEW	International Brothers of Electrical Workers
IBR	Institute of Boiler and Radiator Manufacturers
ICBO	International Conference of Building Officials
ICEA	Insulated Cable Engineering Association
IEEE	Institute of Electrical and Electronic Engineers
IEC	International Electric Code
IES	Illuminating Engineers Society
IGCC	Insulation Glass Certification Council
ISA	Instrument Society of America
LIA	Lead Industries Association
MIA	Marble Institute of America
MIL	U.S. Government, Military Specification
MLSFA	Metal Lath/Steel Framing Association
MOC	Ministry of Communications General
MSHA	Mine Safety and Health Administration
MSS	Manufacturers Standardization Society of Valve and Fittings
NAAB	National Association of Air Balance
NAAMM	The National Association of Architectural Metal Manufacturers
NACE	National Association of Corrosion Engineers
NBFU	National Board of Fire Underwriters
NBGQA	National Building Granite Quarries Association, Inc.
NBHA	National Builders' Hardware Association
NBS	National Bureau of Standards (U. S. Dept. of Commerce)

NCMA	National Concrete Masonry Association
NCPWB	National Certified Pipe Welding Bureau
NEBB	National Environmental Balancing Bureau
NEC	National Electrical Code by NFPA
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NETA	National Electrical Testing Association
NFPA	National Fire Protection Association
NHLA	National Hardwood Lumber Association
NIOSH	National Institute of Occupational Safety and Health
NPA	National Particleboard Association
NRC	Noise Reduction Coefficient
NRCA	National Roofing Contractors Association
NRMCA	National Ready Mixed Concrete Association
NSF	National Sanitation Foundation
NWMA	National Woodwork Manufacturers Association, Inc.
NWWDA	National Wood Window and Door Association
OSHA	Office of Safety and Health Administration
OSHPD	Office of Statewide Health Planning and Development
PCA	Portland Cement Association
PCB	Polychlorinated Biphenyl
PCI	Prestressed Concrete Institute
PDI	Plumbing and Drainage Institute
PI	Perlite Institute
PS	Product Standard of NBS (U.S. Dept. of Commerce)
RFCI	Resilient Floor Covering Institute
RIS	Redwood Inspection Service (Grading Rules)
SAE	Society of Automotive Engineers
SBC	State Building Code
SDI	Steel Door Institute
SIGMA	Sealed Insulating Glass Manufacturers Association
SJI	Steel Joist Institute
SMACNA	Sheet Metal & Air Conditioning Contractors' National Association, Inc.
SPIB	Southern Pine Inspection Bureau (Grading Rules)
SSPC	Steel Structures Painting Council
STC	Sound Transmission Coefficient
SWI	Sealant and Waterproofers Institute
TCA	Tile Council of America, Inc.
UBC	Uniform Building Code
UFAS	Uniform Federal Accessibility Standards
UHMW	Ultra-High Molecular Weight
UL	Underwriters' Laboratories, Inc.
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
USDA	United States Department of Agriculture
USSG	United States Steel Gauge
WCLIB	West Coast Lumber Inspection Bureau (Grading Rules)
WH	Warnock Hersey
WIC	Woodwork Institute of California
WWPA	Western Wood Products Association (Grading Rules)

END OF SECTION

SECTION 01106
HAZARDOUS MATERIALS

PART 1 - GENERAL

1.01 HAZARDOUS MATERIALS PROCEDURES

A. If polychlorinated biphenyl (PCB), or any other hazardous material which has not been rendered harmless is suspected at the project site, Contractor shall immediately stop work in the affected area and report the condition in writing to the Owner's Representative.

B. If PCB, or any other hazardous material is suspected (or identified), the Contractor shall immediately transfer his work effort to other areas of the site that are not impacted by such hazardous material.

C. If it is determined that PCB, or any other hazardous material is present, the Contractor will not be permitted to work in the affected area until such materials are removed by a properly registered hazardous materials abatement contractor, and the area is determined to be safe by the authority having jurisdiction.

D. Removal of PCB or any other hazardous material will be the responsibility of the Owner **unless** PCB was brought on site by the Contractor or his forces. It will be the responsibility of the Contractor to inspect existing electrical components, and identify if any contain PCB.

E. In the event an electrical component is determined to contain PCB, and is not leaking oil, the Contractor shall remove the existing item from the area, and store it in a neat and orderly manner on the project site. The Contractor shall then inform the Owner's Representative of the presence of PCB on the project site. The Owner's Representative shall arrange for removal and disposal of the item, at Owner's expense.

F. If an existing electrical component is uncovered which contains PCB, and is leaking oil, the Contractor is to immediately vacate the affected area of the project site, and notify the Owner's Representative. The Owner will investigate, and if it is determined that a PCB hazard is present, the Contractor will not be permitted to work in the affected area of the project site until the hazard is removed (by others), and the area is determined to be safe by the authority having jurisdiction.

G. A Change Order will be issued by the Owner's Representative to account for the project delay, and to establish a new construction completion date, if required.

END OF SECTION

SECTION 01200
INSPECTION OF WORK

PART 1 - GENERAL

A. ACCESS TO THE WORK

1. In addition to requirements stated elsewhere in the Contract Documents, Owner, Owner's Representative and their representatives shall at all times have access to the Work wherever it is in preparation or progress and Contractor shall provide safe and proper facilities for such access and for inspection. The inspection and written acceptance of material and workmanship, unless otherwise stated in these Specifications, shall be final except as provided in the Contract Documents.

B. TESTING AND APPROVAL

1. In addition to the requirements stated in the Contract Documents, if any law, ordinance or public authority or the Specifications or Owner's Representative's instructions require any work to be specially tested or approved (including use of ionizing radiation for radiography), Contractor shall give Owner's Representative timely notice of its readiness for inspection, and the date fixed for such inspection.

2. Re-examination of questioned work may be ordered by Owner's Representative.

C. OWNER'S REPRESENTATIVE

1. Owner shall supply personnel who shall observe construction in progress. Owner's Representative shall have the following responsibilities and limitations on authority:

   a. Observe installations and work in progress as a basis for determining general conformance of the Work, materials and equipment with the Contract Documents. Owner's Representative will report any discrepancies observed to the Contractor. Only Owner's Representative has the authority to make approvals or rejections.

   b. Only Owner's Representative shall interpret the requirements of the Contract Documents. If any item is ambiguous, Owner's Representative shall make a written interpretation. If Contractor requests changes or modifications to the Contract Documents, Owner's Representative shall make a written determination on the requested changes or modifications.

   c. Prepare an inspection report for each inspection performed.

   d. Review the monthly progress payment request.

   e. Review the test and inspection results of testing laboratories.

   f. The Contractor is not authorized to deviate from the requirements of the Contract Documents unless such deviation has been approved by Owner's Representative in writing.

   g. The Owner's Representative is not authorized to advise on or issue directions to Contractor about any aspect of construction means, methods, techniques, sequences or procedures, or relating to safety programs in connection with the Project.

2. The failure of Owner, Owner's Representative and their representatives and consultants, to observe or inspect the Work, or to detect deficiencies in the Work, or to inform Contractor of any deficiencies which may be discovered, shall not relieve Contractor, its subcontractors regardless of tier, or suppliers from their responsibility for construction means, methods, techniques, sequences and procedures, construction safety, nor from their responsibilities to carry out the Work in accordance with the Contract Documents and to detect and correct defective Work. The term "defective work" means work that is unsatisfactory, faulty, omitted, incomplete, deficient, or does not conform to the requirements of the Contract Documents, directives of Owner's Representative, or the requirements of any inspection, reference standard, test, or approval specified in the Contract Documents, or has been damaged prior to final completion, unless responsibility for the protection of such work has been assumed by Owner through beneficial occupancy (or substantial completion, where applicable) in accordance with the Contract Documents.

A. INSPECTION REQUESTS

1. Contractor shall advise Owner's Representative, at least seventy-two (72) hours in advance of the inspection to be performed.

2. Repeat inspection or inspections requested and subsequently canceled, may be subject to backcharges in accordance with Section 01010.

END OF SECTION

SECTION 01300
SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

A. Shop Drawings, Product Data, and Samples, other than in connection with proposed substitutions, shall be submitted to Owner's Representative only when specifically required; and Owner's Representative will not review any other such submittals. Product Data and Samples for proposed substitutions shall be submitted to Owner's Representative in accordance with Specification Section 01035. Contractor shall be responsible for obtaining such copies of Shop Drawings, Product Data, and Samples as it may require for its own use.

1.02 RELATED REQUIREMENTS

A. Definitions:

1. The terms "Shop Drawings" and "Product Data" as used herein also include, but are not limited to, fabrication, erection, layout and setting drawings, manufacturers' standard drawings, descriptive literature, catalogues, brochures, performance and test data, wiring and control diagrams, all other drawings and descriptive data pertaining to materials, equipment, piping, duct and conduit systems, and methods of construction as may be required to show that the materials, equipment, or systems and the positions thereof conform to the Contract Documents.

2. As used herein, the term "manufactured" applies to standard units usually mass-produced. The term "fabricated" means items specifically assembled or made out of selected materials to meet individual design requirements. Shop Drawings shall establish the actual detail of all manufactured or fabricated items, indicate correct relation to adjoining Work, and amplify design details of mechanical and electrical equipment in accurate relation to physical spaces in the structure.

B. Manufacturers' Instructions: Where any item of Work is required by the Contract Documents to be furnished, installed, or performed in accordance with a specified product manufacturer's instructions, Contractor shall procure and distribute the necessary copies of such instructions to Owner's Representative and all other concerned parties; and Contractor shall furnish, install, or perform the Work in strict accordance therewith.

C. Submittal Schedule:

1. Contractor shall provide a Submittal Schedule to the Owner's Representative for approval no later than ten (10) days after the date of commencement specified in the Notice To Proceed.

2. The schedule for submission of Shop Drawings, Product Data, and Samples by Contractor (the "Submittal Schedule"), shall be agreed upon by both parties in order that the items covered by these submittals will be available when needed by the construction process and so that each party can plan its workload in an orderly manner.

3. Contractor shall prepare the Submittal Schedule and coordinate it with the Contract Schedule. No submittals will be processed before the Submittal Schedule has been submitted

to and accepted by Owner's Representative, except in such cases where the processing of submittals is required before the acceptance of the Submittal Schedule.

4. In preparing the Submittal Schedule, Contractor shall first determine from the Contract Schedule the date the particular item is needed for the Work. Working backwards, Contractor shall add the required number of days for shipment, time for fabrication, and similar items to determine the date of the first submittal. Contractor shall allow a minimum of (15) fifteen working days for Owner's Representative to review each submittal. Contractor shall allow additional days for potential review of re-submittals.

5. The Submittal Schedule shall be adjusted to meet the needs of the construction process and Contract Schedule. Submit two (2) copies (minimum) of the Submittal Schedule after it is completed and each time it is updated by Contractor.

1.03 SHOP DRAWINGS

A. Present information required on Shop Drawings in a clear and thorough manner. Identify details by reference to drawing and detail, schedule, or room numbers shown and specified. Identify any deviation from the Contract Documents clearly.

1.04 PRODUCT DATA

A. Preparation:

1. Clearly mark each copy to identify pertinent products or models.
2. Show performance characteristics and capacities.
3. Show dimensions and clearances required.
4. Show wiring or piping diagrams and controls.

B. Manufacturers' standard schematic drawings and diagrams:

1. Modify the Drawings and other diagrams to delete information which is not applicable to the Work.

2. Supplement standard information to provide information specifically applicable to the Work.

1.05 SAMPLES

A. Office Samples shall be of sufficient size and quality to clearly illustrate the following:

1. Functional characteristics of the products, with integrally related parts and attachment devices.

2. Full ranges of color, texture, and pattern.

B. Field Samples and Mock-Ups:

1. Erect at the Project site, at a location as directed by Owner's Representative.

2. Size: As specified or directed by Owner's Representative.

3. Fabricate each Sample and mock-up to be complete and fully finished.

4. Remove mock-ups at conclusion of Work (unless Owner's Representative specifically approves incorporation of mock-up into the work of the project).

1.06 CONTRACTOR'S REVIEW OF SUBMITTALS

A. Review, mark up as appropriate, and stamp Shop Drawings, Product Data, and Samples prior to submission. Submittals shall clearly show that they have been reviewed by Contractor for conformance with the requirements of the Contract Documents and for coordination of the Work.

B. Determine and Verify:

1. Field measurements.
2. Field construction criteria.
3. Catalog numbers and similar data.
4. Conformance with Contract Documents.

C. Coordinate each submittal with requirements of the Work and of the Contract Documents.

D. Notify Owner's Representative in writing, at time of submission, of any changes in the submittals from requirements of the Contract Documents.

E. Begin no fabrication or Work which requires submittals until the return of Owner's Representative's final reviewed submittals.

F. No submittal shall be forwarded to the Owner's Representative unless it meets the above requirements and is complete. Submittals which do not comply will not be reviewed until they are revised and resubmitted.

G. Incomplete submittals will not be reviewed. Submittals shall include all items required by each Specification Section. Partial submittals or split packages will not be reviewed.

1.07 SUBMISSION REQUIREMENTS

A. Make submittals promptly in accordance with the Submittal Schedule and in such sequence as to cause no delay in the Work or in the work of any separate contractor.

B. Number of Submittals required:

1. Shop Drawings: Submit one (1) reproducible transparency and five (5) opaque reproductions. After review, Owner's Representative will return the reproducible copy to Contractor. Contractor shall make prints as it requires for its use and for Subcontractors' use.

2. Product Data and Non-Reproducible Submittals: Submit the number of copies which Contractor will need, plus four (4) copies (minimum) which will be retained by Owner's Representative.

3. Samples: Submit the number specified in the Section which requires them.

C. Submittals shall contain:

1. Date of submission and dates of any previous submissions.
2. Project name and number.
3. Contract identification.

4. The names of:
   a. Contractor
   b. Subcontractor
   c. Supplier
   d. Manufacturer
5. Identification of the product, with the Specification Section number.
6. Field dimensions, clearly identified as such.
7. Relation to adjacent or critical features of the Work or materials.
8. Reference standards, such as ASTM or Federal Specification numbers.
9. Identification of changes from requirements of the Contract Documents.
10. Identification of revisions on resubmittals.
11. An 8-inch x 3-inch blank space for review stamps.
12. Contractor's stamp, initialed or signed, certifying to the review of submittal; verification of materials and field measurements and conditions; and compliance of the information within the submittal with requirements of the Work and of the Contract Documents.

D. Re-submission Requirements:

1. Shop Drawings and Product Data:
   a. Revise Shop Drawings or Product Data, and resubmit as specified for the initial submittal.
   b. Identify any changes which have been made in addition to those requested.
   c. Note any departures from the Contract Documents or changes in previously reviewed submittals which were not commented upon by Owner's Representative.
2. Samples: Submit new samples as required for initial submittal.

E. Distribution:

1. Owner's Representative will distribute reviewed Shop Drawings, Product Data and Samples, (all of which carry Owner's Representative's review stamp) to the following:
   a. Contractor - Two (2) copies minimum
   b. Owner's Representative - Two (2) copies minimum

2. Owner's Representative's Review: Owner's Representative will review Contractor's submittals, such as Shop Drawings, Product Data, and Samples, for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of Contractor as required by the Contract Documents.

END OF SECTION

SECTION 01305
CONTRACT SCHEDULES

PART 1 – GENERAL

1.01 PRELIMINARY CONTRACT SCHEDULE

A. Submission:

1. Submit the Preliminary Contract Schedule to Owner's Representative at the Pre-Construction Conference.
2. Within seven (7) days after receipt of the Preliminary Contract Schedule, Owner's Representative will notify Contractor of its acceptance of, or its review comments about, the schedule so that appropriate adjustments may be made by Contractor in the development of the Contract Schedule.

B. Form:

1. Prepare the Preliminary Contract Schedule as a bar chart showing continuous flow from left to right. Specific calendar dates shall be clearly and legibly shown for the start and finish of each Work Activity.
2. Prepare the Preliminary Contract Schedule in sufficient detail to demonstrate preliminary planning for the Work and to represent a practical plan to complete the Work within the Contract Time and within the dates shown on the Notice To Proceed.
3. Identify the milestone for all major activities on the Preliminary Contract Schedule.
4. Identify all holidays and non-working days on the Preliminary Contract Schedule.
5. Activities: Identify all work activities which constitute the critical path.

1.02 CONTRACT SCHEDULE

A. Submission:

1. Submit the Contract Schedule, in a form and having general content acceptable to Owner's Representative within ten (10) days following date of Commencement as shown on the Notice to Proceed and prior to submitting the first Application For Payment.
2. Owner's Representative will determine acceptability of the Contract Schedule within seven (7) days after its receipt.
3. No Application For Payment will be processed nor shall any progress payment become due until the Contract Schedule is accepted by Owner's Representative.

B. Form:

1. The Contract Schedule shall be a CPM (Critical Path Method) Format. Specific calendar dates shall be clearly and legibly shown for the start and finish of each Work Activity.
2. The Contract Schedule shall be suitable for monitoring progress of the Work, in sufficient detail to demonstrate adequate planning for the Work, and represent a practical plan to complete the Work within the Contract Time.
3. Identify the milestone events for all construction activities on the Contract Schedule:
4. Identify all holidays and non-working days on the Contract Schedule.
5. If the Contract Schedule is shown on more than one (1) sheet, provide a summary sheet.

C. Activities:

1. Identify all Work activities in correct sequence for the completion of the Work. Work activities shall include the following:

    a. Major Contractor-furnished equipment, materials and building elements, and scheduled activities requiring submittals or Owner's prior approval.
        i. Show dates for the submission, review, and approval of each submittal. Dates shall be shown for the procurement, fabrication, delivery, and installation of major equipment, materials, and building elements, and for scheduled activities designated by Owner.
        ii. A minimum of (10) ten working days shall be allotted for Owner's Representative to review each submittal.
    b. System test dates
    c. Scheduled overtime Work if required by Contract Documents
    d. Dates Contractor requests designated working spaces, storage areas, access, and other facilities to be provided by Owner
    e. Dates Contractor requests orders and decisions from Owner on designated items
    f. Dates Contractor requests Owner-furnished equipment
    g. Dates Contractor requests Owner-furnished utilities
    h. Connection and relocation of existing utilities
    i. Connecting to or penetrating existing structures
    j. Scheduled inspections as required by Codes, or as otherwise specified

2. Identify all Work activities that constitute the critical path
3. Critical Work activities are defined as Work activities which, if delayed or extended, will delay the scheduled completion of one or more of the milestones specified in this Section or the scheduled completion of the Work, or both. All other Work activities are defined as non-critical Work activities and are considered to have float.
4. Float is defined as the amount of time between the early start date and the last start date, or the early finish date and the last finish date, of any activity or group of activities in the CPM schedule. Float shall not be considered as time for the exclusive use of or benefit of either the Owner or the Contractor. Float shall be considered as a resource available to both parties, and it shall not be used to the financial detriment of either party.
5. Delays of any non-critical Work shall not be the basis for an extension of Contract Time until the delays consume the float associated with that non-critical Work activity and cause the Work activity to become critical.
6. The presentation of each Work activity on the Contract Schedule shall include a brief description of the Work activity, the duration of the Work activity in days, and a responsibility code identifying the organization or trades performing the Work activity.
7. Contractor shall furnish cost estimates for each Work activity which cumulatively equal the total contract cost. Mobilization costs may be shown separately; however, other costs, i.e., profit and bond shall be pro-rated throughout all activities.

D. Updating:

1. Review the Contract Schedule with Owner's Representative once each week to incorporate in the Contract Schedule all changes in the progress, sequences, and scope of Work activities.
2. Prepare and submit to Owner's Representative an updated Contract Schedule once each month.
    a. The updated Contract Schedule shall accurately represent the as-built condition of all completed and in-progress Work activities as of the date of the updated Contract Schedule.

b. The updated Contract Schedule shall incorporate all changes mutually agreed upon by Contractor and Owner's Representative during preceding periodic reviews and all changes resulting from Change Orders and Field Orders.
c. Contractor shall perform the Work in accordance with the updated Contract Schedule. Contractor may change the Contract Schedule to modify the order or method of accomplishing the Work only with prior agreement by Owner's Representative.

3. Contractor shall submit the updated Contract Schedule, in the form acceptable to Owner's Representative, at least seven (7) days prior to submitting the Application For Payment.
4. Owner's Representative will determine acceptability of the updated Contract Schedule within seven (7) days after its receipt.
5. No Applications For Payment will be processed nor shall any progress payments become due until updated Contract Schedules are accepted by Owner's Representative.
6. The accepted, updated Contract Schedule shall be the Contract Schedule of record for the period it is current and shall be the basis for payment during that period.

END OF SECTION

SECTION 01320
CHANGE ORDER PROCEDURES

PART 1 – GENERAL

1.01 CHANGE REQUESTS

A. When construction changes are proposed, they will be originated with a Change Request Bulletin issued by the Owner's Representative to the Contractor.

B. Change Request Bulletins will be numerically sequential and may include multiple items.

C. The Contractor shall prepare a Cost Proposal with backup in response to the Change Request Bulletins as rapidly and accurately as possible.

1.02 CONTRACTOR'S COST PROPOSAL

A. Following receipt of a Change Request Bulletin, the Contractor shall prepare an estimate of cost and time for execution of the proposed change which, if accepted, will become the backup for a Change Order.

B. The Cost Proposal shall identify each item of work affected by the proposed change, value of the change, and a summary of overhead, profit, total cost and any time extensions required.

C. Cost Proposals shall show, as applicable, General Contractor's, Subcontractor's, and Sub-Sub-contractor's work. Cost Proposals shall also show detailed breakdown of material (quantities), labor (hours and rates), equipment rentals, and all other direct costs, plus applicable percentages for overhead and profit as provided herein.

D. General Contractor shall be given a Change Directive to authorize work on a change, and the Contract shall be amended on a monthly basis.

1. Work by Contractor: The following percentage shall be added to the contractor's costs and shall constitute the markup for all indirect costs, overhead and profits:
   - 25% For direct costs up to $2,000.00
   - 20% For direct costs greater than $2,000.00 but less than $5,000.00
   - 15% for all costs over $5,000.00

   To the sum of the costs and markups provided for this subsection, actual costs shall be added as compensation for bonding.
2. Work by Subcontractor: When all or any part of the extra work is performed by a Subcontractor, the markup established above shall be added to the Subcontractor's actual cost of such work, to which a markup of 10 percent on costs up to $2,000 of the subcontracted portion of the extra work and a markup of 5 percent on work greater than $2,000 of the subcontracted portion of the extra work may be added by the Contractor.
3. Additional costs for Superintendent or other Field Office Personnel shall not be reimbursable unless it can be shown that the Contractor's Field Office Staff's time on the project site is actually extended due to the change beyond the hours normally worked.

E. Contractor shall provide quotations for Supplements on Cost Proposal Form as provided by the Owner's Representative. No other form of quotation will be accepted by the Owner's Representative. The Contractor may, however, attach additional documentation to the Cost Proposal Form.

1.03 FIELD CLARIFICATIONS AND CONSTRUCTION CHANGE DIRECTIVE

A. From time to time it may become necessary to issue Field Clarifications to the Contractor for minor changes not affecting Contract Sum or Contract Time.

B. Where the change affects the Contract Sum or the Contract Time, and to minimize delays, a Construction Change Directive may be issued in accordance with Article 7 of the General and Supplemental Conditions.

1.04 CHANGE ORDERS

A. Change Orders will be numerically sequential and may include multiple change items.

B. Change Orders will reference (at a minimum):

1. Owner's Representative's Change Request Numbers and Dates;
2. Contractor's Cost Proposal Numbers and Dates;
3. Other applicable written documentation (i.e., meeting notes, Requests For Information, etc.).

C. All Change Orders will be appended with Contractor's Backup, Cost Proposals, or any other written documents referenced in the Change Order.

D. Change Orders will adjust Contract Sum and Contract Time as applicable.

E. Following receipt and acceptance of Contractor's Backup, Change Orders will be prepared and issued by the Owner's Representative. The Owner's Representative will transmit the Change Order (with backup) to the Contractor for signature. The Contractor will then transmit the Change Order (with backup) back to the Owner's Representative for final execution.

F. The Owner's Representative, the Contractor, and the Owner shall sign each original part of the Change Order in ink.

G. Upon execution by the Owner's Representative, Contractor and Owner, the Change Order will become part of the Contract Documents.

H. The Contractor will not bill for a Change Order on the Request For Payment prior to its execution by the Owner. The Owner's Representative will not approve the portion of any Request For Payment which bills for a Change Order not yet executed by the Owner.

1.05 PROJECT SCHEDULE

A. Contractor shall adjust his construction schedule to reflect fully executed Change Orders (if any), in accordance with Specification Section 01305.

END OF SECTION

SECTION 01330
PROJECT MEETINGS

PART 1 – GENERAL

1.01 PROCEDURE MEETING

A. After execution of the construction contract, and typically prior to commencement of the Work, a Pre-Construction Conference (kick-off meeting) will be conducted by Owner to discuss procedures which are to be followed during performance of the Work. The Contractor and Owner's Representative shall be prepared to review job schedules, discuss various aspects of the Work, and administrative procedures for smooth job progress.

1. Location: As designated by Owner's Representative
2. Attending shall be:
   a. Owner's Representative
   b. Owner
   c. Owner's Consultants and Owner's Consultant's Consultants, as appropriate
   d. Contractor
   e. Contractor's Superintendent
   f. Subcontractors, as appropriate
   g. Others, as appropriate

1.02 BILLING MEETING

A. A billing meeting shall be conducted by Owner's Representative each month prior to submittal of the Request for Payment.

1. Location: As designated by Owner's Representative
2. Attending shall be:
   a. Owner's Representative
   b. Owner
   c. Contractor
   d. Contractor's Superintendent
   e. Subcontractors, as appropriate
   f. Others, as appropriate

1.03 PROGRESS MEETING

A. During the course of construction, progress meetings will be held once every week to review progress of the work and resolve construction problems. The minutes of these meetings will be prepared by the Owner's Representative and issued as expeditiously as possible to:

1. Owner: Two (2) copies
2. Contractor: One (1) copy
3. Architect: One (1) copy
4. Location: As designated by Owner's Representative

B. Attending shall be:

1. Owner's Representative
2. Owner, as appropriate

3. Owner's Consultants and Owner's Consultant's Consultants, per the Prime Contract, as appropriate
4. Contractor
5. Contractor's Superintendent
6. Subcontractors, as appropriate
7. Others, as appropriate

1.04 GUARANTEES, BONDS, AND SERVICE AND MAINTENANCE CONTRACTS REVIEW MEETING

A. Eleven (11) months following the date of Beneficial Occupancy, Substantial Completion, if applicable, or Final Completion, a meeting shall be conducted by Owner for the purpose of reviewing the guarantees, bonds, and service and maintenance contracts for materials and equipment.

1. Attending shall be:
   a. Owner's representative
   b. Owner, as appropriate
   c. Owner's Consultants, as appropriate (Extra Service)
   d. Contractor
   e. Subcontractors, as appropriate
   f. Others, as appropriate

END OF SECTION

SECTION 01400
QUALITY CONTROL

PART 1 – GENERAL

1.01 GENERAL

A. Inspections and approvals of portions of the Work required by the Contract Documents or by Applicable Code Requirements shall be made at the times needed in order not to hinder the progress of the Work. Except as otherwise provided, Contractor shall make arrangements for such inspections and approvals. Contractor shall give Owner's Representative timely notice of when and where inspections are to be made.

B. If such procedures for inspection or approval reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, Contractor shall bear all costs made necessary by such failure, including those of repeated procedures and compensation for Owner's Representative's services and expenses.

C. If Owner's Representative is to observe inspections, or make approvals required by the Contract Documents, Owner's Representative will do so, where practicable, upon notification in accordance with Section 01010 and 01200.

D. Do not incorporate into the Work materials represented by samples without the written approval of Owner's Representative.

1.02 INSPECTIONS

A. Certain portions of the Work will be inspected at various stages. Nothing in any prior acceptance shall govern, if at any subsequent time the Work, or portion thereof, is found not to conform to the requirements of the Contract Documents.

B. Owner's Representative shall make periodic on-site observations of construction as it progresses and upon completion, and shall make off-site reviews of fabricated materials and equipment when such off-site reviews are specified in the Contract Documents.

C. Owner's Representative shall observe inspections done by the Contractor as required in the Contract Documents and coordinate and observe special inspection when requested by the Owner.

D. Contractor shall personally supervise all Work and inspect all materials as they arrive for compliance with the Contract Documents, and shall reject defective work and material without waiting for such rejection from others in authority. Opportunity for observation and inspection by the Owner's Representative and Inspector(s) shall be afforded throughout the construction.

E. Contractor shall include, as an attachment to the Contractor Application for Payment, a Monthly Report duly verified by him or her, showing in his or her own personal knowledge, that the work during the period covered by the report has been performed and that the materials used and installed are in accordance with the approved Drawings and Specifications, setting forth any detailed statements of fact required by the enforcement agency.

1.03 ADDITIONAL INSPECTION

A. If initial inspections reveal that any portion of the Work does not comply with Contract Documents, or if Owner's Representative determines that any portion of the Work requires additional inspection, additional inspections shall be made as directed.

B. If such additional inspections establish that such portion of the Work complies with the Contract Documents, all costs of such additional tests or inspections shall be paid by Owner.

C. If such additional inspections establish that such portion of the Work fails to comply with the Contract Documents, all costs of such additional inspections, and all other costs resulting from such failure, including compensation for Owner's Representative and Owner's consultants, shall be deducted from the Contract Sum.

1.04 UNCOVERING OF WORK

A. If a portion of the Work is covered contrary to Owner's Representative's request or direction, or contrary to the requirements of the Contract Documents, it must, if required in writing by Owner's Representative, be uncovered for Owner's Representative's observation and be replaced at Contractor's expense without adjustment of the Contract Time or the Contract Sum.

B. If a portion of the Work has been covered, which is not required by the Contract Documents to be observed or inspected prior to its being covered and which Owner's Representative has not specifically requested to observe prior to its being covered, Owner's Representative may request to see such Work and it shall be uncovered and replaced by Contractor. If such Work is in accordance with the Contract Documents, the costs of uncovering and replacing the Work shall be added to the Contract Sum by Change Order; and if the uncovering and replacing of the Work extends the Contract Time, an appropriate adjustment of the Contract Time shall be made by Change Order. If such Work is not in accordance with the Contract Documents, Contractor shall pay such costs and shall not be entitled to an adjustment of the Contract Time or the Contract Sum.

END OF SECTION

SECTION 01510
CONTRACTOR'S USE OF THE PROJECT SITE

PART 1 – GENERAL

1.01 USE OF PUBLIC THOROUGHFARES

A. Contractor shall make its own investigation of the condition of available public thoroughfares and roads, and of the clearances, restrictions, bridge load limits, and other limitations affecting transportation and ingress and egress at the Project site.

B. Where materials are transported in the prosecution of the Work, do not load vehicles beyond the capacity recommended by manufacturer of the vehicles or prescribed by any applicable state or local law or regulation.

C. Use only established roads; provided, however, that such temporary haul roads as may be required in the work shall be constructed and maintained by Contractor, subject to the approval of Owner's Representative.

D. Provide protection against damage whenever it is necessary to cross existing sidewalks, curbs, and gutters in entering the site. Repair and make good at the expense of Contractor all damages thereto, including damage to existing utilities and paving, arising from the operations under the Contract.

E. Truck staging is not allowed on any residential street surrounding the site unless approved by Owner's Representative.

1.02 RUBBER-TIRED EQUIPMENT

A. Where carts, hand trucks, wheelbarrows, and similar wheeled conveyances are used on or in any portions of any structure, equip with pneumatic tires.

1.03 SERVICE CONTINUITY

A. Within the areas of the Work, investigate and uncover all drainage lines, sewers, electrical ducts, and other piping in use or forming continuations of utility systems and maintain such services in operation during performance of the Work of the Contract.

1.04 STORAGE

A. Contractor's use of the Project site for the Work and storage is restricted to the areas designated on the Drawings or as approved by Owner's Representative. Use of mechanical and electrical rooms for storage of materials or furniture is prohibited.

1.05 TEMPORARY STAIRS, SCAFFOLD AND RUNWAYS

A. Provide all scaffolds, stairs, hoist plant, runways, platforms, and similar temporary construction as may be necessary for the performance of the Contract. Such facilities shall be of the type and arrangement as required for their specific use, substantially constructed throughout and strongly supported, well secured and complying with all applicable rules and regulations of the Industrial Accident Commission of the State of California and all applicable laws and ordinances.

B. Arrange for construction equipment access to areas which may be partly blocked by existing obstructions.

1.06 TEMPORARY HOISTS

A. Provide temporary hoist as required by job conditions for the installation of materials and equipment. Install and operate in accordance with all safety regulations of authorities having jurisdiction.

1.07 TEMPORARY SHORING AND BRACING

A. Provide temporary shoring and bracing as required for execution of the Work. All shoring and bracing shall comply with safety regulations of authorities having jurisdiction.

1.08 TEMPORARY BARRICADES

A. Provide temporary barricades as necessary. Maintain barricades in a clean and neat condition until no longer required and removal is approved or requested.

1.09 REMOVAL AND RECONDITIONING

A. Temporary facilities, barricades, utilities and other construction of temporary nature shall be removed from the Project site as soon as the progress of the work will permit in the opinion of the Owner's Representative; and the portions of the Project site and building occupied by same shall be reconditioned and restored to original condition. For temporary utilities, refer to Section 01010.

B. Legally dispose of all debris resulting from removal and reconditioning operations.

1.10 CONTROL OF CONSTRUCTION WATER

A. Provide impermeable floor coverings and suitable dams to prevent damage by water used for the Work. Immediately clean up and remove all surplus water and water spilled in non-working areas. Do not allow water to overflow gutters or flood streets.

1.11 DUST CONTROL, AIR POLLUTION AND ODOR CONTROL

A. Existing police facility shall remain in operation during construction of the project.

B. The Contractor shall employ measures to prevent the creation of dust, air pollution and odors.

1. Unpaved areas where vehicles are operated shall be periodically wetted down or given an equivalent form of treatment to eliminate dust formation.
2. All volatile liquids including fuels or solvents shall be stored in closed containers.
   a. No open burning of debris, lumber or other scrap will be permitted.
   b. Equipment shall be maintained in a manner to reduce gaseous emissions.
   c. Low sulfur fuel shall be used for construction equipment.
   d. Stockpiles of excavated materials shall be covered with material approved by Owner's Representative.
   e. Contractor shall provide street sweeping whenever silt from construction site is carried over to adjacent public thoroughfares.

1.12 NOISE CONTROL

A. Existing police facility shall remain in operation during construction of the project. The following noise control procedures shall be employed:

1. Maximum Noise: The Contractor shall use equipment and methods during the course of this work that are least disruptive to police facility, adjacent offices or residences. Noise levels for trenchers, graders, trucks and other equipment shall not exceed 90 dBA at 50 feet as measured under the noisiest operating conditions. For all other equipment, noise levels shall not exceed 85 dBA at 50 feet.

2. Equipment: Jack hammers shall be equipped with exhaust mufflers and steel muffling sleeves. All diesel equipment shall have exhaust muffled. Air compressors shall be of a quiet type such as a "whisperized" compressor.

3. Operations: Machines shall not be left idling. Electric power shall be used in lieu of internal combustion engine power wherever possible. Equipment shall be maintained to reduce noise from vibration, faulty mufflers, or other sources.

4. Scheduling: Noisy operations shall be scheduled so as to minimize their disturbance to occupied adjacent areas and duration at any given location.

1.13 TRAFFIC CONTROL

A. Provide traffic control barriers and flagmen as necessary throughout the construction period.

B. Provide flagmen at pedestrian crossings of construction equipment right-of-ways one hundred percent of the time such equipment is operating. When equipment is not operating, such equipment right-of-ways shall be closed to equipment by means of a chain link gate.

C. Provide temporary traffic control barriers to ensure safety of all persons and property.

D. Provide number of flagmen necessary for vehicular and pedestrian traffic control. Flagmen shall be on duty at all times when the Work is in progress.

END OF SECTION

SECTION 01640
PRODUCT OPTIONS AND SUBSTITUTIONS

PART 1 – GENERAL

1.01 SUBSTITUTION OF MATERIALS AND EQUIPMENT

A. Catalog numbers and specific brands of trade names followed by the designation "or equal" or "or approved equal" are used in conjunction with the material and equipment required by the Specification to establish the standards of quality, utility and appearance required. Substitutions which are equal in quality, utility and appearance to those specified may be accepted subject to the following provisions:

1. All substitutions must be approved by the Owner's Representative in writing.

2. Contractor shall submit to the Owner's Representative, within 35 calendar days after the date of commencement specified in the Notice to Proceed, a typewritten list containing a description of each proposed substitute item or material.

3. Contractor shall provide supporting data required by Paragraph C.

4. The Owner's Representative will accept, in writing, such proposed substitutions as are, in the Owner's Representative's opinion, equal in quality, utility and appearance to the items or materials specified.

5. Such approval shall not relieve the Contractor from complying with the requirements of the drawings and specifications.

6. Contractor shall be responsible at the Contractor's own expense for any changes resulting from the Contractor's proposed substitution which affect other parts of the Contractor's own work or the work of others.

7. The decision of the Owner's Representative shall be final.

B. If a request for substitution occurs after the thirty-five (35) calendar day period, the substitution may be reviewed at the discretion of the Owner's Representative; and the costs of such review, shall be borne by Contractor and will be deducted from the Contract Sum.

C. Requests for substitutions will only be considered if Contractor submits the following supporting data:

1. Complete technical data including drawings, performance specifications, samples and test reports of the article proposed for substitution; and any additional information required by the Owner's Representative including but not limited to a line-by-line comparison of the proposed substitute to the specified product.

2. Data described in Subparagraph C-1 for the specified item for which substitution is proposed.

3. Statement by Contractor that the proposed substitution is in full compliance with the requirements of the Contract Documents and Applicable Code Requirements.

4. List of Subcontractors, if any, that may be affected by the substitution.

5. If the proposed substitution requires that portions of the work be redesigned or removed in order to accommodate the substituted item, submit design and engineering calculations prepared by a properly licensed design professional.

D. The Owner's Representative may reject any substitutions not proposed in the manner and within the time prescribed above.

E. Wherever catalog numbers and specific brands or trade names not followed by the designation "or equal" are used in conjunction with material or equipment required by the Specifications, **no substitutions will be considered**.

F. The 35-day submittal period does not excuse the Contractor from completing the project within the performance time stipulated in the agreement or excuse the Contractor from the payment of liquidated damages if final completion is delayed.

G. Wherever more than one (1) manufacturer's product is specified, the first-named product is the basis for the design used in the work and the use of alternative-named manufacturer's products or substitutes may require modification in the project design and construction. If such alternatives are proposed by Contractor and are favorably reviewed by the Owner's Representative, Contractor shall assume costs required to make necessary revisions and modifications including additional costs to the Owner for evaluations of modification of the project design submitted by Contractor to the Owner's Representative.

H. When materials and equipment are specified by first manufacturer's name and product number, second manufacturer's name, or equal, the second manufacturer's product, or product considered by the Contractor to be equal shall be submitted in accordance with the requirements for substitute items.

I. If the Owner's Representative, in review of the list of materials and equipment, requires revisions or corrections to be made or shop drawings and/or supplemental data to be submitted, Contractor shall promptly do so. If any proposed substitute is judged by the Owner's Representative to be unacceptable, the specified item shall be provided; further submissions will not be allowed, unless directed by the Owner's Representative.

J. Samples may be required. Tests required by the Owner's Representative for the determination of the quality and utility shall be made by Contractor's Testing Laboratory, and at the expense of Contractor they shall be made by a testing laboratory, with acceptance of the test procedure first given by the Owner's Representative.

K. In review of the data submitted in support of substitutes, the Owner's Representative will use for purposes of comparison all the characteristics of the specified item as they appear in the manufacturer's published data even though all the characteristics of the specified item may not have been particularly mentioned in the specification. If more than two submissions of data are required, the cost of reviewing these additional submissions shall be charged directly against Contractor; and the Owner will withhold the funds necessary to cover these costs.

END OF SECTION

SECTION 01700
PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.01 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Store Project record documents and Samples in Contractor's field office separate from documents used for construction.

B. Maintain record documents in order and in a clean, dry, legible condition.

C. Do not use record documents for construction.

1.02 RECORD DOCUMENTS

A. Owner will, at no cost, provide Contractor with a set of original reproducibles of the Drawings of the original Contract Documents, which shall be used for recording the "As Built" condition of the Work.

B. Record Drawings: Record the following kinds of information on the Record Drawings:

1. Locations of Work buried under or outside the building, such as plumbing and electrical lines and conduits. Provide horizontal and vertical dimensions from fixed points.

2. Actual numbering of each electrical circuit.

3. Locations of all HVAC, plumbing and electrical Work concealed inside the building; and other work that is changed by Contractor from that shown on the Drawings.

4. Locations of all items, not necessarily concealed, which vary from the locations shown on the Drawings.

C. The following requirements for Record Drawings are in addition to those specified elsewhere:

1. They shall be done carefully and neatly by a competent drafter, familiar with the Work involved, using methods acceptable to Owner's Representative.

2. They shall be kept up to date during the entire progress of the Work and made available to Owner's Representative at any time.

3. Additional Drawings shall be provided as required to accurately describe changes.

4. Record all changes in size, location, and other features of installation shown on the Drawings.

5. Record sufficient information such that Work concealed in the building may be located with ease and accuracy. This may be accomplished by dimensioning or by stating the relationship to the spaces in the building near which the Work was installed. Owner's Representative's decision on what constitutes sufficient information shall be final.

D. Shop Drawings: Provide final Shop Drawings which have been updated to show actual conditions, for Work specified in the individual Sections.

E. Specifications and Addenda:

1. Record the following:

a. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.

b. Changes made by Addenda, Change Order, or Field Order, and clarifications and interpretations made by Letter of Instruction.

END OF SECTION

SECTION 01705
GUARANTEES

PART 1 – GENERAL

1.01 GENERAL

A. All items not called out to be guaranteed for a period of more than one (1) year shall be guaranteed for a minimum of one (1) year.

B. Guarantees for more than one (1) year required by individual Specification Sections require a written guarantee by Contractor.

C. In addition to the individual product guarantees identified in specific Specification Section, Building Systems as a whole, including but not limited to windows, doors, roof, etc. shall be guaranteed against infiltration of wind and water for a minimum of three (3) years.

PART 2 – MATERIALS

2.01 FORM OF GUARANTEE

A. Use form contained at end of this Section.

PART 3 – EXECUTION

3.01 SUBMITTAL REQUIREMENTS

A. Submit prior to the date of final completion and prior to final application for payment.

B. Provide two (2) original copies.

C. Provide on the letterhead of Contractor, subcontractor, or supplier doing the work or supplying the item guaranteed.

GUARANTEE

Project Name: _____ Date: _____

_____

Project Location: _____

Project Number: _____

Guarantee For: _____
(Specification SECTION and Contract No.)

(the "Contract"), between the Kensington Fire Protection District ("Owner") and ("Contractor") _____

_____
(Name of Contractor, Subcontractor, or Supplier as Applicable)

hereby guarantees to Owner that the portion of the Work described as follows:

_____

_____

_____

which it has provided for the above referenced Project, is of good quality; free from defects; free from any liens, claims, and security interests; and has

been completed in accordance with Specification Section _____ and the other requirements of the Contract.

The undersigned further agrees that, if at any time within _____ months after the date of the guarantee the undersigned receives notice from Owner that the aforesaid portion of the Work is unsatisfactory, faulty, deficient, incomplete, or not in conformance with the requirements of the Contract, the undersigned will, within ten (10) calendar days after receipt of such notice, correct, repair, or replace such portion of the Work, together with any other parts of the Work and any other property which is damaged or destroyed as a result of such defective portion of the Work or the correction, repair, or replacement thereof; and that it shall diligently and continuously prosecute such correction, repair, or replacement to completion.

In the event the undersigned fails to commence such correction, repair, or replacement within ten (10) calendar days after such notice, or to diligently and continuously prosecute the same to completion, the undersigned, collectively and separately, do hereby authorize Owner to undertake such correction, repair, or replacement at the expense of the undersigned; and Contractor will pay to Owner promptly upon demand all costs and expenses incurred by Owner in connection therewith.

SUBCONTRACTOR OR SUPPLIER (If Applicable)

Signed: _____ Title: _____

Typed Name: _____

Name of Firm: _____

Contractor License Classification and License Number:

_____

Address: _____

Telephone Number: _____

CONTRACTOR

Signed: _____ Title: _____

Typed Name: _____

Name of Firm _____

SECTION 01710
CLEAN-UP AND DISPOSAL

PART 1 – GENERAL

1.01 DESCRIPTION

A. Clean-up and disposal.

PART 1 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.01 CONTINUOUS CLEAN-UP

A. Under no circumstances shall rubbish, debris, waste, dust, dirt, or surplus materials be allowed to accumulate in the building, or on the Project site, and all such shall be removed continually as the Work progresses and by the end of each day's Work.

1. Materials: In occupied building areas, only sufficient materials and flammable or toxic substances necessary for the Work being performed that day or shift shall be brought into the building and work areas. In no case shall flammable or toxic substances be stored in the building, and these substances shall be immediately removed from the building when not needed and not later than the end of the day's Work.

2. Splattering or spilling of material shall be promptly cleaned up at time of occurrence.

B. Contractor shall provide street sweeping whenever silt from construction site is carried over to adjacent public thoroughfares.

C. Failure to maintain a clean and orderly project site may necessitate action by the Owner. In the event that the Contractor fails to clean up and maintain the project in a clean and orderly manner, the Owner may clean the job-site and back-charge the Contractor for costs in accordance with Section 01010.

3.02 FINAL CLEAN-UP

A. Owner's Representative's Inspection: Give Owner's Representative at least twenty-four (24) hours advance notice of readiness for inspection. Any deficient cleaning operations, as determined by Owner's Representative, shall be immediately corrected as approved at Contractor's expense.

B. Interior surfaces and areas where Work is performed shall be left in vacuum clean condition with all dust, dirt, stains, hand marks, paint spots, plaster droppings, and other blemishes and defects completely removed. To the extent of Contractor's operations, use or materials, the following requirements apply to all areas where Work is performed:

1. Walls: Bare and painted surfaces shall be cleaned and free of dust, lint, streaks, or stains.

2. Hardware and metal surfaces shall be cleaned and polished using non-corrosive and non-abrasive materials.

3. Glass: New glass and soiled existing glass shall be washed and polished both sides and left free of dirt and spots. Labels shall be removed.

4. Ceilings shall be clean and free of stains, handmarks, and defacing.

5. Fixtures and Equipment: New mechanical and electrical fixtures and like items shall be cleaned and polished. Lighting fixtures shall be free of dust, dirt, stains, or waste material. Equipment and machinery shall be cleaned, serviced, and ready for use. Existing items shall be cleaned as required including ventilating supply and return equipment in walls and ceilings.

6. Surfaces not mentioned shall be cleaned according to the intent of this Section and as required for Owner's Representative's approval.

3.03 DISPOSAL

A. Under no circumstances shall debris, rubbish, or waste material be disposed of on Owner's property by burying or otherwise, and all shall be removed from Owner's property to a legal disposal area. Contractor shall bear all dumping charges.

3.04 CORRECTIVE WORK

A. Where existing Work has been dirtied, stained, defaced, or otherwise made defective and cleaning operations are not satisfactory, as determined by Owner's Representative, Contractor shall remove the Defective Work and install new Work as requested and approved, at no extra cost to Owner.

3.05 CLEAN-UP SPECIFIED IN OTHER SECTIONS

A. Any clean-up specified in other Sections of these Specifications shall be in addition to, and not in lieu of, these requirements.

END OF SECTION

SECTION 2072
MINOR DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Removal of designated building elements and fixtures.
B. Disposal of materials. Storage of removed materials & protection of existing building.
C. Identification of utilities.

1.2 RELATED SECTIONS

A. Division 1 Requirements.

1.3 SUBMITTALS FOR REVIEW

A. Submit under provisions of Division 1.
B. Shop Drawings: Indicate demolition and removal sequence, indicate method of conveyance to street level, show attachments and all equipment, including methods of building protection.

1.4 REGULATORY REQUIREMENTS

A. Conform to applicable local and U.B.C. requirements for demolition work, dust control, products requiring electrical disconnection and re-connection, and hazardous materials.
B. Obtain required permits from authorities.
C. Do not close or obstruct any emergency exit paths or doorways.
D. Do not disable or disrupt building fire or life safety systems without 3 days prior written notice to Owner.
E. Conform to procedures applicable if hazardous or contaminated materials are discovered, other than those referred to in these special provisions.

1.5 SEQUENCING

A. Submit under provisions of Division 1.
B. Sequence activities as required to allow the most efficient work sequence of combined abatement & demolition trades. The sequencing must accommodate combined progress by all trades, to the greatest degree possible, in order to meet the project schedule.

1.6 SCHEDULING

A. Schedule work under provisions of Division 1.
B. Describe demolition removal procedures and schedule.
C. Perform noisy, malodorous, dusty, or disruptive work during times specified by Owner.

1.7 PROJECT CONDITIONS

A. Conduct demolition without interference to adjacent and occupied building areas.
B. Cease operations immediately if structure appears to be damaged and notify Architect/Engineer. Do not resume operations until directed.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 PREPARATION

A. Provide, erect, and maintain temporary barriers at locations as required to insure the safety of any persons.
B. Erect and maintain weatherproof closures for exterior openings.
C. Erect and maintain temporary containment barriers to prevent spread of dust and odors to permit continued Owner occupancy. Erect also barriers as required to maintain clear paths for egress.
D. Protect existing materials which are not to be demolished.
E. Prevent vibration of structure; provide isolation materials where required.
F. Notify affected utility companies before starting work and comply with their requirements.
G. Mark location and termination of utilities.
H. Provide appropriate temporary signage and lighting, including lighting and signage for exiting or building egress.
I. Provide for ventilation of work site and adjacent floors. Inspect for and clean up smoke, dust and odors at the work site and adjacent floors at the end of each work shift.

3.2 DEMOLITION

A. Disconnect remove, cap, and identify designated utilities within demolition areas.
B. Demolish in an orderly and careful manner. Protect existing supporting structural members and windows, doors, electrical equipment and mechanical equipment to remain.
C. Perform selective demolition work in a systematic manner. Use methods required to complete work indicated on the Drawings.
    1. Concrete: Sawcut concrete. Wet concrete to prevent dust. Use removal methods that will not crack or structurally disturb remaining slab or partitions. Use power saw where possible.
    2. Edges: Cut edges of existing surfaces to remain neatly to the lines shown or as directed. Control edges by saw-cutting, line drilling, or other approved method.
    3. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors or framing.
    4. Provide services for effective air and water pollution control as required by local authorities having jurisdiction.
D. Hazardous Materials: If hazardous materials are encountered during demolition operations, notify the Owner immediately and stop work until receiving further direction.

3.3 DISPOSAL

A. Remove demolished materials from site daily. Do not allow debris to accumulate on floors or roof areas of building.
B. Debris control: Remove, transport and legally dispose of debris off-site and in a manner to prevent spillage on streets or in adjacent areas.
C. Upon completion of Work, leave areas in clean condition.
D. Remove temporary Work.
E. Provide wash down of adjacent walks and roads as necessary to maintain them reasonably free from dust and dirt resulting from operations under contract.

F. Regulations: Local regulations regarding hauling and disposal shall apply.

3.4 CLEAN-UP AND REPAIR

A. Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protections and leave interior areas broom clean.
B. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work.
C. Repair adjacent construction of surfaces soiled or damaged by selective demolition work.
D. Materials used for repair shall match and be of equal or better quality as the materials removed or damaged.

END OF SECTION

TABLE OF CONTENT

1 GENERAL 1
1.1 REFERENCES 1
1.2 DEFINITIONS 3
1.3 REQUIREMENTS 7
1.4 SCOPE OF WORK 8
1.5 PRE-JOB SUBMITTALS 9
1.6 POST-JOB SUBMITTALS: 10
1.7 ENVIRONMENTAL CONSULTANT 10
2 MATERIALS AND EQUIPMENT 11
2.1 SIGNS AND LABELS: 11
2.2 ENCAPSULANT: 12
2.3 PLASTIC SHEETING: 12
2.4 TAPE: 12
2.5 LIQUID FLOOR ADHESIVE REMOVER: 12
2.6 STRIP CHART/CIRCULAR CHART RECORDER(S): 13
2.7 VACUUM EQUIPMENT: 13
2.8 LOCAL EXHAUST SYSTEM: 13
2.9 HOURS OF OPERATION FOR HEPA FILTRATION UNITS: 14
2.10 RESERVE EQUIPMENT: 14
2.11 TRANSPORTATION EQUIPMENT: 14
2.12 CONNECTIONS TO WATER SUPPLY: 14
2.13 OTHER TOOLS AND EQUIPMENT: 14
3 EXECUTION 15
3.1 WORK AREA PREPARATION 15
3.2 CONTAINMENT AND WORKER DECONTAMINATION SYSTEM SET-UP 15
3.3 PERSONNEL PROTECTION EQUIPMENT 16
3.4 AIR MONITORING: 17
3.5 CLEARANCE INSPECTIONS 18
3.6 CLEARANCE CRITERIA 18
3.7 ASBESTOS AND LEAD-CONTAINING MATERIALS DISPOSAL 19

SECTION 02080

ASBESTOS AND LEAD ABATEMENT SPECIFICATION

1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification by reference. The publications are referred to in the text by basic designation only. If there is a conflict between any of the listed regulations or standards, then the most stringent or restrictive shall apply.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ANSI Z9.2	1979 (R 1991) Fundamentals Governing the Design and Operation of Local Exhaust Systems
ANSI Z88.2 1992	Respiratory Protection
ASTM C 732	1982 (R 1987) Aging Effects of Artificial Weathering on Latex Sealants
ASTM D 522	1993 (Rev. A) Mandrel Bend Test of Attached Organic Coatings
ASTM D 1331	Solutions of Surface-Active Agents
ASTM D 2794	1993 Resistance of Coatings to the Effects of Rapid Deformation (Impact)
ASTM E 84	1991 (Rev. A) Surface Burning Characteristics of Building Materials
ASTM E 96	1994 Water Vapor Transmission of Materials
ASTM E 119	1988 Fire Tests of Building Construction and Materials
ASTM E 736	1992 Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
ASTM E 1368	1990 Visual Inspection of Asbestos Abatement Projects

BAY AREA AIR QUALITY MANAGEMENT Owner (BAAQMD)

BAAQMD 11 Regulation 11, Rule 2 (San Francisco Bay Area Region)

CALIFORNIA ASSEMBLY BILLS (CAB)

CAB 2040	Yearly Registration of Contractors

CALIFORNIA CODE OF REGULATIONS (CCR), Title 17

Division 1, Chapter 8	Accreditation, Certification and Work Practices in Lead-Related Construction

CALIFORNIA DEPARTMENT OF INDUSTRIAL RELATIONS (CDIR) DIVISION OF OCCUPATIONAL SAFETY AND HEALTH, TITLE 8, CALIFORNIA ADMINISTRATIVE CODE

CDIR CARS	Carcinogen and Asbestos Registration Sections 340-344.53, 341.6 Amended, and 341.9 Amended Through 341.14
CDIR CSO	Construction Safety Orders, Chapter 4, Subchapter 4
CDIR ESO	Electrical Safety Orders, Chapter 4, Subchapter 5

CDIR 1529	Asbestos Construction Standard
CDIR 1532.1	Lead in Construction
CDIR 3203	Accident Prevention Program
CDIR 3204	Access to Employee Exposure and Medical Records
CDIR 3220	Emergency Action Plan
CDIR 3221	Fire Prevention Plan
CDIR 5194A	Respiratory Protection Equipment Standard
CDIR 5194B	Hazard Communication Standard
CDIR 5208	Asbestos Standard
CDIR 5209	Carcinogen Regulation
CDIR 6003	Accident Prevention Signs

CALIFORNIA HEALTH SERVICES (CHS) TITLES 22 AND 23, CALIFORNIA ADMINISTRATIVE CODE DISPOSAL REQUIREMENTS

CHS 25123	Section 25123
CHS 25124	Section 25124
CHS 25143	Section 25143
CHS 25163	Section 25163
CHS 66508	Section 66508
CHS 66510	Section 66510
CHS DIV 4	Division 4, Commencing with Section 66000, "Disposal"

CALIFORNIA HEALTH AND SAFETY CODE (CHSC)

CHSC 20	Division 20, Commencing with Section 24200

CALIFORNIA LABOR CODE (CLC)

CLC DIVISION 5	Part 1, commencing with 6300

CALIFORNIA PROPOSITIONS (CP)

CP 65	Proposition 65

CALIFORNIA STATE BOARD OF EQUALIZATION (CSBE)

ETU	Excise Tax Unit

CALIFORNIA STATE LICENSE BOARD (CSLB)

CBPC	California Business and Professional Code Sections 7058.5 and 7058.7, "Certification

CODE OF FEDERAL REGULATIONS (CFR)

29 CFR 1910.134	Respiratory Protection
29 CFR 1910.141	Sanitation

29 CFR 1910.145	Accident Prevention Signs and Tags
29 CFR 1926.21	Safety Training and Education
29 CFR 1926.65	Hazardous Waste Operations and Emergency Response
29 CFR 1926.103	Respiratory Protection
29 CFR 1926.59	Hazard Communication
29CFR 1910.1000	Air Contaminants
29 CFR 1926.1101	Asbestos
29 CFR 1926.62	Lead Exposure in Construction
40 CFR 61-SUBPART A	General Provisions
40 CFR 61-SUBPART M	National Emission Standard for Asbestos
49 CFR 172	Hazardous Materials Tables and Hazardous Materials Communications Regulations
40 CFR 260	Hazardous Waste Management Systems: General
40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Generators of Hazardous Waste
40 CFR 263	Transporters of Hazardous Waste
40 CFR 264	Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 265	Interim Status Standard for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 745	Lead; Requirements for Lead-Based Paint Activities
40 CFR 763	Asbestos Containing Material in Schools
49 CFR 178	Shipping Container Specifications

UNDERWRITERS LABORATORIES INC. (UL)

UL 586	1990 High-Efficiency, Particulate, Air

U.S. Housing and Urban Development (HUD)

HUD	Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing

1.2 DEFINITIONS

Asbestos Action Level: An airborne concentration of asbestos of 0.1 fiber per cubic centimeter (f/cc) of air calculated as an eight (8)-hour time-weighted average, at which preventive and corrective actions must be taken to lower the level of 0.1 f/cc.

Aggressive Sampling: Refers to air sampling either during or following the agitation of the air.

Airlock: A system for permitting ingress and egress with minimum air movement between a contaminated area and uncontaminated areas. Typically consists of two curtained or gasketed doorways separated by a distance of at least six feet such that one passes through one doorway into the airlock, allowing the doorway to close off the opening. This airlock must be maintained in uncontaminated condition at all times.

Ambient Air Quality: The quality of air (in terms of airborne fiber content) that is present in a given space.

Amended Water: Water to which a surfactant has been added to reduce water surface tension and thereby provide a more rapid penetration.

Area Monitoring: Sampling of airborne asbestos fiber concentrations and/or airborne lead concentrations within the work area and outside the work area. Sampling shall represent airborne concentrations that may reach the breathing zone.

Asbestos Fibers: Refers to asbestos fibers having an aspect ratio of 3:1, and those fibers longer than five (5) micrometers.

Asbestos Permissible Exposure Limit (PEL): A level of airborne fibers specified by OSHA as an occupational exposure standard for asbestos. This level represents the 8-hour time-weighted average of 0.1 fibers per cubic centimeter as measured by Phase Contrast Microscopy (PCM) analytical method.

Asbestos-Containing Material (ACM): Those manufactured products and construction materials including structural and mechanical building materials, as well as packings and gaskets that contain more than one-tenth of one percent (0.1 %) asbestos by weight.

Asbestos: Asbestos include asbestiform varieties of serpentinite (chrysotile), riebeckite (crocidolite) cummingtonite-gunerite (amosite), anthophylite, tremolite, and actinolite. For the purposes of determining worker respiratory protection, both the asbestiform and non-asbestiform of the above minerals, and any chemically treated or altered materials shall be considered as asbestos.

BAAQMD: Bay Area Air Quality Management //Name of Owner//.

Baseline: Refers to the background level of asbestos monitored before abatement.

Breathing Zone: A hemisphere forward of the shoulders and head with a radius of approximately six to nine inches.

Breaching: A rift or gap in the critical or secondary barriers that allow egress of air from the containment to outside, or vice versa.

Certified Asbestos Consultant (CAC): Any person who contracts to provide professional health and safety services relating to asbestos-containing construction material, which comprises 100 square feet or more of surface area. The activities of certified asbestos consultant include building inspection, abatement project design, contract administration, sample collection, preparation of asbestos management plans, clearance monitoring, and supervision of certified site surveillance technicians.

Certified Site Surveillance Technician (CSST): Any person who acts as an independent on-site representative of an certified asbestos consultant. The CSST monitors the asbestos abatement activities of others, provides asbestos air monitoring services for area and personnel samples, and performs building surveys and contract administration at the direction of a CAC. The CSST shall conduct monitoring according to 29 CFR 1910.1001 (d), 1926.1101, Cal-OSHA, and as otherwise specified in this contract.

Chain-of-Custody: A legal concept involving documentation of the physical possession of a sample/samples from the moment it is collected, transported, analyzed, and ultimately stored in an archive.

Change Rooms: Refers to the two chambers in the decontamination area used to change into and out of protective clothing.

Certified Industrial Hygienist (CIH): A person certified by the American Board of Industrial Hygiene or his designated representative.

Clean Room: An uncontaminated area or room that is part of the worker decontamination enclosure system, with provisions for storage of workers' street clothes and protective equipment.

Clearance Level: Refers to less than <0.01 fibers/cubic centimeter for each sample collected when analyzed via Phase Contrast Microscopy (PCM). Clearance level for samples analyzed Transmission Electron Microscopy (TEM) will be less than 70 structures per square millimeter (< 70 s/mm). Samples shall be collected by aggressive sampling methods and the minimum air volume shall be 1,200 liters.

Contractor: The party or parties or company contracting with the //Name of Owner// to perform work.

Critical Barrier: A unit of temporary construction which provides the only separation between an asbestos work area and an adjacent potential occupied space. This includes the decontamination unit, perimeter walls, ceilings, penetrations and any temporary critical barriers between the work area and the uncontaminated environment.

CSLB: Contractors State Licensing Board

DOP: Dioctylphthalate, the challenge aerosol used to perform on-site leak testing of HEPA filtration equipment.

Decontamination Unit: A decontamination unit shall be set up for each containment area. Refers to system of airlocks used to decontaminate personnel, waste bags, equipment, etc. when exiting the work area.

Disposal Bag: Minimum six (6) mil thick leak-tight plastic bags used for transporting asbestos waste from work place, and to disposal site. Each disposal bag must have required labels according to 8 CCR 1529 (Cal-OSHA asbestos rule), 5194 (HAZCOM), 49 CFR 171-179 (USDOT), and 40 CFR 61 Subpart M (NESHAP). Each disposal bag must labeled with generator's name, address, site location and generator number.

Encapsulant: A liquid material that can be applied to asbestos-containing material that controls the possible release of asbestos fibers from the material either by creating a membrane over the surface (bridging) or by penetrating into the material and binding its components together (penetrating encapsulant).

Enclosure: The construction of an air-tight, impermeable, permanent barrier surrounding the asbestos-containing material to prevent the release of asbestos fibers into the air.

Environmental Consultant: Certified Industrial Hygienist (CIH), Certified Asbestos Consultant (CAC), and technical representatives of the //Name of Owner//.

Excursion Limit: A California Code of Regulations (8 CCR 1529) requirement that ensures no employee is exposed to airborne concentration of asbestos in excess of 1.0 fibers per cubic centimeter of air (1 f/cc) as averaged over a sampling period of thirty (30) minutes.

HEPA: High Efficiency Particulate Air filter: The type of filter used to remove asbestos fibers from an airstream.

Foreman: An individual who fulfills the duties of "competent person" as defined in 29 CFR 1926.1101. This individual must supply documentation of a passing grade in an EPA accredited course in Practices and Procedures in Asbestos Control. The foreman must supervise on-site during all abatement work.

HEPA Filter Equipment: High efficiency particulate air filtered vacuuming equipment with a filter system capable of collecting and retaining asbestos fibers. Filters shall be of minimum 99.97 percent efficiency for retaining fibers of .3 microns or larger.

Lead: Toxic metallic element of atomic number 82, or any other materials, substances or compounds that may contain lead. Note for metal painted surfaces lead is often found in combination with chromates. For the purposes of this specification, lead also refers to lead-chromate paints.

Lead Action Level: Employee exposure, without regard to the use of respirators, to an airborne concentration of 30 micrograms per cubic meter of air (30 ug/m3) of lead averaged over an 8-hour period.

Lead Hazardous Waste: Rags, general debris, and renovation/demolition debris are to be treated as a hazardous waste if laboratory results indicate a lead (Pb) concentration of 5 milligrams per liter (mg/l) or greater using the EPA approved

Toxicity Characteristic Leaching Procedure (TCLP) test. The waste will also be classified as hazardous waste if the Total Threshold Limit Concentration (TTLC) of measured lead is greater than 1000 mg/kg or if the Soluble Threshold Limit Concentration (STLC) of measured lead is greater than or equal to 5 mg/l.

Lead Permissible Exposure Limit (PEL): Employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 50 micrograms per cubic meter of air (50 ug/m3) of lead averaged over an 8-hour period.

Negative Pressure Respirator: A respirator in which the air pressure inside the respiratory-inlet covering is positive during exhalation in relation to the air pressure of the outside atmosphere, and negative during inhalation in relation to the air pressure of the outside atmosphere.

NESHAP: National Emission Standard for Hazardous Air Pollutants - EPA Regulation 40 CFR Subpart M, Part 61.

NIOSH: National Institute for Occupational Safety and Health: (Research Institute within Federal OSHA). Sets test standards, analytical methods, and certifies performance of various respirator designs.

Personal Monitoring: Sampling of asbestos fiber concentrations within the breathing zone of an employee.

PEL: Permissible Exposure Limit; OSHA TWA exposure standard for an eight-hour period.

Phase Contrast Microscopy (PCM): Phase contrast microscopy (PCM) is a technique using a light microscope equipped to provide enhanced contrast between the fibers and the background. Filters are cleared with a chemical solution and viewed through the microscope at a magnification of approximately 400X. This method does not distinguish between fiber types and only counts those fibers longer than 5 micrometers and wider than approximately 0.25 micrometers. Because of these limitations, fiber counts by PCM typically provide only an index of the total concentration of airborne asbestos in the environment monitored.

Powered Air Purifying Respirator (PAPR): A full facepiece respirator that has the breathing air powered to the wearer after it has been purified through a HEPA filter.

Protection Factor: The ratio of the ambient concentration of an airborne substance to the concentration of the substance inside the respirator at the breathing zone of the wearer. The protection factor is a measure of the degree of protection provided by a respirator to the wearer.

Shower Room: A room between the clean room and the equipment room in the worker decontamination enclosure system. This room contains hot and cold or warm running water and soap suitably arranged for complete showering during decontamination. The shower room comprises an air lock between contaminated and clean areas.

Soluble Threshold Limit Concentration (STLC): A material is considered as hazardous waste if laboratory test result indicate Soluble Threshold Limit Concentration of measured lead are greater than or equal to 5 milligrams per liter (mg/l).

Surfactant: A chemical wetting agent added to water to improve penetration, thus reducing the quantity of water required for a given operation or area.

TEM: Transmission Electron Microscopy: Asbestos structure analysis for a specified volume of air. TEM is a technique that focuses an electron beam onto a thin sample. As the beam transmits through certain areas of the sample, an image resulting from varying densities of the sample is projected onto a fluorescent screen. Transmission electron microscopy is the state-of-the-art analytical method for identifying asbestos fibers collected in air samples in non-industrial settings. Transmission electron microscopes equipped with selected area electron diffraction (SAED) capabilities, also can provide information on the crystal structure of an individual particle.

Toxicity Characteristic Leaching Procedure (TCLP): Test developed by U.S. Environmental Protection Agency (USEPA) to simulate landfill conditions and the potential for a waste to leach hazardous materials (40 CFR 261 - Appendix 2).

Total Threshold Limit Concentration (TTLC): A material is considered as hazardous waste if laboratory test result indicate Total Threshold Limit Concentration of measured lead are greater than or equal to 1000 milligrams per kilogram (mg/kg).

Visible Emissions: Any emissions containing particulate asbestos material that is visually detectable without the aid of instruments. This does not include condensed uncombined water vapor.

Visual Inspection: A visual inspection by Certified Industrial Hygienist, Certified Asbestos Consultant, or Certified Site Surveillance Technician of the work area under adequate lighting to ensure that the work area is free of visible asbestos material, debris, and dust.

Work Area: The area where lead or asbestos-related work or removal is performed and that is defined or isolated to prevent the spread of lead or asbestos dust, fibers or debris, and entry by unauthorized personnel. Work area is a Regulated Area as defined by 29 CFR 1926.1101 and Cal-OSHA.

Zinc Protoporphyrin (ZPP) Test: Biological test for lead-exposure that measures the amount of zinc protoporphyrin in blood.

1.3 REQUIREMENTS

A. Contractor shall refer to the Kensington Fire Station/Public Safety Building Renovation Specifications and Drawings for details.

B. The work covered by this specification includes the handling, removal, and proper disposal of asbestos containing materials (ACM) and lead containing paint. The Contractor shall performed appropriate Soluble Threshold Limit Concentration (STLC) testing for lead waste disposal

C. Contractor shall submit unit prices for the removal of all items listed on the Project Unit Price Sheet located at the end of this specification. Should the work be increased or decreased from that outlined in this specification, the Contractor agrees that the unit prices shall be the basis of compensation or deduction from the bid amount.

D. Comply with federal, state, and local regulations pertaining to hazardous materials removal, storage, transportation and disposal; construction, safety and heath, certifications, licenses, permits, and training. Also comply fully with this specification and regulations that define the most stringent standards.

E. The Contractor shall perform all work specified herein with competent persons trained, knowledgeable and qualified in state-of-the-art techniques relating to asbestos-containing materials abatement, handling, and the subsequent cleaning of contaminated areas.

F. During removal activities, the Contractor shall protect against contamination of other floors and adjacent areas and shall ensure that there is no airborne release of asbestos-containing materials. The monitoring technician retained by the Owner shall collect air samples in the building and in adjacent areas to evaluate the Contractor's performance. Airborne contaminants or visible debris contamination outside the work area as a result of poor work practices will require the implementation of additional controls and clean-up. All costs associated with the implementation of additional controls and clean-up will be incurred by the Contractor.

G. It is the Contractor's responsibility to confirm the quantities for removal and disposal of asbestos and non-asbestos containing materials. The Contractor must conduct a site visit to determine exact locations of materials impacted by the planned renovations.

H. By submitting a bid, the Contractor acknowledges investigation (through a site visit) and acceptance of the conditions affecting the work. These conditions include but are not limited to, physical conditions of the site that may affect access; handling and storage of tools and materials; access to water and electricity or other utilities that may otherwise affect the performance of required activities.

I. Any information developed from exploratory work done by the Environmental Consultant and any investigation done by the Contractor to acquaint himself with available information will not relieve the Contractor from the responsibility of properly estimating the difficulty or cost of successfully performing the work. Environmental Consultant is not responsible for any conclusions or interpretations made by the Contractor based on the information made available by the Owner or his/her representative.

J. The Contractor must hold a current, valid asbestos handling license issued by the California State Contractor's Licensing Board (SCLB) and a current valid Certificate of Registration for Asbestos-Related Work issued by the California Department of Industrial Relations- Division of Occupational

Safety and Health (Cal-OSHA). Display copies of SCLB license and Cal-OSHA Certificates in a visible place at the job-site.

K. Asbestos-containing materials removed during the abatement activities shall be disposed of in an approved manner complying with all applicable federal, state, and local regulations. Appropriate waste manifests or letters of salvage shall be furnished to the Owner thereby limiting the Owner's liability for improperly salvaged items. Materials are conveyed to the Contractor "as is," without any warranty, expressed or implied, including but not limited to, any warranty to marketability or fitness for a particular purpose, or any purpose.

L. Contractor is responsible, to every extent possible, for preserving finishes not scheduled for removal and/or demolition. Contractor is to make all cuts parallel with lines of building and shall not demolish or damage any walls or other building materials unless scheduled for demolition, or required to do so to access asbestos-containing materials.

1.4 SCOPE OF WORK

A. No drawings are provided with this specification. It is the intent of the project to remove all: regulated asbestos containing materials and lead-containing paint impacted by the planned work. Contractor shall refer to the Kensington Fire Station/Public Safety Building Renovation Plans for details.

B. All asbestos abatement shall be conducted in a fully enclosed negative pressure containment. Workers shall use personal protective equipment, including respirators and protective clothing, during removal work.

1. ASBESTOS-CONTAINING MATERIAL (ACM): Asbestos containing materials are shown below. Reference the demolition drawings for the quantities of materials requiring abatement. It is the Contractor's responsibility through a site visit to confirm the quantities and extent of work required to complete the project.

Homogenous Material	Material Locations	Asbestos Content
Mastic under carpet and leveling compounds	1st floor - All mastic under carpet 2nd floor - Mastic under carpet in looby	3% CH
12"x12" beige floor tile and mastic and leveling compounds	2nd floor	Tile = 2% CH Mastic = ND
Sheetrock (drywall) with joint compound/Mud walls and ceilings	All drywall (sheetrock) walls and ceilings with mud/joint compound	Mud/joint compound <1% Drywall = ND
Transite wall panels and associated glues	1st floor apparatus room 2nd floor – detained room and janitor closet	Assumed ACM

CH = Chrysotile Asbestos ND = None Detected

C. LEAD-CONTAINING MATERIALS:

1. Peeling and Cracked Paint

(a) The paints impacted by the planned renovations contain lead. Peeling and cracked lead-containing paint is present in various locations of the building. The Contractor shall abate any peeling and cracked paints impacted by the planned renovations according to the procedures outlined in these specifications. The Contractor is

responsible for proper handling, abatement, personnel monitoring, personnel protection, and disposal of lead containing materials.

2. Sanding of Interior Walls and Miscellaneous Surfaces for Repainting

(a) during wetting will become part of the scope of work scheduled for abatement. Spot locations on interior walls will be sanded by the Contractor to a smooth finish suitable for repainting. Specific locations will be demarcated by the General or by the Owner's representative(s).

(b) Contractor is to assume that approximately 1,000 square feet of interior wall sanding will be required and approximately 150 square feet of miscellaneous interior wood trim sanding will be required.

(c) Contractor shall continuously mist the surface with water from a small atomizer or sprayer in order to minimize dust generation.

(d) All sanding work shall be wet sanding except near electrical circuits. Orbital sanding devices or other mechanical sanders shall be used only in conjunction with a HEPA vacuum attachment

1.5 PRE-JOB SUBMITTALS

The following items shall be submitted to, and approved by Environmental Consultant before commencing work involving the asbestos-containing materials outlined in these specifications. By submission of a bid, the Contractor agrees that he/she will hold harmless and indemnify the Owner and the Environmental Consultant against infringement on any patent laws as they may relate to this project.

A. Submit a minimum of two (2) copies of the submittals to the Owner's representatives (the Environmental Consultant). Assemble each submittal in a three-ring binder or in a plastic spiral/comb binder, grouping items in order and identifying them with tabs for ease of review.

B. Asbestos Abatement Plan: Asbestos handling, engineering control, removal, and disposal procedures.

C. Submittal of worker documentation for employees used on the job.

Asbestos Abatement Work

- Current AHERA training certificates for all supervisors, competent persons, and abatement workers for hazards of asbestos exposure and any other hazardous materials to be encountered during work. Training shall include protective clothing, use of showers, and respiratory protection.
- All employees engaged in the work shall have had instruction on the use and fitting of respirators in accordance with latest CAL/OSHA Title 8, CCR 1529.
- All employees must have appropriate medical examinations (must be less than 12 months old) which must be consistent with the requirements in Cal/OSHA Title 8 CCR 1529.
- Respirator fit testing records must be less than seven months old. Document testing on the type of respiratory protective equipment used for this project.

Lead Abatement Work

- current training certificates for all supervisors and workers performing lead abatement work as required under Title 17, CCR Division 1, Chapter 8.
- all workers have successfully passed fit test for the respirator(s) to be worn within the last 6 months.

- all abatement workers have received appropriate medical examinations. The examination must be consistent with the requirements in Cal/OSHA Title 8 CCR, Section 1535 and Section 1532.1, including pre-job blood lead testing and a physician written opinion regarding the worker able to perform lead related work

D. Certificates of Compliance: Submit manufacturer's certification that vacuums, ventilation equipment, and other equipment required to contain airborne asbestos fibers conform to ANSI Z9.2.

E. The Contractor shall provide independent on-site DOP testing of the effectiveness of all air filtration units (HEPA units) that will be used on-site. The test results shall be signed by a Certified Industrial Hygienist or Professional Engineer. Repeat testing if the unit or the air filtration units have been repaired or replaced.

F. Licenses: Submit copies of state and local licenses, evidence of Cal-OSHA registration and permits necessary to carry out the work of this contract.

G. If applicable, provide copy of notification to Bay Area Air Quality Management District (BAAQMD) for asbestos abatement.

H. Material Safety Data Sheets/Specification Sheets: The Abatement Contractor is to submit Material Safety Data and Specification Sheets for all chemicals, encapsulants, etc. to be used for this project.

1.6 POST-JOB SUBMITTALS:

A. The Abatement Contractor shall submit copies of the Security and Safety Logs showing names of persons entering the work space. The logs shall include date and time of entry and exit, supervisor's record of any accident (detailed description of accident), emergency evacuations, and any other safety or health incident, waste manifests, air sample results, and pressure differential strip chart readings for each differential recording device on the site.

B. Upon completion of on-site work, Abatement Contractor is submit completed waste manifests and copies of all accident reports during the course of the project.

1.7 ENVIRONMENTAL CONSULTANT

A. An Environmental Consultant will be retained to advise the Owner in all matters pertaining to the work performed in accordance with these specifications and requirements.

B. The Environmental Consultant will act as the Owner's liaison in technical matters involving the asbestos-containing materials related work.

C. The Environmental Consultant shall only review submittals for general conformance with the abatement concept and general compliance with the information provided in the Bid Documents. Any action indicated during submittal review is subject to the requirements of the Specifications. The Contractor shall be responsible for dimensions and quantities which shall be confirmed at the job site.

D. The designated site representative of the Environmental Consultant is authorized by the Owner to have free access to all asbestos-containing materials work areas, to assist in interpretation of procedures, and to advise on all provisions of the contract documents pertaining to the control of asbestos-containing materials.

E. The Environmental Consultant will advise the Owner to stop the Contractor's work if, in the course of performing monitoring duties, the consultant observes an instance of substantial non-conformance with the contract documents and/or a situations presenting health hazards to workers or the building's employees. Work shall not resume until the corrective measures have been enforced. Instances of substantial non-conformance shall include, but not be limited to, the following:

1. Loss of negative pressurization;

2. Activities or misconduct imperiling worker's or building occupant's safety; and

3. Breaches in containment resulting in potential release of asbestos to non-work areas.

F. All asbestos abatement programs shall be conducted using good work practices to prevent the release of fibers outside the work area. If poor work practices are observed, the Environmental Consultant shall direct the Contractor to make the necessary corrections. Generally, airborne concentration levels measured by PCM inside the containment area exceeding 0.1 fibers/cc will be viewed as an indication of poor work practices.

G. If appropriate conditions are not made after repeated warnings, or if an immediate threat exists that asbestos fibers could be released outside the work area, all abatement work will be stopped. The decision to stop work shall be made jointly by the Environmental Consultant and the Owner.

H. The Environmental Consultant may perform air sampling inside and outside the asbestos-containing materials work area during all phases of the work. The Contractor shall cooperate fully with the Consultant and ensure the cooperation of his workers during collection of air samples and work area inspections.

I. The Environmental Consultant's role in advising the Owner on environmental health matters does not relieve the Contractor's obligation to comply with all applicable health and safety regulations promulgated by the federal, state, or local governments. Air monitoring results generated by the Environmental Consultant shall not be used by the Contractor to represent compliance with regulator agency requirements for monitoring of workers exposure to airborne asbestos, nor shall any other activity on the part of the Environmental Consultant represent the Contractor's compliance with applicable health and safety regulations.

2 MATERIALS AND EQUIPMENT

2.1 SIGNS AND LABELS:

A. Provide labeling in accordance with U.S. EPA requirements. Provide the required signs, labels, warnings, or posted instructions for containers used to transport contaminated material to the landfill.

B. Location of Caution Signs and Labels: Provide bilingual caution signs at all approaches to work area including the building lobby. Locate signs at such a distance that personnel may read the sign and take the necessary protective steps required before entering the area. Provide labels and affix to all asbestos materials, scrap, waste, debris, and other products contaminated with asbestos.

C. Warning Sign Format: Vertical format conforming to 29 CFR 1926.1101:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA

D. Warning Label Format: Provide labels that comply with 29 CFR 1926.1101 of sufficient size to be clearly legible, displaying the following legend:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

2.2 ENCAPSULANT:

A. Contractor is wholly responsible for ensuring that all encapsulant(s) used (including those recommended is this specification) are fully compatible with all replacement finishes.

B. Performance Requirements: Classification - penetrating encapsulant; spray applied and brushable. Product shall be tested and listed by EPA and possess the following characteristics:

1. Flame resistance/flame spread ~25 (ASTM E162) V6. Fire classification - UL Class A approved in the specific or similar assembly to its intended application.

2. Product shall be tested and rated non toxic and non-irritating under the Federal Hazardous Substances Control Act and contain no methylene chloride.

3. Product shall have been successfully applied in similar applications.

2.3 PLASTIC SHEETING:

A. Use fire-retardant (FR) polyethylene film manufactured by PolyAmerica, Grand Prairie, Texas 75051, or equal.

1. Thickness - 6-mil, minimum, NO EXCEPTIONS.

2. Flame Resistance/Flame Spread Rate <25.

3. Conforms to NFPA #701 and Tested in accordance with ASTM E-84.

B. Spray adhesive for sealing polyethylene to polyethylene shall contain no methylene chloride or methyl chloroform (1,1,1-trichloroethane) compounds.

2.4 TAPE:

A. Tape, 2" or wider, shall be capable of sealing joints of adjacent sheet of polyethylene and shall attach polyethylene sheet to finished or unfinished surfaces or similar materials. Tape shall be capable of adhering under dry and wet conditions., including use of amended water. Taping to critical or sensitive surfaces shall be completed using preservation sealing tape, such as 3M Scotch Brand No. 4811 Preservation Tape; or 3M Scotch Branch No. 472 Plastic Film Tape.

2.5 LIQUID FLOOR ADHESIVE REMOVER:

A. Liquid floor adhesive remover shall be a nonflammable material only, with a flash point above 140 °F and shall not contain methylene chloride, halogenated hydrocarbons or the following glycol ethers.

Common Name	Abbreviation	CAS #	Chemical Name
Ethylene glycol methyl ether	EGME	109-86-4	2-methoxyethanol
Ethylene glycol methyl ether acetate	EGMEA	110-49-6	2-methyoxyethyl acetate
Ethylene glycol ethyl ether	EGEE	110-80-5	2-ethoxyethanol
Ethylene glycol ethyl ether acetate	EGEEA	111-15-9	2-ethoxyethyl acetate
Ethylene glycol dimethyl ether	EGDME	110-71-4	1,2-dimethoxyethane
Ethylene glycol diethyl ether	EGDEE	629-14-1	1,2-diethoxyethane

Diethylene glycol	DEG	111-46-6	2,2-dihydroxyethyl ether
Diethylene glycol methyl ether	DEGME	111-77-3	2- (2-methoxyethoxy) ethanol
Diethylene glycol ethyl ether	DEGEE	111-90-0	2- (2-ethoxyethoxy) ethanol
Diethylene glycol dimethyl ether	DEGME	111-96-6	bis- (2-methoxyethyl) ether
Triethylene glycol dimethyl ether	TEGDME	112-49-2	2,5,8,11 - tetraoxadodecane
Dipropylene glycol	DPG	110-98-5	2,2'-dihydroxyisopropyl ether

B. Material shall be recommended by the manufacturer for the purpose of removing floor covering adhesive, and shall be used according to manufacturer's recommendations.

C. Provide odor isolation and control to prevent disruption of occupants of space adjacent to where liquid removers are being used. Product shall be tested and rated non toxic and non-irritating under the Federal Hazardous Substances Control Act.

2.6 STRIP CHART/CIRCULAR CHART RECORDER(S):

A. Work areas shall have a minimum differential pressure of –0.02 inches water gage at all times. Fluctuations below –0.02 inches w.g. is unacceptable and may require temporary cessation of work until conditions are corrected.

B. Multiple continuous circular chart recorder(s) shall be used to document the level of pressure difference between the containment space and all other spaces as deemed necessary by the Environmental Consultant. Defective or non-operating instrumentation may require temporary cessation of work until instrumentation is repaired or replaced.

C. Differential air pressure systems shall be in accordance with Appendix J of EPA's "Guidance for Controlling Asbestos-Containing Materials in Buildings, EPA 560/5-85-024. The Differential pressure system shall be continuous monitored by the Contractor using a recording instrument equal to a Dwyer Instrument Co.'s " Photohelic Gauge" connected to an appropriate strip chart recorder. The recording instrument shall be connected to an audible alarm which will activate at a pressure differential of -0.02 inches water gauge air pressure.

D. The chart recorder will be checked a minimum of four times per day by a person familiar with the operation. Each check shall be documented on the circular chart with a time and date notation and the initials of the person performing the check. A copy of the circular chart shall be submitted daily to the Consultant.

E. Air which is exhausted to maintain negative pressure shall be exhausted from the building at locations approved by the Owner. Exhausted air shall not be near or adjacent to other building intake vents or louvers or at entrances to buildings.

2.7 VACUUM EQUIPMENT:

A. All vacuum equipment used in the work area shall be DOP tested.

2.8 LOCAL EXHAUST SYSTEM:

A. Sufficient High Efficiency Particulate Absolute (HEPA) ventilation units shall be used to maintain the negative pressure in each work area at -0.02 inches of water column. These exhaust systems shall be DOP tested and in accordance with ANSI and the HEPA unit shall bear a UL 586 label. HEPA filtered air necessary to maintain pressure differential shall be vented to non-contaminated areas outside the buildings. Other HEPA units shall operate within the enclosure to circulate air and control fiber counts. All HEPA units shall be fitted as follows:

1. A two stage pre-filter as follows: 100 micron low efficiency filter and a second stage medium prefilter for particle sizes down to 5 microns;

2. Lapse time meter showing accumulated hours of operation;

3. Electrical interlock preventing the operation of the unit without a HEPA filter;

4. Audible alarm and automatic shutdown system in the event of filter rupture or blockage of the discharge

5. Warning lights which indicate the status of the HEPA unit;

2.9 HOURS OF OPERATION FOR HEPA FILTRATION UNITS:

A. The ventilation system shall remain in operation 24 hours a day until the work area has passed the specified clearance criteria. HEPA filtered air necessary to maintain pressure differential shall be vented to non-contaminated areas outside the buildings. Other HEPA units shall operate within the enclosure to circulate air and control fiber counts.

2.10 RESERVE EQUIPMENT:

A. Contractor shall have the following equipment on site: one reserve, functioning and DOP-tested HEPA Filter Vacuum Cleaning Unit, one reserve and DOP-tested HEPA area filtration unit, and sufficient polyethylene, respirators, protective equipment, tape, tools, etc.

B. Provide authorized visitors, Consultants or other Contractors requiring access to the work area with suitable protective clothing, headgear, eye protection, as described in this specification, whenever the visitor must enter the work area. The Contractor shall have available and maintained at all times a minimum of three (3) suits and other suitable protective equipment for this purpose. All protective equipment shall be new and for the exclusive use of visitors.

C. The Contractor shall document that each visitor has been trained and fit-tested prior to entering an abatement area.

2.11 TRANSPORTATION EQUIPMENT:

A. Transportation equipment, as required, shall be lockable and suitable for loading, temporary storage, transit and unloading of contaminated waste without exposure to persons or property. Any vehicle used to transport asbestos waste shall be properly registered with all applicable controlling agencies.

2.12 CONNECTIONS TO WATER SUPPLY:

A. Contractor shall assure that all connections to the site's water system shall be temperature and pressure rated for operation of the temperatures and pressures encountered. After use, connections and fittings shall be removed without damage or alteration to existing water piping and equipment. Leaking or dripping valves shall be piped to the nearest drain or located over an existing sink or grade where water shall not damage existing finishes or equipment.

B. Employ heavy-duty abrasion-resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system in each work area. Provide fittings as required to allow for connection to existing wall hydrants or spouts.

2.13 OTHER TOOLS AND EQUIPMENT:

A. The Contractor shall provide other suitable tools for the stripping, removal and disposal activities. Tools shall include hand-held scrapers, plastic brushes, sponges, rounded edge shovels, brooms, polyethylene, carts, etc. All tools shall be inspected for contamination by the Consultant prior to use.

Equipment not inspected by the Environmental Consultant or contaminated equipment shall be removed from the site immediately. The Contractor shall bear the cost of any clean-up, laboratory costs and Environmental Consultants time associated with any clearance work.

B. All other materials not specifically described, but required shall be selected by the Contractor subject to the approval of the Environmental Consultant.

C. Prohibited Equipment: The following equipment and materials are prohibited from use on this project unless accepted in writing by the Environmental Consultant:

1. Vacuum powered removal or collection equipment located outside the asbestos work area, such as a "Vacu-Loader".

2. Gasoline, propane, diesel or other fuel powered equipment inside the building, unless previously approved in writing by the Owner and the Environmental Consultant.

3. Equipment that creates excessive noise or vibration that would affect safety of the building or generate complaints from neighboring building occupants. No equipment shall exceed an A-weighted sound level of 85 dB as measured at 3 ft. from the radiating source without written permission of the Environmental Consultant.

4. Flammable solvents with a flash point below 140 degrees F or materials containing ethylene glycol ether, methylene chloride, ethyl chloroform (1,1,1-trichloroethane), or other hazardous substances.

5. Non-fire retardant polyethylene sheeting.

6. Polyurethane spray foam for application in fire-rated assemblies, including but not limited to penetrations into stairwells, mechanical rooms, electrical closets, rated floor-to-floor assemblies, etc.

3 EXECUTION

3.1 WORK AREA PREPARATION

A. Provide all necessary connections for temporary utilities in the work place during abatement. Temporary electrical power shall be according to OSHA and the National Electrical Code for Wet Environments.

B. As required, establish designated limits for the asbestos work area with continuous barriers. Provide signs around the perimeter of the work area according to Cal-OSHA requirements.

C. Contractor shall conform to the Owner's lockout requirements, and secure the entire job site at all times. Area entrances and exits shall be secured by the Contractor during the abatement phase. Unauthorized visitors are strictly prohibited. Only the Contractor, Environmental Consultant, and Owners' representatives are permitted at the job site. Contractor shall ensure that all doors, gates, windows, and potential entrances to the building are secured and locked at the end of each work day.

D. Contractor shall store all materials, equipment, and supplies for the project inside the building in areas designated by the Owner.

3.2 CONTAINMENT AND WORKER DECONTAMINATION SYSTEM SET-UP

A. Contractor shall set-up containment in accordance with HUD guidelines requirements for all lead abatement work.

B. The Contractor shall be responsible for identifying all HVAC components (if applicable) that lead into or out of the work areas. All components shall be disconnected and sealed airtight for the duration of the

abatement work. All openings which lead to the building exterior or to adjacent interior building areas shall be sealed with two (2) layers of 6 mil poly secured with duct tape.

C. Contractor is to construct airtight, negative pressure enclosures using a minimum of two (2) layers of 6-mil fire retardant poly secured with duct tape to the walls and ceilings.

D. A three-chambered decontamination unit shall be required for each containment. Chambers shall be arranged as follows: a clean/change room, a shower, and a dirty/change room.

E. The clean/change room of the worker decontamination unit shall be of sufficient size to accommodate the work crew and their belongings. It shall include a respirator storage area and be fully equipped with reserve equipment and materials such as clean suits, towels, soap, tape, and respirator filters.

F. Approved fire extinguishers (Class ABC, multi-purpose, dry chemical type, rated: 4A; 60BC) shall be readily available to workers (maximum travel distance of 50 feet) inside and adjacent to work area(s). Personnel and emergency exits shall be clearly indicated on the inside of the containment area. The emergency exit plan shall be approved by the Environmental Consultant prior to the set up of any work areas.

G. The Environmental Consultant will inspect and approve all containment setups before any abatement is undertaken.

H. Contractor shall provide multiple and easily accessible viewing ports from the clean area into each abatement area. Viewing ports must be a minimum of 2' x 2', clear-see-through plastic with no scratches, tape, or glue marks. Viewing ports must permit the inspector to view the majority of the work area.

3.3 PERSONNEL PROTECTION EQUIPMENT

A. Personal Hygiene Practices:

1. The Contractor shall enforce and follow good personal hygiene practices during the abatement of asbestos-containing materials. These practices will include but not be limited to the following:

   (a) No eating, drinking, smoking, or applying cosmetics in the work area. The Contractor will provide a clean space, separated from the work area, for these activities.

   (b) If air monitoring data gathered by the Environmental Consultant in areas adjacent to the work areas shows exposure to airborne asbestos exceeds Cal-OSHA criteria, that area will become regulated and workers must wear protective clothing and approved respirators and must have a shower facility provided at the area.

B. Respirators:

1. Establish a respirator program as outlined by ANSI and required by Cal/OSHA Title 8 CCR 1529 and 29 CFR 1910.134. Select respirators from those approved jointly by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH). Respirators selected must be approved by the Certified Industrial Hygienist. Submit program for review.

2. Respirators and Protective Equipment for Handling Asbestos:

   (a) At minimum, provide each employee with the following respiratory protection:

      (1) Asbestos abatement of flooring materials - NIOSH/MSHA-approved half-face air purifying respirators with HEPA cartridges.

C. Protective Clothing:

1. Provide personnel exposed to asbestos fibers with fire retardant disposable protective whole body clothing, head coverings, gloves, and foot coverings. Provide disposable plastic or rubber gloves to protect hands. Cloth gloves may be worn inside the plastic or rubber gloves for comfort, but shall not be used alone. Make sleeves secure at the wrists and make foot coverings secure at the ankles with tape. Ensure that all personnel entering and leaving the work space follow this procedure. Suits shall be of adequate size to accommodate the largest employee. Foot covers may be part of the coveralls. Non-disposable footwear shall be left in the work area until it is disposed of at the completion of the job.

2. Protective clothing will be worn inside the work area after the area passes pre-abatement inspection and shall remain in use until the area passes final clearance inspection.

D. Goggles:

1. Contractor is to provide goggles to personnel engaged in asbestos operations when half-face respirators are in use.

E. Authorized Visitors Protective Clothing:

1. Provide authorized visitors with suitable protective clothing, headgear, and eye protection whenever the visitor must enter the work area. The Contractor will have available a minimum of three (3) suits and other suitable protective equipment for this purpose. Respiratory protection provided to authorized visitors shall be new and stored in convenient secure lockers of sufficient size to also permit the storage of clothing and other personal belongings.

3.4 AIR MONITORING:

A. The purpose of the air monitoring conducted by the Environmental Consultant will be to detect possible release of fibers emanating from the work area.

B. The Environmental Consultant at his/her option may provide area air monitoring as described in this specification. In addition to air monitoring within the work area and adjacent areas.

C. The Environmental Consultant shall perform all final clearance inspection and sampling.

D. The method of analysis for clearance air samples shall be via Transmission Electron Microscopy (TEM) or Phase Contrast Microscopy (PCM) methods. The method of analysis for in-progress asbestos air samples shall be PCM and TEM at the option of the Environmental Consultant. All PCM air sample analysis shall comply with NIOSH Method 7400.

E. Ambient airborne lead levels outside the work area shall not exceed 30 $\mu g/ m^3$ or baseline, whichever is less. If the airborne lead concentration inside or outside the work area exceeds 30 $\mu g/m^3$, then the abatement must stop. Contractor must take appropriate actions to reduce the airborne lead concentration within the acceptable limits

F. The Contractor shall be responsible for all personal air sampling. During the performance of any work in the contaminated work area, sufficient personnel breathing zone samples shall be taken to constitute representative sampling. These samples shall be taken each shift and for each distinct crew operation, and shall be used to verify adequacy of fiber control and respiratory protection. Personal breathing zone air sampling shall be in accordance with CAL/OSHA asbestos standards.

3.5 CLEARANCE INSPECTIONS

1. Initial Visual Inspection: Contractor is to notify the Environmental Consultant when the decontamination process in each containment area is complete. Evidence of debris will require additional clean up by the Contractor. Contractor shall be responsible for re-cleaning all areas found to be deficient.

2. If the Environmental Consultant determines that the work area is sufficiently clean, the Contractor may proceed with encapsulation. Contractor shall provide a coating of non-diluted Encapsulant to all surfaces in the work area. The Contractor shall allow the encapsulant to dry for the period specified by the manufacturer. The Contractor is responsible for confirming compatibility of encapsulant with new finishes.

B. Asbestos Clearance Testing:

1. Following encapsulation and drying time, the Contractor shall request that the Environmental Consultant conduct air clearance sampling. Clearance air sampling shall not take place until all encapsulant is dry as determined by the Environmental Consultant.

3.6 CLEARANCE CRITERIA

A. Asbestos Clearance Criteria:

1. The clearance criteria for all asbestos work areas will be using a modified AHERA protocol.

2. If air samples do not pass the required clearance criteria, the area shall be recleaned and new samples shall be collected by the Environmental Consultant.

3. The Contractor shall be responsible for all costs associated with re-sampling and re-analyses including costs associated with the Environmental Consultant. This amount will be deducted by the Owner from the Contractors final Payment.

4. The Environmental Consultant shall notify the Contractor of acceptable asbestos fiber concentrations. The Contractor shall then remove all the remaining barriers in the work area.

B. Lead Clearance Testing:

1. After removal of poly sheeting, the Monitoring technician will conduct a final visual inspection of each work area. Any lead material found shall be cleaned by the Contractor and any repairs to existing conditions shall be made at no additional cost to the Owner or the Monitoring technician. The Monitoring technician has the option to collect wipe samples and/or air and soil samples for lead content analyses. If lead samples indicate lead concentrations are below the baseline/clearance sample results, the Monitoring technician shall provide the Contractor with a written notice of acceptance.

2. At the option of the Monitoring technician, several lead dust wipe samples shall be collected following the abatement work in each area. Lead dust clearance criteria is as follow:
   (a) Floor - 100 ug/ft^2
   (b) Window sills - 500 ug/ft^2
   (c) Window wells, exterior sills & porches - 800 ug/ft^2.

3. The Contractor shall be responsible for all costs associated with recleaning and re-sampling of failed work areas including all costs associated with the Monitoring technician.

4. At the option of the Monitoring technician, clearance air samples for lead will also be collected in each work area. Clearance criteria will be less than 30 micrograms of lead per cubic meter of air (30 $\mu g/m^3$).

3.7 ASBESTOS AND LEAD-CONTAINING MATERIALS DISPOSAL

A. Asbestos Disposal Procedures:

1. Ensure that polyethylene bags are sealed air-tight. All bags shall be wet cleaned prior to removing them from the equipment decontamination unit.

2. It is the responsibility of the Contractor to determine current waste handling, labeling, transportation and disposal regulations for the work site and for each waste disposal landfill. The Contractor must comply fully with these regulations, local, state, and federal regulations and provide documentation of the same.

3. Ensure all disposal containers are properly labeled according to 8 CCR 1529, 5194 (HAZCOM), 49 CFR 171-179 (USDOT), 40 CFR 61 Subpart M (NESHAP), and any local regulations and state regulations as required by this specification.

4. Asbestos-containing waste that is properly labeled and double-bagged, may be temporarily stored in unoccupied areas approved by the Owner. Rooms must be made secure before storing the waste. Waste is not to remain in temporary storage area for longer than four (4) days before final load-out of materials.

5. All vehicles used to transport waste must be registered with the Department of Toxic Substance Control and display the proper registration and expiration stickers.

6. Debris box for asbestos-containing waste shall be fully lined with a minimum of one (1) layer of 6-mil poly on the walls and two (2) layers on the floor. Contractor shall not throw bags into the truck.

7. Debris box shall be constructed with minimum 20-gauge steel with no windows or openings other than the door. The door of the container shall have a secure cover on the locking device with access to the lock only at the key-hole. Once the debris box is filled and the manifest is signed, Contractor must transport the debris box off the job site.

8. Contractor shall provide at minimum one (1) day advance notification to the Owner when signatures are required on manifest/manifests. The Contractor shall ensure that the Hazardous Waste Manifest is correctly filled out.

9. Contractor is responsible for all coordination with the waste disposal site and with the waste hauling company.

B. Lead Waste Disposal procedures:

1. The Contractor shall follow all federal and state regulations for waste handling, containerizing, transporting, and disposing of hazardous waste.

2. The Contractor shall remove waste from the building following specification requirements. Waste shall be deposited directly into double polyethylene waste bags, goosenecked, then deposited into fiber drums or other approved waste receptacles that will be used to transport the waste.

3. The Contractor is responsible for providing all waste receptacles required for disposal. All waste temporarily stored on site shall be secured to prevent against unauthorized entry and vandalism.

4. The Contractor shall establish a manifest system that meets federal and state regulations and accounts for all waste at all times.

5. The transporter must possess an approved EPA identification number. The hazardous waste manifest must be completed by the Contractor.

6. The Contractor shall provide the Environmental Consultant with copies of the EPA ID number of the transporter, copies of the manifest forms, and written acknowledgment from the landfill that they are authorized by the EPA and the State where they are located, to accept and dispose of hazardous waste.

7. Final manifest and receipts must be provided to the Owner and copied to the Environmental Consultant within fourteen (14) days of the removal of waste from the site

END OF SECTION

SECTION 02250
TERMITE CONTROL

PART 1 - GENERAL

1.01 WORK INCLUDED

A This section includes everything necessary for and incidental to the execution and completion of all soil poisoning for subterranean termite control.

1.02 RELATED WORK

A. Division 3: Concrete

B. Section 06100: Rough Carpentry

1.03 QUALITY ASSURANCE

A. The Subcontractor for termite control shall have the experience, facilities, and personnel of sufficient quantity and quality to assure performance of the work in a timely fashion and in a manner that will produce the specified results. Subcontractor shall be registered and licensed in accordance with the regulations of the State of California.

B. All work of this section shall conform to the code, ordinance or regulation of any governmental agency having jurisdiction.

1.04 SUBMITTALS

A. The Subcontractor for termite control shall submit the following:

1. Proposed formulation and proprietary materials to be used for termite control.

2. Proof that the proposed formulations and their application conform to all applicable codes, ordinances and regulations of any governmental agency having jurisdiction.

3. Proof of registration and licensing by the State.

4. Method and extent of application, and coordination with other work.

5. Written certificate stating completion of work in accordance with requirements herein.

1.05 GUARANTEE

A. Upon completion of the work, and as condition of final acceptance, the Owner shall be furnished with a written guarantee which shall provide that the Termite Control shall prevent subterranean termites from attacking the building or its contents for a period of five (5) years. If subterranean termite activity exists in or under the building during the guarantee period, the Subcontractor promptly, and without expense to the Owner, shall:

1. Re-treat the soil to prevent subterranean termites from attacking the building or its contents.

2. Make good all damage caused by subterranean termite activity.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Toxicants: Proprietary materials which are being used as soil poisons for subterranean termite control are acceptable for use provided they meet all current requirements and standards of the appropriate regulating agencies.

PART 3 – EXECUTION

3.01 APPLICATION

A. Installation shall be performed in conformance with toxicant manufacturer's guide and recommended application methods for pre-construction and post-construction treatments.

B. Working solutions: Applied uniformly to all areas beneath new and existing concrete and all foundation concrete at a rate of one gallon per 10 square feet of ground area. Toxicants may be applied before placing granular fill which is to be used as a base layer for the slab. If granular fill is in place when toxicants are applied, the working solution should be increased by 50% (1.5 gallons per square foot) to account for absorption by the fill. Ground areas beneath concrete slabs-on-grade which abut principal building slabs shall be similarly treated for a distance not less than 3 feet from the building.

C. Soil poisons shall not be applied when soil is excessively wet. Runoff would result in lower potency of treatment, reducing or nullifying the effectiveness of the treatment.

D. Apply 4 gallons of working solution per 10 linear feet to all critical areas under the slab, including around plumbing, below expansion joints and control joints, and other features that will penetrate the slab.

E. Apply toxicants to all existing sub-surface perimeter foundations and any spot areas prone to infestation.

F. After grading is finished, apply 4 gallons per 10 linear feet to a shallow trench along the exterior perimeter of the building.

3.02 CLEANUP

A. Cleanup of all spills of any toxic material and disposal of all containers, applicators, or other material or equipment contaminated by a toxic material as a consequence of this Work, shall be accomplished in strict conformance with all applicable codes, ordinances and regulations of any governmental agency having jurisdiction.

END OF SECTION

SECTION 03100
CONCRETE FORMWORK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes
1. Formwork for cast-in-place concrete, with shoring, bracing, and anchorage.
2. Openings for other work.
3. Form accessories.
4. Form stripping.

B. Related Documents and Sections
1. Division 1 Requirements.
2. Section 03200 - Concrete Reinforcement.
3. Section 03300 - Cast-In-Place Concrete.

1.2 QUALITY ASSURANCE

A. Formwork shall be in conformance with ACI 347, "Guide for Formwork for Concrete," unless otherwise specified.

1.3 DELIVERY, STORAGE AND HANDLING

A. Store products subject to damage by dirt and moisture in a clean, dry location, off the ground and suitably protected.

1.4 COORDINATION

A. Coordinate the design, construction and installation of concrete formwork with the requirements for openings, sleeves, chases, reglets, pipes, recesses, nailers, anchors, ties, inserts and other embedded items.

PART 2 PRODUCTS

2.1 MATERIALS

A. Form materials shall be new and undamaged at start of work.

B. Use flexible spring-steel forms or laminated boards to form radius bends.

C. Form Lumber: Douglas Fir, Construction Grade, No. 2 or better, S1S2E.

D. Plywood: 5-ply, 3/4 in. thick, APA B-B Plyform, Class I, Exterior Type with mill-oiling treatment omitted.

2.2 EARTH FORMS

A. Where approved, vertical excavated surfaces may be used for forms for slabs on grade and grade beams, provided that the earth will stand without caving and that suitable provisions are taken to prevent raveling of top edges or sloughing of loose materials from the walls of the excavation. Footings must be increased 2 in. in width from that shown on plans.

B. Where earth forms are permitted, clear dimensions as indicated shall be maintained and any over-excavation shall be filled monolithically with concrete.

C. Construct wood edge strips at top sides of excavations.

2.3 FORM ACCESSORIES

A. Accessories which will be wholly or partially embedded in concrete, such as ties and hangers, shall be a commercially manufactured type, of metal; wire will not be acceptable.

B. The portion remaining in the concrete shall leave no metal within one inch of concrete face and no fractures, spalls, depressions, or other surface disfigurations greater that 3/4 in. in diameter.

C. Spreader cones on ties shall not exceed 1 in. in diameter.

2.4 FORM SEALER

A. Manufacturers
1. Sonneborn Building Products, Inc., "Form Saver".
2. Grace Construction Materials "Form Fill".
3. Burke "Form Sealer".

B. Type: Shall eliminate grain raise as a result of moisture and shall not interfere with color, bond, or subsequent treatment of concrete surface.

2.5 FORM-RELEASE AGENTS

A. For Exposed Concrete to Receive Paint or Other Coatings: Chemically active type producing water-insoluble soaps. Release agents shall contain no petroleum solvents such as creosote, paraffin, wax or diesel oils.

B. For Unexposed Concrete: Any type that will not interfere with bond of applied finishes.

PART 3 EXECUTION

3.1 FORMWORK

A. All concrete placement shall be contained by constructed forms or stable earth forms.

B. Design, construct, and brace formwork and temporary falsework to safely support concrete and safely hold personnel during construction operations.

C. Construct forms of sufficient strength and rigidity to produce finished concrete of the precise size, shape, and location indicated, within the specified tolerances. Form assembly shall permit removal in proper sequence without damage to concrete. Reinforce frames and blockouts from movement and deformation.

D. Arrange forms to permit single placement of exposed areas and panels without joints between adjacent forming materials in the same plane.

E. Construct forms no higher than 12 in. above the top of a placement or construction joint.

F. Construction Joints
1. Form in accordance with requirements of Section 03300.
2. Provide a surfaced strip where construction joints intersect exposed surfaces; faces to provide straight lines at joints. Prior to subsequent placement, remove strip and tighten forms.
3. Construction joints shall show no overlapping or offsetting of concrete surfaces and shall, as closely as possible, present the same appearance as butted plywood joints.
4. Joints in a continuous line shall be straight and true.

G. Provide cleanouts as required to permit inspection and thorough cleaning of loose dirt, debris, and waste material. Cleanouts shall not be apparent on concrete surfaces exposed to view in the finished Work.

H. Chamfered Corners
1. Chamfer exposed corners unless otherwise indicated.
2. Obtain chamfers by placing 3/4 in. x 3/4 in. non-staining moldings in forms. Provide pieces in longest lengths possible and miter joints.

I. Whenever concrete bases or foundations are to be provided for equipment furnished as part of the Work of other Sections, verify dimensions for the equipment to be furnished before concrete is placed.

J. Form surfaces for concrete exposed to view in the finished Work shall be constructed of plywood.

K. For surfaces not exposed to view in the finished Work, forms shall be lumber, form plywood, or any other suitable material.

L. Formwork shall be clean and free of debris when concrete is placed.

M. Forms shall be sufficiently tight to prevent leakage of water and mortar.

N. Subject to approval of the Owner's Representative, undamaged wood formwork may be reused maximum 6 times. Use of metal forms is unlimited.

3.2 TOLERANCES

A. Construct formwork to tolerances specified in ACI 347, except that anchor bolt setting tolerances shall be ±1/8 in. within a given group, such as steel connections or equipment bases, and within groups in relation to other groups, such as column centers.

B. The tolerance for column centers shall not be cumulative, so that the actual overall dimension of a series of columns, for example, building bays shall still be within ±1/8 in. of the overall dimension indicated.

C. Where tighter tolerances are required to accommodate detention equipment or other items specified in other sections, construct formwork to the most restrictive tolerance.

3.3 PREPARATION OF FORMS

A. Treat contact surface of plywood and lumber forms with a form sealer in accordance with the manufacturer's printed instructions.

B. Clean surfaces and reseal before each use to ensure undamaged concrete.

C. Do not use form oil.

3.4 STRIPPING OF FORMS

A. Strip forms using methods which will not damage concrete.

B. Do not remove forms until concrete has attained sufficient strength to support its own weight and construction live loads to be placed thereon without damage to the structure, but not before minimum time as follows:
1. Footings, Curbs, Walks, and Paving: Side forms may be removed 24 hours after concrete is placed.
2. Side Forms of Slabs: 10 days.
3. Shoring: 21 days.

3.5 RESHORING

A. Submit reshoring plan to Architect/Engineer if forms are to be stripped earlier than specified above.

END OF SECTION

SECTION 03200
CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes
   1. Reinforcing steel bars, wire fabric, and accessories for concrete and unit masonry.

B. Related Sections
   1. Division 1 Requirements.
   2. Section 03100 - Concrete Formwork.
   3. Section 03300 - Cast-in-Place Concrete.
   4. Section 03305 - Concrete Testing and Inspection.

1.2 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 315 - Details and Detailing of Reinforced Concrete.

C. ACI 318 - Building Code Requirements For Reinforced Concrete.

D. ANSI/ASTM A 82 - Cold Drawn Steel Wire for Concrete Reinforcement.

E. ANSI/ASTM A 185 - Welded Steel Wire Fabric for Concrete Reinforcement.

F. ANSI/AWS D1.4 - Structural Welding Code for Reinforcing Steel.

G. ASTM A 615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

H. ASTM A 706 - Low-Alloy Steel Deformed Bars for Concrete Reinforcement.

I. AWS D12.1 - Welding Reinforcement Steel, Metal Inserts and Connections in Reinforced Concrete Construction.

J. UBC - Uniform Building Code, 1994 Edition.

1.3 SUBMITTALS

A. Submit under provisions of Division 1.

B. Shop Drawings: Indicate bending and placing details of reinforcement; bar sizes, spacings, locations, and quantities of reinforcing steel, and wire fabric; bending and cutting schedules; supporting and spacing devices, splice locations.

C. Certificates: Welding certificates of welders in conformance with AWS D1.4.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Submit manufacturers' installation instructions.

F. Submit certified copies of mill test report of reinforcement materials analysis.

1.4 QUALITY ASSURANCE

A. Detailing, fabricating, and spacing of reinforcement shall be in conformance with ACI 315 and ACI 318, unless otherwise indicated.

B. Tests: Under provisions of Division 1.

C. Weld reinforcement in accordance with AWS D1.4. Do not weld reinforcement unless specifically indicated or directed by Architect or Engineer.

D. Perform Work in accordance with ACI 301.

E. Owner's Representative will inspect reinforcement.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver reinforcing steel from the mill in securely tied bundles, each bundle limited to one size and grade of material. Plastic or metal tags in an exposed position on each bundle shall identify the mill, the melt or heat number, and the grade and size of material.

B. After fabrication, bundle and tag reinforcing steel for identification at the site. Tags shall identify the steel by the reinforcement item marking indicated on the reviewed Shop Drawings and the quantity of such item contained in the bundle.

C. Segregate to maintain identification after bundles are broken.

D. Store off the ground, protected from the elements and contaminants which could adversely affect bond.

1.6 COORDINATION

A. Coordinate with placement of formwork, formed openings and other Work.

PART 2 PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Bars
   1. Welded Bars: ASTM A 706, Grade 60 deformed low alloy steel bars, plain finish.
   2. All Others:
      a. #4 or Larger: ASTM A 615, Grade 60 deformed billet steel bars, plain finish unless otherwise indicated.
      b. #3 Bars ASTM A 615 Grade 40 deformed low alloy steel bars plain.

B. Welded Wire Fabric: ASTM A 185 Plain Type. Provide in flat mats, rolls are not acceptable.

2.2 ACCESSORY MATERIALS

A. Wire for Ties, Stirrups, and Spiral Reinforcement: ASTM A 82, minimum 16 gage.

B. Chairs, Bolsters, Spacers, Bar Supports, and Other Accessories
1. Conform to requirements of ACI 315; size and shape for strength and support of reinforcement during concrete placement conditions.
2. Where portion of accessories will be within 1/2 in. of concrete surfaces exposed to the weather in the finished Work, such accessories shall be made of stainless steel.
3. Use wire bar type support complying with CRSI recommendations, unless otherwise indicated.
4. For slabs on grade, use supports with sand plates or horizontal runners where base materials will not support chair legs.
5. For exposed-to-view concrete surfaces, where legs of supports are in contact with forms, provide supports with legs which are hot-dip galvanized, plastic coated or stainless steel protected.
6. Over vapor barriers, use load-bearing bottom pads or precast concrete chairs to prevent penetration of the membrane.

C. Welding Filler Metal: E70XX for A 706, Grade 60 bars, low hydrogen electrodes.

2.3 FABRICATION

A. Fabrication of reinforcement items shall proceed only after review of bar lists and Shop Drawings. Each unit of reinforcement shall be fabricated to conform to the reviewed bar lists and shop drawings.

B. Reinforcing steel shall be bent cold and shall not be straightened or rebent in a manner that will damage the material.

C. Fabricate concrete reinforcing in accordance with ACI 318 and California Building Code.

D. Locate reinforcing splices, not indicated on Drawings, at point of minimum stress as approved.

PART 3 EXECUTION

3.1 PLACEMENT

A. At time of concrete placement, reinforcement shall be free of coatings that could adversely affect the bond with concrete.

B. Reinforcement shall be supported and fastened together to prevent displacement by construction loads or by the placement of concrete, beyond the tolerances specified in ACI 301. Sizes and dimensions of supports shall be as required to position the steel as indicated on the reviewed Shop Drawings and in conformance with the minimum concrete protective covering requirements of ACI 301.

C. Furnish reinforcing bars full length, to the extent practicable. Splices will be permitted only where indicated on the Drawings, Shop Drawings or as otherwise permitted by the Owner's Representative.

D. Lap welded wire fabric reinforcement 12 in. at edges, unless otherwise indicated, and wire together.

E. Sleeved Splices: Install splice sleeves only where indicated in accordance with manufacturer's instructions.

F. Other Splices in Reinforcement: Lapped ends of bars may be placed in contact and securely wired or may be separated sufficiently to permit the embedment of the entire surface of each bar in concrete.
1. Stagger splices in adjacent bars.
2. Lap bars 40 diameters unless otherwise indicated.

G. Reinforcing bars shall not be rebent or straightened; remove and replace.

H. Obstructions: Should conduit, pipes, inserts, sleeves, or other items interfere with the placement of reinforcement, notify the Owner's Representative and obtain approval of procedure before placement of concrete is started.

I. Concrete Cover: Indicated on Drawings.

J. Welding
1. Conform to the requirements of AWS D1.4; perform by AWS-qualified welders.
2. Perform field test on minimum one weld within each 25 welds. Conduct non-destructive field test (radiographic for butt welds, magnetic particle for fillet welds) for welds indicated.

K. Place, support and secure reinforcement against displacement. Do not deviate from required position.

L. Misplaced Reinforcing
1. If reinforcing bars are found to be misplaced after concrete has been placed, immediately notify the Owner's Representative and make no correction and cutting without Owner's Representative review and recommendations.
2. Misplaced bars shall not be bent.
3. Perform redesign alterations, corrections, or replacement of concrete or reinforcing required because of misplaced bars.

M. Do not displace or damage vapor barrier.

N. Accommodate placement of formed openings.

3.2 MAINTENANCE OF REINFORCING

A. Continuously inspect and maintain reinforcement in proper position during concrete operations.

END OF SECTION

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes
1. Structural concrete for building and structure elements, concrete floors (supported and unsupported) exterior concrete flatwork.
2. Expansion and contraction joint devices associated with concrete work.
3. Equipment pads and other items indicated.
4. Installation of inserts, anchorages and other embedded items.

B. Related Sections
1. Division 1 Requirements.
2. Section 03100 - Concrete Formwork: Formwork and accessories.
3. Section 03200 - Concrete Reinforcement.
4. Section 03305 - Concrete Testing and Inspection.
5. Section 07900 - Joint Sealers.
6. Section 09900 - Painting.
7. Division 15: Mechanical items for casting into concrete.
8. Division 16: Electrical items for casting into concrete.

1.2 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 305R - Hot Weather Concreting.

C. ACI 306R - Cold Weather Concreting.

D. ANSI/ASTM D 1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

E. ANSI/ASTM D 1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

F. ASTM C 33 - Concrete Aggregates.

G. ASTM C 94 - Ready-Mixed Concrete.

H. ASTM C 150 - Portland Cement.

I. ASTM C 171 - Sheet Materials for Curing Concrete.

J. ASTM C 260 - Air Entraining Admixtures for Concrete.

K. ASTM C 309 - Liquid Membrane-Forming Compounds for Curing Concrete.

L. ASTM C 494 - Chemicals Admixtures for Concrete.

M. UBC - Uniform Building Code, 1994 Edition.

1.3 DEFINITIONS

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

1.4 SUBMITTALS

A. Submit under provisions of Division 1.

B. Product Data: Provide data on products and materials specified.

C. Shop Drawings: Indicate locations of proposed construction and control joints, prior to placement.

D. Samples: Submit two 6 in. long samples of expansion/contraction joint and control joint.

E. Certificates of Compliance: Prior to incorporation in construction, submit manufacturer's Certificate that specific products proposed for use meet or exceed specified requirements.

F. Mix Designs.

G. Manufacturer's Installation Instructions: Indicate installation procedures and interface required with adjacent Work.

H. Certificate of Installation for Concrete Hardeners: Submit manufacturer's certificate stating that concrete hardener has been applied in accordance with the manufacturer's instructions. The contractor shall sign the certificate.

1.5 QUALITY ASSURANCE

A. Conform to UBC Uniform Building Code 1994 Edition.

B. Perform Work in accordance with ACI 301. Maintain one copy of document on site.

C. Acquire cement and aggregate from same source, respectively, for all work.

D. Conform to ACI 305R when concreting during hot weather.

E. Conform to ACI 306R when concreting during cold weather.

F. Allowable Tolerances: Deviation from plumb or level shall not exceed 1/8 in. within 10 ft. in any direction, as determined with a 10 ft. straight edge.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle packaged materials in the manufacturer's original, sealed containers, each clearly identified with the manufacturer's name, and name and type of product.

B. Store materials subject to damage by dirt and moisture in a clean, dry location, off the ground and suitably protected.

C. Store coarse and fine aggregates in separate, covered bins.

D. Store bulk cement in covered bins.

1.7 JOB CONDITIONS

A. Environmental Requirements for Placing Concrete
1. Hot Weather: ACI 305R. See execution below.
2. Cold Weather: ACI 306R. See execution below.
3. Do not place concrete during precipitation, unless adequate protection is provided.
4. All concrete subjected to freeze-thaw cycles shall be designed as air-entrained per ASTM C 260 and ACI 201.2R.

1.8 COORDINATION

A. Coordinate work under provisions of Division 1.

B. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

C. Coordinate the installation of items to be embedded in concrete, and provide openings in the concrete necessary for performance of the Work of other Sections.

D. In advance of concrete placements, determine finish characteristics required by the Work of other Sections and provide concrete surfaces accordingly.

E. Concrete which is to receive application of other Work shall be water-cured only, and maintained free from other formwork and curing materials, unless otherwise accepted by the Owner's Representative.

1.9 FIELD SAMPLES

A. Provide under provisions of Division 1.

B. Construct and erect a field sample for architectural concrete surfaces receiving special treatment or finish as result of formwork.

C. Sample Panel: Sufficient size to indicate special treatment or finish required.

D. Locate where directed.

E. Approved sample panel is considered basis of quality for the finished work. Keep sample panel exposed to view for duration of concrete work.

F. Approved sample may remain as part of the Work.

PART 2 PRODUCTS

2.1 MATERIALS

A. Concrete: Ready-mixed, ASTM C 94.

B. Cement: ASTM C 150, Type I, Type II, or Type V.

C. Aggregate: ASTM C 33.

D. Water: Potable, clean, not detrimental to concrete, containing less than 500 ppm of chlorides.

2.2 ADMIXTURES

A. Water-Reducing Admixture: ASTM C 494.
1. Manufacturers
   a. Euclid Chemical Company, Eucon WR-75.
   b. Master Builders, Pozzolith 220N.
   c. Sika Chemical Corp., Plastocrete 160.

B. Water-Reducing, Retarding Admixture: ASTM C 494.
1. Manufacturers
   a. Euclid Chemical Company, Eucon Retarder-75.
   b. Master Builders, Pozzolith 100XR.
   c. Sika Chemical Corp., Plastiment.

C. High Range Water-Reducing Admixture (Superplasticizer): ASTM C 494.
1. Manufacturers
   a. Euclid Chemical Company, Eucon 37.
   b. American Admixtures, Melment L10A.

D. Air-Entraining Admixture: ASTM C 260.
1. Manufacturer: Approved by CDC Representative.

E. Accelerator: ASTM C 494, Type C or E; Non-corrosive, non-chloride.
1. Manufacturer
   a. Euclid Chemical Company, Accelguard 80.
   b. Master Builders, Incorporated; Pozzutec 20.
   c. W.R. Grace Company; Daraset.
2. Submit test report from independent testing laboratory of results of an acceptable accelerated corrosion test method such as that using electrical potential measures, of minimum 1 year duration, demonstrating non-corrosive nature of product.

F. Bonding Admixture: Acrylic latex, non-rewettable type.
1. Manufacturer
   a. Euclid Chemical Company, Flex-Con.
   b. The Burke Company, Burke Acrylic Bondcrete.
   c. Thoro System Products, Acryl 60.
   d. W. R. Grace, Daraweld C.

G. Fly Ash: Fly ash addition to the concrete mix with reduction of Portland cement is acceptable, subject to the following criteria:
   1. Fly ash shall conform to the requirements to the ASTM C 618, Class F, supplementary optional chemical and physical requirements of Tables 1A and 2A, except that the maximum sulfur trioxide shall be 4% and the maximum loss on ignition shall be 1.5%.
   2. Fly ash may be used only in concrete mixes with Portland cement Type II and IIA and shall not be used with high early strength Portland cement Type III.
   3. The reduction of Portland cement, by weight, shall not exceed 12% when comparing the mix design without fly ash with the mix design with fly ash. For comparing the mix design, the Contractor shall furnish a certified mix design without fly ash together with a mix design with fly ash. In addition, the Contractor shall submit test results on three test cylinders for each test; age, prepared and cured in accordance with ASTM C 192, test at 7 and 28 days in accordance with ASTM C 39. The test cylinders shall have been prepared from a batch of the proposed design mix with fly ash. Where the 28-day test do not meet the specified strength requirements, the design mix will not be acceptable.
   4. The amount of fly ash, by weight, added to the mix shall not be less than the reduction of Portland cement determined as specified in the proceeding subparagraph (3).

2.3 ACCESSORIES

A. Curing Compound: Liquid membrane, ASTM C 309, type I; conforming to volatile organic compound (VOC) limits established by Local Air Quality Control Board (LAQCB) District Regulations.

B. Sheet Curing Material: ASTM C 171.

C. Hardener: Clear, non-metallic dust-on type.
   1. Manufacturer
      a. Sonneborn, "Harcol Standard Natural".
      b. Burke Floor Hardener.
      c. Lambert Corp., "Colorhard".

D. Bonding Agent
   1. Manufacturer
      a. Euclid Chemical Company; Euco-Weld.
      b. Larsen Products Corp.; Weld-Crete.
      c. Symons Corporation; Ready Bond.
   2. Type: Polyvinyl acetate, rewettable type, with visible tinted pigment to verify coverage.

E. Bond Breaker
   1. Nonstaining type, providing a positive bond prevention.
   2. Manufacturer and Product
      a. Williams Distributors, Inc., Seattle WA, Williams Tilt-Up Compound.
      b. SCA Construction Supply Division, Superior Concrete Accessories, Franklin Park, IL Silcoaseal 77.
      c. Burke Co., San Mateo, CA Burke Clean Lift Bond Breaker or Burke Tilt Free Bond Breaker.

F. Structural Epoxy Bonding Adhesive: 2-component, 100% solids compound suitable for use on dry or damp surfaces.

1. Manufacturer
   a. Euclid Chemical Company; Eucopoxy LPL, Euco 452MV.
   b. Sika Chemical Corporation; Sikadur 32 Hi-Mod.
   c. The Burke Company; Burkepoxy MV.

G. Non-Shrink Grout
   1. Manufacturer
      a. Euclid Chemical Company; Euco N-S Grout, Euco Hi-Flow Grout.
      b. Master Builders; Masterflow 713, Masterflow 928.
      c. The Burke Company; Burke Non-ferrous Non-shrink Grout.
      a. W.R. Meadows "Sealtight 588"
   2. Type: CRD C621; non-metallic; capable of achieving a 95% bearing under a 4 x 4 ft. baseplate when grout is placed at a fluid consistency.

H. Patching Mortar: Epoxy type, 100% solids, suitable for use on damp or dry surfaces.
   1. Manufacturer
      a. Euclid Chemical Company; Euco 456 Mortar.
      b. Sika Chemical Corporation; Sikadur 43 Patch-Pak.
      c. The Burke Company; Burkepoxy Mortar.

I. Patching Compound: Free flowing, polymer modified, cementitious topping.
   1. Manufacturers
      a. Vertical or Overhead Applications
         1) Euclid Chemical Company; Verticoat.
         2) Sika Corporation; SikaRepair 223.
         3) Burke Company; Skimcrete.
      b. Other Applications
         1) Euclid Chemical Company; Euco Thin Coat.
         2) Sika Chemical Corporation; Sikatop 121.
         3) Burke Company; Burke-Krete.

J. Evaporation Retardant
   1. Manufacturers
      a. Euclid Chemical Company; Eucobar.
      b. Master Builders; Confilm.
      c. The Burke Company; Burke Finishing Aid Concentrate.

2.4 JOINT DEVICES AND FILLER MATERIALS

A. Joint Filler Type A: ASTM D 1751; Asphalt impregnated fiberboard or felt, 1/4 in. thick; tongue and groove profile.

B. Joint Filler Type B: ASTM D 1752; Closed cell polyvinyl chloride foam, resiliency recovery of 90% if not compressed more than 50% of original thickness.

C. Joint Filler Type C: ASTM D 1752; Premolded sponge rubber, fully compressible with recovery rate of minimum 95%.

D. Epoxy Joint Filler: 2-component, 100% solids compound; minimum 50 shore D hardness.

1. Manufacturer
   a. Euclid Chemical Company; Euco 700.
   b. Metzger/McGuire Co.; MM-80.
   c. The Burke Company; Burkepoxy Reflex Joint Filler.

E. Construction Joint Devices: Integral galvanized steel formed to tongue and groove profile, with removable top strip exposing sealant trough where indicated.

2.5 MIXES

A. General Requirements
1. Design mixes shall be in accordance with UBC 1905A.3.12.1 trial batch.
2. Instruct Testing Agency to base mix designs on use of materials tested and approved.
3. Concrete mixes shall be designed to meet strengths specified and be of uniform density without segregation when placed.
4. Water-cement ratio which shall control the amount of total water added to concrete for the following conditions:

Concrete Aggregate Size	With Superplasticizer W/C Ratio	Without Superplasticizer W/C Ratio
1 in.	0.385	0.45
3/4 in.	0.375	0.44

5. Air Content: 4 - 6%.
6. Water Reducers: Use water-reducing admixtures in all concrete.
7. Mix designs are subject to review. Final acceptance of materials will depend upon strength testing after placement.
8. Specifically Prohibited Admixtures
   a. Admixtures containing hydrogen chloride, calcium chloride, or thiocyanates.
   b. Admixtures containing more than 0.05% chloride ions.
9. Unspecified admixtures will not be permitted, unless modified by the Testing Agency as necessary, and each such modification is approved by the Engineer of Record.
10. Concrete may be designed for either pump or conventional placement. If pumping will be used, the mix shall be specifically designed for pumping and shall be so designated.

B. Nonshrink Grout: Mix in accordance with the manufacturer's printed instructions, using potable water from a domestic source.

C. Dry Pack: Mix, in proportions by volume, 1 part cement to 2-1/2 parts fine aggregate, screening out materials retained on a No. 4 sieve. Mix with water to a consistency such that, when a ball of mixture is compressed in the hand, it will maintain its shape, showing finger marks, but not showing any surface water.

D. Patching Mortar: Mix in proportions, by volume, of 1 part cement to 2 parts fine aggregate.

2.6 MIXING

A. Batch Plant Conditions
1. Equipment and plant shall be capable of weighing, proper segregation and efficient handling, and shall be subject to approval. Equipment and plant processes not approved shall not be used in the Work.

2. Use approved automatic metering capable of determining moisture content of sand.

B. General Requirements
1. Concrete mixing shall comply with UBC Section 1905A.3.1.1 and ASTM C 94.
2. Mix cement, fine and coarse aggregates, admixtures, and water to exact proportions of mix designs.
3. Measure fine and coarse aggregates separately according to approved method which provides accurate control and easy checking.
4. Adjust grading to improve workability; do not add water, unless otherwise recommended by the Owner's Representative.
5. Maintain proportions, values, and factors or prove mixes throughout Work.

C. Admixtures: Use automatic metering dispenser to introduce admixture into mix.

2.7 CONCRETE CLASSES

A. See schedule at the end of this Section.

2.8 STEEL REINFORCING AND EMBEDS

A. Steel reinforcing and accessories are specified in Section 03200.

B. Inserts, anchorages, and other embedded items are specified in Section 05500.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that conditions are satisfactory for the installation of cast-in-place concrete.

B. Verify requirements for concrete cover over reinforcement.

C. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

D. If unsatisfactory conditions exist, do not commence the installation until such conditions have been corrected. Beginning installation means acceptance of existing conditions.

E. Hot Weather:
1. Follow all requirements as per ACI 305R-89; except as modified below in this Section.
2. The concrete temperature at placement shall not exceed 100 deg. F.
3. Use ice and/or cold water as part of the mixing water to reduce concrete temperature. Adjust the mix accordingly to take in account the ice. Where maximum quantities of ice and/or cold mixing water are required, aggregates should be properly drained to minimize free moisture.
4. Flatwork surfaces shall be water cured in forms and covered with burlap and plastic sheeting for protection. Forms and burlap shall be wetted down a minimum of 7 times daily to keep it continually moist.

5. Water cure all flatwork surfaces until minimum design strength is reached but not sooner than 5 days.
6. Submit a list which outlines concrete placement and curing.

F. Cold Weather Concrete.
1. Follow the requirements of ACI 306R-2 except as modified below.
2. Concrete temperature at placement and curing shall not fall below 55 deg. F for sections less than 12 in. in dimension and 50 deg. F for all others.
3. Placement temperatures may not be higher than 20 deg. F over the minimum temperatures shown above.
4. For concrete protection provide foam insulating blankets until concrete has obtained its minimum design strength, but not less than 3 days.
5. Where additional heat is required to maintain minimum concrete temperatures as listed above, heat shall be provided with electric heating wires embedded in insulating blankets.
6. Apply approved curing compound immediately after finish of newly placed concrete is complete.
7. Insure maximum temperature drop of concrete after initial protection does not exceed 45 deg. F in its first 24 hours.
8. Concrete shall not be placed against frozen subgrade or forms.
9. Submit list which outlines concrete placement and curing procedures.

3.2 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.

B. Remove loose dirt and foreign matter from excavations and forms; remove standing water and saturated soil from excavations and from cavities. Placing concrete in standing water shall not be permitted.

C. Thoroughly clean reinforcement and other embedded items free from loose rust and other objectionable matter.

D. Thoroughly wet wood forms, except coated plywood, and adjacent concrete at least 1 hour in advance of placing concrete; securely close cleanout end inspection ports; repeat wetting as necessary to keep forms damp.

E. Moisten subgrade or sand associated with under-slab vapor barrier system one day prior to placing concrete; maintain moist until concrete placement.

F. Maintain equipment clean and of sufficient quantity and capacity to efficiently execute the Work.

G. Verify that subgrade and forms have been checked for line and grade, and work areas have been observed and approved by the Owner's Representative.

3.3 PLACEMENT

A. Notify the Owner's Representative 48 hours before each concrete placement.

B. Transporting

1. Concrete shall be handled from the mixer to the place of final deposit as rapidly as practicable by methods which prevent the separation or loss of the ingredients.
2. Concrete shall not be dropped freely where reinforcing bars will cause segregation, nor shall it be dropped more than 4 ft.
3. Spouts, elephant trunks, or other approved means shall be used to prevent segregation.
4. Concrete may be pumped from the transit mixer to places of deposit, provided that information on mix-design adjustments, equipment data, procedures, and the entire operation are submitted for the Owner's Representative's prior review.
   a. Pumps shall be suitable for the mix, aggregate size, and slump required.
   b. Pump operators shall be experienced in the operation of the equipment to be used.
5. Use of aluminum equipment to transport concrete is not permitted.

C. Depositing
1. Place concrete in accordance with UBC, Section 1905A.10.
2. Maintain during placement or until the completion of the section, a plastic surface approximately horizontal.
3. Prevent displacement of reinforcement, anchor bolts, welding plates, and other items required to be embedded in concrete.
4. Before concrete sets, completely remove concrete spilled on forms or reinforcing steel in portions of structure not to be immediately concreted.
5. Place concrete continuously between predetermined expansion, control, and construction joints. An interruption in placing of more than 60 minutes will be cause for shutting down concrete placement operations and the wasting of remaining mixed concrete, concrete in hoppers, and concrete in mixers. In case such interruption occurs, provide construction joints where and as directed, and cut concrete back to such line, cleaning forms and reinforcing as specified herein.
6. Keep a record of the time and data of placing the concrete in each portion of the structure. Keep reports until the completion of the structure, and keep reports open to the review of the Owner's Representative.

D. Consolidation
1. Thoroughly consolidate concrete by puddling with suitable tools during placement and thoroughly working around reinforcement, embedded fixtures, and into the corners of forms.
2. In addition to manual spading and tamping, internally vibrate concrete with high-speed mechanical vibrators of sufficient amplitude for adequate consolidation.
3. Vertically insert and remove hand-held vibrators at points 18 in. to 30 in. apart.
4. Do not use vibrators to transport concrete in forms.
5. Vibrate concrete minimum amount required for consolidation.
6. Do not vibrate concrete placed for slab on grade except at slab edges adjacent to edge forms and at items embedded in the slab.

E. Construction Joints
1. Verify location and conformance with typical details; provide only where designated or accepted by the Owner's Representative.
2. Horizontal construction joint shall conform to UBC Section 1906A.4.
3. Surface of construction joints shall be cleaned and roughened by removing the entire surface and exposing clean aggregate solidly embedded in mortar matrix.
4. Contact surface shall be thoroughly cleaned by sandblasting or chipping the entire surface not earlier than five days after the initial placement or by an accepted method that will assure equal bond such as a thorough hose washing of surface not less than two or more than four

hours after concrete is placed, wash water and chalk-like material being entirely cleaned from the surface. Vertical construction joints in suspended slabs shall be sandblasted.

5. Prevent formation of shoulders and ledges.
6. Provide keys across vertical joints as indicated; in addition, place dowels across the joints.
7. Jointing Floor Slabs-on-Grade: Interior floor slabs-on-grade shall be constructed in alternate strips. Provide transverse "Soff-cut" Systems as outlined below. Locate construction joints under partitions whenever possible.
8. Control joints shall be located between construction joints.
9. Use the "Soff-cut" Systems or an approved equivalent to saw cut the joints. To control shrinkage and cracking, cut joints within 4 hours after placing and finishing the concrete. During hot weather, take all necessary measures to prevent cracking.

3.4 FINISHING - GENERAL

A. Remove fins, projections, and loose material.

B. Patch honeycomb, aggregate pockets, voids, and holes exceeding 1/4 in. diameter as follows:
1. Chip out until sound concrete is exposed to minimum depth of 1 in.
2. Prepare patching mortar with approximately 2 parts normal Portland cement, 1 part white cement, and 9 parts fine aggregate; vary proportions of cement as necessary to match color of adjacent concrete.
3. Saturate surfaces with water and fill cavities with patching mortar.
4. Fill holes left by form ties with patching mortar.
5. Cure patches as specified for concrete.

3.5 FORMED SURFACE FINISHES

A. Smooth Finish: Obtain by the use of plywood; no fins, pockmarks, and other irregularities shall be present in the exposed surfaces of concrete.

B. Scored Finish: Where indicated, roughen the concrete in an accepted manner, or etch with sharp-pointed steel tools to key or otherwise improve the mechanical bond of the surface. Such scoring or roughing shall disturb or otherwise roughen at least 10% of the area so scored.

C. Grout-Cleaned Finish
1. Prepare grout of 2 parts normal portland cement, 1 part white cement, and 4-1/2 parts fine aggregate mixed with water to consistency of thick paint.
2. Wet surfaces and rub grout on surfaces using rubber or cork float so that all small voids and imperfections are filled.
3. Allow surfaces to dry for approximately on hour, scrape off excess grout with trowel, then rub surfaces with burlap sacks.
4. Keep surfaces continuously damp for 24 hours.
5. Use on exposed wall surfaces, vertical surfaces of equipment foundations, and other vertical surfaces for which no other finish is specified.

3.6 UNFORMED SURFACE FINISHES

A. Floating
1. Provide as first stage for flatwork finishes, unless otherwise specified.

2. Thoroughly consolidate areas, strike off to screeds tamp to recess large aggregate below surface level.
3. Fill voids, reconsolidate, and re-level surfaces as necessary.
4. Do not proceed with subsequent finishes until surface water has absorbed or dried off and surface sheen has become dull.

B. Wood Float Finish
1. Also provide as second stage for other finishes, unless otherwise specified.
2. Using approved floating machines or hardwood trowels, float surfaces to required planes and shapes, working just sufficiently to bring surfaces to uniform condition.
3. Work no more than necessary to achieve uniform texture free from irregularities and screed marks; except where receiving fills or mortar beds, leave surfaces in roughened, granular condition for good mechanical bond.
4. Cut and fill surfaces as necessary to true up.
5. When followed by other finishes, floating shall leave small amount of mortar on surfaces without excess of water.
6. Do not proceed with subsequent finishes until surface water has absorbed or dried off and concrete has set sufficiently to prevent fines or water from being worked to the surface.
7. Finish texture shall be fine-grained and granular to provide good slip-resistance, and shall be reasonably free from directional trowel marks.
8. Provide for exterior and interior surfaces of buildings, unless otherwise indicated.

C. Steel Trowel Finish
1. Using finishing machines or steel trowels, trowel surfaces to produce a dense, hard, smooth steel trowel finish.
2. Commence troweling in one pass just sufficiently to flatten floated surface.
3. Wait until concrete has set sufficiently; then resume steel troweling; continue and repeat as required to obtain a hard steel trowel finish, free of blemishes, ripples, and trowel marks.
4. Do not:
   a. Use cement or sand dusting to absorb or otherwise remove surface water.
   b. Commence troweling too soon on freshly placed concrete.
   c. Overwork surfaces by excessive troweling in an area in 1 pass.
5. Work out lips, uneven levels, and other irregularities prior to final troweling.
6. Neatly tool exposed edges, expansion joints, curbs, arises, and other details.
7. Surface across joints shall be level and free from offsets.
8. Provide for interior surface not otherwise indicated or specified.

D. Broom Finish
1. For exterior flatwork and where indicated.
2. Draw a soft-bristled push broom over an initially trowel-finished surface.
3. When coarser surfaces are desired, use a stiffer-bristled broom.
4. Broom finish shall provide a non-slip surface, even if exposed to rain.

3.7 CONCRETE HARDENER

A. Apply where indicated, in accordance with the rate specified for each space per the manufacturer's printed instructions.

3.8 PROTECTION

A. Maintain concrete temperature above 55 deg. F during curing, except as modified in 03300-3.1F.

B. Protect concrete from damage by sun and rain. See 03300-1.7.

C. Do not subject concrete to any loads until it is completely cured and has attained its minimum 28 day design strength.

D. Protect concrete during and after curing from damage from subsequent construction operations.

E. Cover traffic areas with reinforced Kraft paper or plywood sheets; maintain paper and plywood in place and in good repair for as long as necessary to protect against damage from construction operations.

F. Keep finished areas free from traffic for a minimum of 4 days or as necessary until surfaces have set sufficiently to prevent damage.

3.9 CURING

A. Curing shall immediately follow finishing and shall be accomplished for each portion of the Work as follows:
   1. Water cure all flatwork surfaces with burlap and plastic sheeting for a minimum of 7 days by form-curing. Forms and slabs shall be wet down thoroughly at least 4 times daily or until forms are removed. At contractors option, forms may be removed when 75% concrete design strength has been reached, but not sooner than 4 days. Follow immediately with membrane curing if outside of building and with fog spray to maintain moist condition inside of building.

3.10 DEFECTIVE CONCRETE

A. Defective concrete will be repaired or replaced. Determination will be made by the Owner's Representative

B. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Owner's Representative for each individual area.

C. Defective concrete shall be repaired or replaced as recommended by the Owner's Representative at no additional expense to the Owner. Repair materials shall include cements, admixtures, epoxy, and aggregates as required by the nature of the defects.

D. With the prior acceptance of the Owner's Representative, some minor defective Work may be repaired by use of cement mortar; however, if the defects are serious or affect the strength of the structure or its appearance, the Owner's Representative may require the removal and replacement of that portion of the structure affected.

E. Immediately after removing forms, concrete surfaces shall be inspected, and pour joints, voids, rock pockets, tie holes, and similar defects shall be patched at once, but not until the surfaces have first been examined by the Owner's Representative. Submit information on patching mixture and method proposed for use to the Owner's Representative for review prior to commencing.

3.11 PATCHING

A. Allow Owner's Representative to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Owner's Representative upon discovery to determine its repair or replacement.

C. Patch imperfections as directed.

D. Patching Tie Holes
   1. Cut nails and tie wires for form ties flush with the face of the concrete, and leave surfaces smooth and clean.
   2. Remove metal spreader ties on exposed concrete Work, or snap off inside the wall surface.
   3. Patch resulting cone pockets on exposed surfaces, and solidly pack with cement grout.

3.12 DRY PACKING

A. Provide for setting steel plates or bolts on concrete.

B. Completely fill voids; thoroughly compact in place.

C. Bolts or inserts which have been dry packed or grouted in place shall not be tensioned sooner than seven days after packing.

3.13 SCHEDULE

A. Where not otherwise indicated on the Drawings or in other Sections, provide concrete in accordance with the following Table.

CLASS***	STRENGTH	SLUMP (MAX)*	AGGREGATE (MAX)**	MINIMUM CEMENT LBS./CU. YD.
Building Foundations	3000	4 IN.	1-1/2 IN.	470
Slabs on Grade (Interior floor)	3000	4 IN.	0-3/4 IN.	470
Slabs on Grade (Exterior Walkways)	3000	4 IN.	0-3/4 IN.	470
Suspend.Slabs & Walls	4000	4 IN.	3/4 IN.	550
Fence Footings	3000	4 IN.	1-1/2 IN.	470
Items not otherwise indicated	3000	4 IN.	1 IN.	470

* Concrete with superplasticizer designed into the mix shall arrive at the site without the superplasticizer at slump of 2 to 3 in., be verified, then have superplasticizer added at the site to attain specified slump.

** Maximum aggregate size not more than 1/3 thickness of concrete component.

*** Air Dry Weight shall not exceed 150 lbs./cu. ft. for normal weight concrete or 110 lbs./cu. ft. for lightweight concrete.

END OF SECTION

SECTION 03305
CONCRETE TESTING AND INSPECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes
   1. Concrete testing and inspection required by other Sections.

B. Related Sections
   1. Division 1 Requirements.
   2. Section 03200 - Concrete Reinforcement.
   3. Section 03300 - Cast-In-Place Concrete.

1.2 REFERENCES

A. ACI 216 - Fire Endurance of Concrete Elements

B. ACI 318 - Building Code Requirements for Reinforced Concrete.

C. ASTM C 31 - Method of Making and Curing Concrete Test Specimens in the Field.

D. ASTM C 39 - Test Method for Compressive Strength of Cylindrical Concrete Specimens.

E. ASTM C 42 - Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

F. ASTM C 94 - Ready-Mixed Concrete.

G. ASTM C 143 - Test Method for Slump of Portland Cement Concrete.

H. ASTM C 173 - Test on Fresh Concrete for Entrained Air.

I. AWS D1.4 - Structural Welding Code for Reinforcing Steel.

J. UBC - Uniform Building Code; 1994 Edition.

1.3 DESCRIPTION

A. This Section describes required testing and inspection of concrete work to be performed by Independent Testing Laboratory employed by Contractor under provisions of Section 01410.

B. Cooperate with testing agency employed by the Department.

1.4 SUBMITTALS

A. Submit under provisions of Division 1.

B. Submit the Following
   1. Certified copies of mix designs for each concrete class specified.

2. Certification that materials meet requirements specified.
3. Samples only as specified.
4. Certification from vendor that samples originate from and are representative of each lot proposed for use.
5. Mill test reports for reinforcing.
6. Ready mix delivery tickets, ASTM C 94.
7. Certified copies of concrete reinforcement test results for tensile and bending strength.
8. Certified copies of concrete cylinder compressive strength test results at time intervals specified.
9. Batch plant certification.

1.5 CONDITIONS

A. Contractor shall allow the Testing Laboratory and Department's agency free access to places, whether on or off the job site, where materials are stored, proportioned, mixed, or fabricated; to places where equipment is stored or serviced; and to job site during times of preparation, installation, erection, placement, curing and patching.

B. The Contractor shall supply labor, transportation, and on-site storage facilities required by the Testing Laboratory and Department's agency for taking and preparing samples for testing.

1.6 SEQUENCING AND SCHEDULING

A. Notify the Owner's Representative in sufficient time prior to fabrication, field welding, mixing, and placement to permit testing and inspecting without delaying work; minimum 24 hour notice required.

1.7 ENVIRONMENTAL CONDITIONS:

A. Hot Weather: Follow all requirements as per Section 03300, paragraph 3.01E.

B. Cold Weather: Follow all requirements as per Section 03300, paragraph 3.01F.

PART 2 PRODUCTS

2.1 MATERIALS AND TESTS

A. Test and inspect in accordance with UBC, Chapter 17.

B. Include reinforcement, welding, cements, aggregates, admixtures, and batch plant inspection.

2.2 CONCRETE

A. The Owner's Representative or Engineer/Architect will.
1. Review mix designs, certificates of compliance, and samples of materials proposed for use.
2. Test and inspect materials, as necessary, in accordance with ACI 318, for compliance with requirements specified in Section 03300.

B. The Independent Testing Laboratory shall inspect plant prior to Work to verify following:

1. Plant is equipped with approved metering devices for determining moisture content of fine aggregate.
2. Other plant quality controls are adequate.

PART 3 EXECUTION

3.1 TESTING AND INSPECTION OF CONCRETE REINFORCEMENT

A. Independent Testing Laboratory Employed by Contractor Shall Test Reinforcing Bars as Follows:
   1. Take samples from bundles as delivered to fabricator from mill; 2 specimens from each 2-1/2 tons, or fraction thereof, of each size and grade.
   2. When bundles are identified by heat number, and accompanied by mill certificates, no testing of bars is required.

B. Independent Testing Laboratory Employed by Contractor Shall Inspect Welding as Follows: Inspect welding, including prior fit-up, welding equipment, and weld certification in accordance with AWS D1.4

3.2 TESTING AND INSPECTION OF CONCRETE AGGREGATE

A. Independent Testing Laboratory employed by Contractor shall test and inspect aggregate as follows: Per Table 5.1 of ACI 216R.

3.3 TESTING AND INSPECTION OF CONCRETE

A. The Independent Testing Laboratory Employed by Contractor Shall:
   1. Perform testing in accordance with ACI 318.
   2. Test slump of concrete according to ASTM C 143.
   3. Test concrete for required compressive strength in accordance with UBC Chapter 17A and as follows:
      a. Make and cure specimen cylinders according to ASTM C 31 for each class poured at site as directed by Owner's Representative.
      b. Retain 1 cylinder for 7 day test, 1 for 14 day test and 3 for 28 day test. Hold 1 cylinder for subsequent testing, if necessary.
      c. Number each cylinder 1A, 1B, 1C, 1D, 1E, 1F, 2A, 2B, 2C, etc.; date each set; and keep an accurate record of placement on what each set represents.
      d. Transport specimen cylinders from job to laboratory.
      e. Test specimen cylinders at age 7 days, 14 days and age 28 days for specified strength according to ASTM C 39.
   4. Take core specimens of hardened structure and test specimen according to ASTM C 42 when laboratory tests of specimen cylinders show compressive strengths below specified minimum.
   5. Test for air entrainment as specified in design mix as per ASTM C 173.

B. The Contractor shall submit ticket for each batch of concrete delivered to jobsite. Ticket shall bear following information:
   1. Design Mix Number.
   2. Time of batching.
   3. Weight of cement, aggregates, water, and admixtures with maximum aggregate size.
   4. Total volume of concrete.

C. Concrete Placed Without Inspection by Owner's Representative
   1. Owner's Representative will determine the most suitable method of ascertaining quality of concrete.
   2. Contractor shall bear all expenses for X-ray or other inspection of in-place concrete.
   3. Contractor shall bear all expenses for removing concrete determined to be unsuitable.

3.4 TESTING AND INSPECTION OF WELD EMBEDS

A. The welding requirements for steel embeds shall conform to UBC Standards Chapter 19-2.

3.5 RETESTING

A. When tests or inspections reveal failure of materials to meet Contract requirements, Independent Laboratory shall provide additional tests in accordance with specified requirements as necessary until acceptance.

B. The cost of additional testing by Department's agency made necessary because of the failure of materials to meet Contract requirements will be deducted from the Contract Price.

END OF SECTION

SECTION 05120
STRUCTURAL STEEL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes
   1. Structural steel framing members.
   2. Shear stud connectors.
   3. Baseplates.
   4. Grouting under baseplates.

B. Related Sections
   1. Division 1 Requirements.
   2. Section 05300 - Metal Deck: Support framing for small openings in deck.
   3. Section 09900 - Painting: Finish painting.

1.2 REFERENCES

A. ASTM A 36 - Structural Steel.

B. ASTM A 53 - Pipe, Steel, Black and Hot-Dipped Zinc-Coated Welded and Seamless.

C. ASTM A 108 - Steel Bars, Carbon, Cold-Finished, Standard Quality.

D. ASTM A 153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.

E. ASTM A 307 - Carbon Steel Externally Threaded Standard Fasteners.

F. ASTM A 325 - Structural Bolts Heat Treated, 120/105 KSI Minimum Tensile Strength.

G. ASTM A 500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.

H. ASTM A 501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

I. ASTM A 572 - High Strength Low Alloy Columbium-Vanadium Steel of Structural Quality.

J. ASTM F 436 - Hardened Steel Washers

K. ASTM F 959 - Direct Tension Indicating Washers.

L. AWS A2.4 - Symbols for Welding, Brazing and Non-destructive Examination.

M. AWS D1.1 - Structural Welding Code.

N. AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

O. AISC - Specification for Architectural Exposed Structural Steel.

P. AISC - Specification for Structural Joints Using ASTM A 325 and A 490 Bolts.

Q. UBC - Uniform Building Code 1995 Edition.

R. SSPC - Steel Structures Painting Council.

1.3 SUBMITTALS

A. Submit under provisions of Division 1.

B. Shop Drawings
1. Indicate profiles, sizes, spacing and locations of structural members, openings, attachments, shop and erection details, including cuts, codes, connections, holes, threaded fasteners, rivets, and welds. Include cambers and loads, locations, markings, quantities, materials, and shapes; and methods of connecting, anchoring, fastening, bracing, and attachment to Work of other Sections.
2. Indicate shop and field welds by welding symbols in accordance with AWS A2.4. Indicate net weld lengths.

C. Manufacturer's Mill Certificate: Submit certificate that products meet or exceed specified requirements.

D. Mill Test Reports: Submit Manufacturer's Certificates, indicating structural strength, destructive and non-destructive test analysis.

E. Welders' Certificates: Submit Manufacturer's Certificates, certifying welders employed on the Work, verifying AWS qualifications within the previous 12 months.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Conform to UBC, Chapter 22A - Steel.

B. Fabricate structural steel members in accordance with AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

C. Perform Work in accordance with AISC - Specification for Architectural Exposed Structural Steel.

D. Shop and Field Quality Control
1. The Owner's Representative will:
   a. Continuously inspect welding in conformance with UBC, Section 1701A.5.5.1.
   b. Inspect bolted connections in accordance with UBC Section 1701A.5.6.
2. Independent Testing Laboratory shall perform non-destructive weld testing in accordance with UBC, Section 1703A.

E. Perform testing under provisions of Division 1.

1.5 QUALIFICATIONS

A. Fabricator: Company specializing in performing the work of this Section with minimum 3 years experience.

B. Erector: Company specializing in performing the work of this Section with minimum 3 years experience.

C. Design connections not detailed on the Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of California.

D. Welding Qualifications: Prior to commencing welding, welding procedures, welding operations, and welders shall be qualified in accordance with AWS D1.1.
   1. Welders who have not performed welding for a period of three or more months shall be requalified.
   2. Welders whose work fails to pass inspection shall be requalified before performing further welding.
   3. The costs of certifying qualifications shall be paid as part of the Work of this Section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver welding electrodes to job site in unbroken containers or packages bearing manufacturer's name.

B. Protection
   1. Ship, store, and handle structural steel in a manner to prevent rusting and deformation. Store steel products off grade and positioned to drain rain water readily.
   2. Deliver bolts, nuts, and washers in bags or boxes, properly tagged for identification.

C. Store other metal products in a weather-tight and dry place until ready for use in the work.

D. In event of damage, immediately make repairs and replacements necessary, and at no additional cost.

1.7 FIELD MEASUREMENTS

A. Verify that field measurements are as shown on shop drawings.

PART 2 PRODUCTS

2.1 MATERIALS

A. Structural Steel Members: ASTM A 36 and A 572, Grade 50 as indicated.

B. Structural Tubing: ASTM A 500, Grade B. (fy=46ksi)

C. Steel Pipe: ASTM A 501 or ASTM A 53, Type S, Grade B, E, or S; galvanized where indicated or specified, black elsewhere.

D. Shear Stud Connectors (High Strength Anchors): ASTM A 108 Grade 1015, forged steel, headed, uncoated.
   1. Nelson Stud Welding Company.

2. Tru-Weld.
3. Stud Welding and Rebar Splicing of Erico Products, Inc.

E. Bolts, Nuts, and Washers: ASTM A 325 galvanized to ASTM A 153 for galvanized members.

F. Anchor Bolts: ASTM A 307.

G. Expansion Anchors: Proprietary type designed for uses required, sizes as indicated.
1. ITT Philips Drill Div. "Red Head Wedge" or "Self Drill Anchor".
2. Ramset Fastener Systems "Trubolt" or "Remodrill".
3. Hilti Co. "HSL Heavy Duty HDI Drop-In Anchors".

H. Welding Materials: AWS D1.1; type required for materials being welded.

I. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at 28 days, unless otherwise indicated.
1. U.S. Grout Corporation Five Star Grout.
2. Master Builders Masterflow 713.
3. Euclid Euco N-S Grout.
4. W.R.Meadows Sealtight 588.

J. Shop and Touch-Up Primer
1. Tnemec "No. 10-99 Metal Primer".
2. Rust-Oleum "No. 769 DampProof Red Primer".
3. Porter International "260FD".

K. Shims and Leveling Devices: Type required for temporary support of base plates; of sufficient size and capacity to support dead load of structure without deformation.

L. Temporary Supports, Staying and Bracing: As required by the conditions of installation.

2.2 FABRICATION

A. Fabricate structural steel in accordance with AISC "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings", and as specified.

B. Shop Connections
1. Welded where possible, unless otherwise indicated, in accordance with AWS D1.1.
2. Welds exposed to weather or damp conditions in the finished Work shall be continuous and watertight.

C. Field Connections: Locate field splices only where indicated.

D. Bolted Connections
1. Punch, drill or ream holes 1/16 in. larger than bolt diameter. Unless otherwise indicated, holes may be punched if material is not thicker than bolt diameter plus 1/16 in.
2. Ream unfair holes, but only up to next larger bolt size. Comply with General Notes on Structural Drawings.
3. As erection progresses, bolt up work to assume dead loads, lateral forces, and erection stresses.

4. If types of fastener are not shown, use ASTM A 325 bolts.

E. Assembly Using Standard Threaded Fasteners: Use beveled washers for full bearing under heads of bolts and nuts and tighten to "snugtight" condition.

F. Assembly of High-Strength Bolted Connections
1. Beveled washers for full bearing under heads and nuts.
2. Tighten bolts to snug-tight condition in accordance with AISC "Specification for Structural Joints Using ASTM A 325 and A 490 Bolts".
3. Tighten bolts to AISC specified torque for connections designated as "Slip-Critical" (A325-SC).

G. Shop and Field Welding
1. Weld by shielded-arc method, submerged-arc method, flux-coated arc method, or other method approved by AWS. Perform welding in accordance with AWS D1.1.
2. If sizes of fillet weld are not indicated, use AISC minimum weld size, but not less than 3/16 in. fillet welds.

H. Prior to fabrication, straighten material by methods which will not injure material. Do not straighten material until methods have been reviewed and approved by the Owner's Representative.

I. Prior to assembling component parts of a connection, thoroughly clean contact surfaces of loose scale, rust, burrs, and other matter, and remove local twists and bend.

J. Columns: Splice column shafts only as indicated or reviewed and approved by Owner's Representative.

K. Shear Connectors
1. Automatically end weld in accordance with AWS D1.1, Section 7, and the stud manufacturer's instructions.
2. At the beginning of each day's Work, make a minimum of 2 test stud welds to metal which is the same as the actual work piece, using the automatic welding equipment to be used for production welds.
3. Bend each stud 90 deg. by striking with a heavy hammer, and verify that there is no tearing out or cracking of the weld section.

L. Surface Preparation
1. Grind smooth weld spatter and sharp edges prior to cleaning.
2. Prior to application of primer or delivery from shop, clean surfaces as follows:
   a. SSPC SP-2 where structural steel is to be encased in cast-in-place concrete, or to be concealed by other construction in the completed Work.
   b. SSPC SP-7 where structural steel is to remain exposed in the completed work.

M. Shop Primer
1. Shop coat surfaces of structural steel with 3 mil minimum dry film thickness of primer, unless otherwise specified.
2. Do not apply primer to within 2 in. of surfaces to be field welded, or to be encased in cast-in-place concrete.
3. Apply two coats of primer to surfaces of steel assemblies which will remain permanently concealed after assembly.
4. Apply shop primer within 8 hours of surface cleaning.

5. Shop primer, of poor quality or insufficient thickness shall be touched-up or recoated by the fabricator, and to a condition acceptable to the CDC Representative.

N. Temporary Coating
1. Coat contact faces of steel which will be grouted for bearing, such as column base plates and similar items, with an oil-based, rust-inhibitive temporary coating containing no metallic pigment.
2. Manufacturers
a. Exxon Petroleum Co., "Rust-Ban 294".
b. Houghton Company, "Rust-Veto 342".

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. If unsatisfactory conditions exist, do not commence the installation until such conditions have been corrected. Beginning of installation means acceptance of existing conditions.

3.2 ERECTION

A. Install and erect structural steel in conformance with AISC "Code" and "Specifications."

B. Welding shall be performed by welders qualified as specified.

C. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

D. Erection tolerances shall be in accordance with AISC "Code," except as follows:
1. Individual members, shall be considered plumb or level where the error does not exceed 1:750.
2. Vertical dimensions shown as story height measured from the top of the beams at their connections at each column shall not vary by more than +1/4 in. per story exclusive of column shortening due to dead load.
3. Plumb displacement of the center line of columns from the established column line shall be no more than 1/4 in. per story, non-cumulative.
4. Horizontal dimensions shall not vary more than + 1:2,000 for the length or width of the structure.
5. Maximum Offset From True Alignment: 1/4 in.

E. Anchor Bolts
1. Setting Tolerances
a. Anchor bolts within a given group, such as a steel connection or equipment base, shall not exceed +1/8 in. for bolts 1 in. in diameter and less and +3/16 in. for bolts larger than 1 in. in diameter.
b. Vertical dimensional tolerance shall be +1/4 in.
2. Anchor bolts shall be fitted and held in place by templates.

3. Upon completion of concrete placement, anchor bolts shall be rechecked for correct location and elevations; make necessary corrections.
4. Projecting portion of anchor bolts shall be wire brushed, the washers and nuts replaced, and the bolt protected from dust and other foreign materials by a wrapping of a waterproof material.

F. Structural Steel
1. Structural members shall not be cut or altered without prior approval of the Owner's Representative.
2. Column or column base plates shall be set on a steel shims or otherwise supported and the structure aligned and plumbed prior to grouting under the base plates.
3. Place temporary bracing necessary for erecting before bolting in accordance with AISC recommendations. Additional or temporary bracing shall be provided wherever design loads may be exceeded during erection or placing of equipment.
4. Only light drifting will be permitted to draw parts together. Draft punching to match unaligned holes will not be permitted. Enlargement of holes necessary to make connections resulting from misfit shall be performed by reaming or drilling, and the proper size bolt shall then be used.
5. Welding will be permitted only as indicated on the reviewed Shop Drawings. Welds exposed to the weather in the complete structure shall be continuous and made watertight by the welding.
6. Flame cutting will be permitted only as specifically approved by the Owner's Representative.

G. Grout under baseplates and elsewhere indicated.

H. Tack weld nut and washer to base plate of columns where nut is exposed to view in completed construction.

3.3 ADJUSTING AND CLEANING

A. After erection, thoroughly clean surfaces of foreign an deleterious matter such as dirt, mud, oil, and grease that could impair bonding of concrete.

B. Repair paint damaged or removed by field welding, field assembly, handling, or other operations, with primer compatible with shop primer. Field paint unpainted field connections, bolts, and similar parts with primer.

C. Repair abraded areas of the shop-applied coating, and areas of weld where the shop-applied coating has been damaged, with a primer or galvanizing repair compounds as applicable, compatible with the shop coating.

END OF SECTION

SECTION 05500
METAL FABRICATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Shop fabricated ferrous metal items, galvanized and prime painted.

1.2 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Section 03300 - Cast-In-Place Concrete: Placement of metal fabrications in concrete.

1.3 RELATED SECTIONS

A. Section 09900 - Painting: Paint finish.

1.4 UNIT PRICE - MEASUREMENT AND PAYMENT

A. All Components:
   1. Basis of Measurement: By the pound.
   2. Basis of Payment: Includes fabrication, finishing, and installation.

1.5 REFERENCES

A. ASTM A36 - Structural Steel.

B. ASTM A53 - Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.

C. ASTM A123 - Zinc (Hot-Galvanized) Coatings on Products Fabricated From Rolled, Pressed and Forged Steel Shapes, Plates, Bars, and Strip.

D. ASTM A153 - Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

E. ASTM A283 - Carbon Steel Plates, Shapes, and Bars.

F. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.

G. ASTM A325 - High Strength Bolts for Structural Steel Joints.

H. ASTM A386 - Zinc-Coating (Hot-Dip) on Assembled Steel Products.

I. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.

J. ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

K. ASTM B177 - Chromium Electroplating on Steel for Engineering Use.

L. AWS A2.0 - Standard Welding Symbols.

M. AWS D1.1 - Structural Welding Code.

N. SSPC - Steel Structures Painting Council.

1.6 SUBMITTALS

A. Submit under provisions of Division 1.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

C. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

1.7 QUALIFICATIONS

A. Prepare Shop Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the place where the Project is located.

B. Welders Certificates: Submit under provisions of Division 1, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

1.8 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on Drawings.

PART 2 PRODUCTS

2.1 MATERIALS

A. Steel Sections: ASTM A36.

B. Steel Tubing: ASTM A500, Grade B.

C. Plates: ASTM A283.

D. Pipe: ASTM A53, Grade B.

E. Bolts, Nuts, and Washers: ASTM A325, galvanized to ASTM A153 for galvanized components.

F. Welding Materials: AWS D1.1; type required for materials being welded.

G. Shop and Touch-Up Primer: SSPC 15, Type 1, red oxide.

2.2 FABRICATION

A. Fit and shop assemble in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3 FINISHES

A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

B. Do not prime surfaces in direct contact with concrete or where field welding is required.

C. Prime paint items with one coat.

D. Galvanize in accordance with ASTM A123, structural steel members.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Beginning of installation means erector accepts existing conditions.

3.2 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete or embedded in masonry with setting templates, to appropriate sections.

3.3 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Field weld components indicated on Drawings.

D. Perform field welding in accordance with AWS D1.1.

E. Obtain Architect/Engineer approval prior to site cutting or making adjustments not scheduled.

F. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

3.4 ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

3.5 SCHEDULE

A. The Schedule is a list of principal items only. Refer to Drawing details for items not specifically scheduled.

B. Bumper Posts and Guard Rails: As detailed; prime paint finish.

C. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.

D. Joist Hangers: Joist strap anchors, fabricated with 18 gage steel; prime paint finish.

E. Ledge and Shelf Angles, Channels and Plates Not Attached to Structural Framing: For support of metal decking, joists, and masonry; prime paint finish.

F. Lintels: As detailed; prime paint finish.

G. Door Frames for Overhead Door Openings and Wall Openings: Channel and Angle sections; prime paint finish.

H. Handrails: As detailed; prime paint finish.

END OF SECTION

SECTION 06100
ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

A. DESCRIPTION
1. Structural and non-structural wall, floor, and roof framing.
2. Wall and roof sheathing.
3. Roof curbs, cants and nailers.
4. Blocking in wall and roof openings.
5. Wood furring and grounds.
6. Concealed wood blocking for support of toilet and bath accessories, wall cabinets, wood trim and wall-mounted equipment.
7. Telephone and electrical panel boards.
8. Preservative treatment of wood.

1.2 RELATED SECTIONS

A. Section 03100 - Concrete Formwork: Concrete openings to receive wood blocking.

B. Section 07200 - Insulation.

C. Division 15 - Mechanical: Rough-in.

D. Division 16 - Electrical: Rough-in.

1.3 REFERENCES

A. APA - American Plywood Association, Form J20: APA Product Guide - Grades and Standards

B. AWPA - American Wood Preservers Association C1 - All Timber Products Preservative Treatment by Pressure Process.

C. AWPA - American Wood Preservers Association C20 - Structural Lumber Fire Retardant Treatment by Pressure Process.

D. CCR - California Code of Regulations, Title 24.

E. NFPA - National Forest Products Association.

F. USPS - United States Product Standard.

G. WCLIB - West Coast Lumber Inspection Bureau.

H. WWPA - Western Wood Products Association.

1.4 SUBMITTALS

A. General: Refer to Division 1 - Submittals.

B. Product Data: Provide technical data on wood preservative materials and application instructions.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Handle, stack, and store lumber and plywood off the ground in such a manner that it will be protected from damage and prevented from absorbing moisture. Protect with waterproof covering, providing for adequate air circulation, secured to prevent blow-off, and maintain in undamaged condition.

B. Do not store seasoned materials in wet or damp locations.

C. Protect fire-retardant materials against high humidity and moisture during storage and erection.

D. Protect plywood and other sheet materials against damage to edge, corner, and surfaces while unloading handling.

E. Store plywood and other sheet materials in an enclosed area, or protect as specified for lumber.

F. Store attachment devices off the ground in a dry location, protected from dirt, damage, and the elements.

1.6 QUALITY ASSURANCE

A. REQUIREMENTS OF REGULATORY AGENCIES

1. Rough carpentry shall meet applicable requirements of UBC, 1994 Edition.
2. Each piece of lumber shall be WCLIB grade marked or by an agency certified by WCLIB; and each mill shipment to job site shall be accompanied by a WCLIB certificate of inspection.
3. Each piece of plywood shall be grade stamped in accordance with APA "Guide to Plywood Grades," and with the requirements of PS 1.
4. Fire-retardant treatment shall provide UL classification FRS.
5. Each piece of fire-retardant lumber and plywood shall be labeled to show compliance with the UL requirement specified and shall be grade stamped with the applicable AWPA quality mark indicating the preservative and retention.
6. Do not mill or trim pressure treated members beyond limits recommended by treatment manufacturer.

PART 2 PRODUCTS

2.1 MATERIALS

A. LUMBER: Douglas Fir; S4S, grade stamped, WCLIB or WWPA; size conforming to PS 20; free of boxed heart; maximum 19% moisture content at time of fabrication; of the following minimum grades.

1. Studs (2-4 inches thick, 4 inch and wider): No. 1 Grade.
2. Structural Joists and Planks (2 - 4 in. thick, 5 in. and wider): No. 1 Grade.
3. Grounds: Straight and free from loose knot and knot holes.
4. Miscellaneous Light Framing (2 - 4 in. thick, 2 - 4 in. wide): Construction Grade.
5. Blocking: No. 1 Grade. (Larger than 4 inch thick).

B. POSTS AND BEAMS: (larger than 4 inches in thickness) Douglas Fir #1; S4S, Grade stamped, WCLIB or WWPA; size conforming to PS20; free of box heart; maximum 19% moisture content at

time of installation, unless otherwise noted.

C. PLYWOOD: Softwood plywood; US Product Standard PS-1; grade stamped by APA or other approved testing agency; 48 x 96 in. panel size unless otherwise indicated.
1. Concealed Sheathing: C/D - INT with exterior glue.
2. Concealed Structural Components: Structural I C/D - INT with exterior glue.
3. Telephone and Electric Terminal Boards: B/D - INT; 3/4 in. thick, square edges; fire-retardant pressure treated.

2.2 ACCESSORIES

A. ROUGH HARDWARE
1. Hangers, Clamps, Straps and Anchors and similar items as required for complete installation.
a. General: Manufactured by Simpson Strong Tie Co., Inc.; types as shown.
b. Alternate Manufactures: Comparable products with current ICBO approval and equal or greater rated load capacity, manufactured by TECO/LUMBERLOCK, TECO Products, or accepted equal.

B. FINISHES
1. When in contact with pressure-treated products, carbon-steel fastenings shall be hot-dip galvanized.
2. Rough hardware exposed to moisture or to the exterior shall be hot-dip galvanized or cadmium-plated, unless otherwise indicated.

C. For fastenings secured to hardened concrete or masonry, inserts and sleeves shall be metal only.

D. NAILS
1. For securing sheet metal and stripping to hardened concrete or masonry, use hardened-steel masonry nails.
2. For general rough carpentry, use types and sizes as indicated, and in conformance with UBC Nailing Schedule, except sizes shall not be smaller than indicated.

E. ANCHORS (Unless Otherwise Indicated)
1. Toggle bolt type for anchorage to hollow masonry.
2. Expansion anchors for anchorage to solid masonry or concrete.
3. Bolt and nuts for anchorages to steel: ASTM A307, Grade A.

F. POWDER-ACTUATED FASTENERS
1. Types and Sizes: Appropriate for work required and materials involved.
2. Uses: Limited to those indicated, specified, or approved by owner's representative.

G. ADHESIVES: ASTM C 557.
1. Manufacturer
a. Miracle Adhesive Co. "Construction Adhesive".
b. "Sonneborn 400" by Chemrex, Inc./Sonneborn Products Div.
c. PRC Corp. "PR-365".

H. Furnish miscellaneous lag screws, screws, tapes, and other items necessary to complete the work.

I. ASPHALT FELTS: ASTM D 226 60 minute, Grade D.

2.3 WOOD TREATMENTS

A. Treatment materials having a highly persistent, noticeable residual odor will not be permitted.

B. After treatment, kiln or air dry lumber and plywood to a moisture content of 19% or less.

C. Surface-Applied Wood Preservative (Type A).
1. Non-aqueous solution containing not less than 5% pentachlorophenol, commercially prepared and formulated to repel water and inhibit decay.
2. Suitable for application by either brush or dip methods.
3. Integral coloring to allow visual inspection of treated members.

D. Pressure-Treated Wood Preservative (Type B).
1. Required for lumber and plywood where indicated or specified and not otherwise required to be fire-retardant pressure treated.
2. Concealed Locations: Any process acceptable in accordance with UBC Standard 25-12 and meeting specified requirements.
3. Exposed Locations: Treated members shall be milled smooth within limits permitted by process manufacturer.

PART 3 EXECUTION

3.1 PREPARATION

A. GENERAL: Refer to Division 1 - Coordination.

B. EXAMINATION:
1. Verify that conditions are satisfactory for the installation of rough carpentry.
2. If unsatisfactory conditions exist, do not commence installation until such conditions have been corrected. Beginning installation means acceptance of existing conditions.

C. MEASUREMENTS: Take field measurements; report variance between plan and field dimensions.

D. TEMPORARY BRACING:Provide bracing adequate to keep structure stable, plumb and in line; keep in place until permanent framing is completed. Provide bracing capable of supporting loads imposed by stockpiled material, erection equipment and other loads, during construction.

3.2 FASTENERS

A. NAILS
1. Per UBC Table 25Q, unless otherwise noted. Space groups of nails no closer together than 1/2 nail length and not closer than 1/4 nail length from cut ends of lumber.
2. Pre-drill undersize holes as necessary to prevent splitting.
3. Drive nails straight and free from bends.
4. At multiple or grouped nailing, set alternate nails at slightly different angles to improve strength.
5. For trim or similar members, side-stagger alternate nails to prevent warp and twist.
6. Where concealed, set nailheads flush to avoid interference with materials next to be applied.
7. Use of nail gun is subject to written approval of the architect.

B. BOLTS AND NUTS: Use steel plates as templates for location of holes; drill holes 1/16 inch larger than diameter of bolts; tighten nuts or rods and bolts at time of installation. Retighten before covering up and just before final acceptance of the work.

C. WASHERS: Install at bolts, nuts or lag screws bearing on wood; not required under heads of carriage bolts.

D. SCREWS:
1. Hammering or driving in place is not permitted. Use soap to lubricate screw threads, if required.
2. Lag Screws: Drill holes of same diameter and depth as shank; drill holes for threaded portion no larger than 3/4 shank diameter.
3. Wood Screws: Drill holes for shank and threaded portion 7/8 shank or threaded root diameter.

3.3 FRAMING

A. Construct and secure rough carpentry as required by the Drawings and as specified.

B. Construction details, connections, and fastenings not otherwise indicated or specified shall be in accordance with the requirements of UBC.

C. Provide solid backing and blocking as indicated and required.

D. Set members level and plumb, in correct position.

E. Place horizontal members with crown side up.

F. Construct curb members of single pieces.

G. Plates and sills on concrete or masonry: Bed plates and sills of exterior walls in Portland cement mortar to obtain continuous level bearing; bolt down after mortar sets. Bed plates for interior partitions when indicated or necessary for level bearing.

H. Studs: Space as indicated; frame corners with not less than 3 studs. Set on single sole plate, cap with double top plate lapped at corners, lapped no less than 4 ft. at splices.

I. Posts, Girders, and Beams: Frame to true end bearings; provide supports and anchors of such design to hold securely in position and prevent base deterioration. Splice girders and beams only over bearings.

J. Curb roof openings, except where prefabricated curbs are provided, form corners by alternating lapping side members.

K. Coordinate curb installation with other Sections whose work affects or is affected by the work of this Section.

L. Cut and prepare ends/surfaces for full bearing, and as otherwise necessary for proper fit.

M. Cut notches without overcutting inside corners.

3.4 SHEATHING

A. Secure sheathing to framing members with ends over firm bearing and staggered.

3.5 WOOD NAILERS AND BLOCKING

A. Provide where shown and required for attachment of other work. Use only materials of the longest practical lengths and sizes to minimize jointing, free from warp.

B. Securely attach work to substrates by anchoring and fastening as shown and as required by code. Minimum anchorage of bolts, 32 in. on center, with a minimum of 2 bolts per piece. Provide washers in contact with wood under bolt heads and nuts. Countersink all bolt heads in top layer of blocking.

C. Use fasteners of size that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Tighten bolts and lag screws at installation and retighten at completion of work.

3.6 BACKBOARDS

A. Provide telephone and electrical panel backboards.

B. Size backboards as indicated; where not indicated, over-size the backboards by 12 in. on all sides.

C. Sand to leave paintable surface.

3.7 WOOD TREATMENT

A. Apply Type A preservative treatment in accordance with manufacturer's instructions.
   1. Treat members after cutting, shaping, and bolting.
   2. Application:
      a. Dip members for 15 minutes, or saturate by brushing on 2 complete coats at 10 minute intervals.
      b. Air-dry 2 hours before setting tread members into place.

B. Type B Pressure Treated Products: After cutting, shaping, and boring, retreat surfaces using materials and methods in accordance with instructions of pressure-treatment manufacturer.

C. All wood required to be fire-retardant treated, shall be treated in accordance with the manufacturer's instructions and requirements of UBC.

3.8 FIELD QUALITY CONTROL

A. When complete, wood construction shall be free from unnecessary cuts, holes, and other damage and defects.

3.9 WOOD TREATMENT SCHEDULE

A. Type A (Surface Applied Preservative): Lumber and plywood members after cutting, shaping, and bolting.

B. Type B (Pressure Treated Preservative):
   1. Required for lumber and plywood where indicated, pressure-treated Douglas Fir.
   2. Provide for lumber and plywood in contact with concrete, masonry, or grout.

END OF SECTION

SECTION 06200
FINISH CARPENTRY

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes but is not limited to:

1. Plastic laminate work.
2. Casework and countertops.
3. Cabinet hardware.
4. Wood shelves and rod.
5. Wood door frames and wood base.
6. Exterior wood siding and soffit.
7. Other miscellaneous finish carpentry items.

1.02 RELATED WORK

A. Section 06100: Rough Carpentry

B. Section 08210: Wood Doors

C. Section 09900: Painting

D. Division 15: Plumbing

1.03 QUALITY ASSURANCE

A. All millwork shall be manufactured in accordance with the standards in the latest edition of the Manual of Millwork of the Woodwork Institute of California in the grade specified.

B. Before delivery to the jobsite, the millwork supplier shall issue a W.I.C. Certified Compliance Certificate indicating the millwork products he or she will furnish and certifying that they will fully meet all the requirements of the grade specified.

C. The shop drawings for the casework shall bear the W.I.C. Certified Compliance Grade Stamp indicating the grade specified.

D. Each unit of casework shall bear the W.I.C. Certified Compliance Grade Stamp indicating the grade specified.

E. Each plastic laminate countertop shall bear the W.I.C. Certified Compliance Grade Stamp indicating the grade specified.

1.04 SUBMITTALS

A. Shop Drawings and Product Data: Submit in accordance with Section 01001.

B. Certification: Contractor shall provide Certificate of Compliance by W.I.C. for the following items:

1. Plastic laminate work.

2. Casework.

C. Samples: Provide 12-inch square samples of finished materials; 6-inch square sample of plastic laminate and melamine in specified colors; and drawer and cabinet pulls.

1.05 DELIVERY AND STORAGE

A. Do not deliver materials until site conditions are adequate to receive the work. Protect items from weather while in transit.

B. Store indoors, in ventilated areas with constant but minimum temperature not lower than 60 degrees F. and maximum relative humidity of 25% to 55%.

PART 2 - PRODUCTS

2.01 MATERIALS AND FABRICATION

A. Exterior Woodwork:

1. Wood shingles to match existing.
2. Tongue-in-groove redwood soffit to match existing.
3. Redwood trim to match existing.

B. Interior Architectural Woodwork:

1. Quality Standard: W.I.C. Custom Grade.
2. Softwood Lumber: PS 20; graded in accordance with W.I.C. Custom DF species, texture and finish to match existing.
3. Shelf Material: ¾-inch thick plywood with wood veneer.

C. Casework, Trim and Paneling for Plastic Laminate Finish:

1. Quality Standard: W.I.C. Custom Grade or W.I.C. Modular Grade.
2. Plastic Laminate: Provide Formica standard plastic laminate, or reviewed equal Wilsonart product.
   a. Horizontal Surfaces: Nominal 0.050 inch.
   b. Vertical Surfaces: Nominal 0.032 inch.
   c. Postformed Surfaces: Nominal 0.040 inch.
   d. Surface Finish: provide plastic laminate of the color, texture and pattern to be selected by the Architect.
   e. Exposed surfaces of casework shall have plastic laminate, with unexposed surfaces balanced with backing sheet. Backing sheet shall be minimum of 0.020 inch thick.
3. Exposed Edges: Fabricate with plastic laminate matching other exposed surfaces.

2.02 MISCELLANEOUS ACCESSORIES

A. Anchors, Nails and Screws: Select the material, type, size and finish required by each substrate for secure anchorage. Provide toothed steel or lead expansion bolt screws for drilled-in-place anchors.

B. Adjustable Cabinet Shelf Supports: Provide flush-mounted, satin chrome, pilaster-type slotted steel standards unless otherwise noted. Provide matching shelf rests.

C. Side Pair Drawer Slides: 50-pound rated (per pair), ball-bearing nylon rollers, ½-inch wide units, commercial grade, full extension slides.

D. Magnetic Cabinet Catches: BHMA B03142, B03152 or B03162 (type as applicable), plastic case, commercial grade.

E. Invisible Hinges: Provide one of the following:

1. Hafele "3D"
2. Heinze America 120-170 degree opening
3. Blum Module 90, 170 degree opening

F. Door and Drawer Pulls:

1. Pulls: Forms and Surfaces HC 420-123
   Finish: Brushed aluminum or stainless steel
   Available From: McMurray Pacific

G. Finish for all exposed hardware except as otherwise indicated: US 26D.

2.03 FABRICATION

A. Fabricate cabinetwork and finish carpentry items in accordance with recommendations of W.I.C. When necessary to cut and fit on site, make materials with ample allowance for cutting. Scribe to fit without use of trim.

B. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and other fixtures and fittings. Verify locations of cutouts from on-site dimensions. Prime paint contact surfaces of cutouts.

C. Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Corners and Joints: Hairline. Slightly bevel arrises. Locate counter butt joints at least two feet from cutouts.

D. Cap exposed plastic laminate edges with material of same finish and pattern.

E. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.

F. Use exposed fastening devices or nails only when unavoidable and reviewed by Architect. Arrange neatly.

G. Shop assemble cabinetwork and finish carpentry items for delivery to site in sizes easily handled and to ensure passage through building openings.

2.04 PREPARATION FOR FINISHING

A. Sand work smooth and set exposed nails and screws. Apply wood filler in exposed nail and screw indentations and leave ready to receive site-applied finishes. On items to receive transparent finishes, use wood filler which matches surrounding surfaces and of types recommended for applied finishes.

B. Prime paint concealed surfaces and surfaces in contact with cementitious materials.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install millwork under supervision of factory-trained mechanics and in accordance with W.I.C. Custom Quality Standard.

B. Set and secure materials and components in place, plumb and level with no distortions. Shim as required using concealed shims.

C. Secure to grounds, stripping and blocking with counter-sunk, concealed fasteners and blind nailing as required for a complete installation. Scribe and cut for accurate fit to other finished work.

3.02 PREPARATION FOR FINISH

A. Sand work smooth and set exposed fasteners. Apply wood filler in exposed fastener indentations.

B. Site Finishing: Refer to Section 09900 Painting.

3.03 ADJUST AND CLEAN

A. Adjust and lubricate hardware for proper operation.

END OF SECTION

SECTION 07200
BUILDING INSULATION

PART 1 - GENERAL

1.01 WORK INCLUDED

A. This section describes the requirements for furnishing and installing building insulation and associated work, including:

1. Batt insulation.

2. Batt acoustical insulation.

1.02 RELATED WORK

A. Section 06100: Rough Carpentry

B. Section 09252: Gypsum Board- Acoustic Ceiling Reconstruction

1.03 QUALITY ASSURANCE

A. Thermal Conductivity: where insulation is identified by "R" value, provide thickness required to achieve indicated value.

B. Fire Ratings: comply with fire-resistance and flammability ratings specified.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Protect insulation from physical damage and from becoming wet or soiled. Comply with manufacturer's recommendations for handling, storage and protection during installation.

B. Furnish material in manufacturer's packaging, complete with installation instructions.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Owens-Corning

B. Manville

C. Approved equal

2.02 BATT INSULATION

A. Thermal Batt Insulation: R-19 at walls; Kraft-faced glass fiber batt insulation complying with ASTM C 665, Type II, Class C, vapor retarder perm rating 1.00 when tested in accordance with ASTM E96.

B. Sound Attenuation Batt Insulation: unfaced glass fiber batt acoustical insulation complying with ASTM C665, Type I and ASTM E 136. 4" thickness at walls, 9" thickness in ceilings.

2.03 MISCELLANEOUS MATERIALS

A. Mechanical Anchors: Miracle Adhesive Corp. "Stuck-Up," Stick-Klip Mfg. Co. "Stic-Klip" or approved equal. Provide protective covers or an approved unpointed clip for areas under 7'-0" above the floor.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General:
1. Comply with manufacturer's instructions for installation conditions.
2. Extend insulation full thickness over entire area to be insulated, without visible gaps or separations. Cut and fit tightly around obstructions.
3. Apply a single layer of required thickness, unless otherwise indicated or required.
4. Do not obstruct ventilation spaces.

B. Apply insulation units to substrate by indicated methods, complying with manufacturer's recommendations.

C. Stuff loose mineral fiber insulation into miscellaneous voids and cavity spaces. Compact to approximately 40% of maximum value.

D. Fit batt insulation snugly between framing members and around piping, wiring and other penetrations.

3.02 PROTECTION

A. General: Protect installed insulation from harmful exposures and from physical damage.

END OF SECTION

SECTION 07620
FLASHING & SHEET METAL

PART 1 - GENERAL

1.01 SUMMARY

A. Furnishing and installation of sheet metal flashing and accessories, including but not limited to:

1. Flashing and counterflashing.

1.02 RELATED WORK

A. Section 06100 – Rough Carpentry

B. Section 07500 – Modified Bitumen Roofing

C. Section 09900 – Painting

D. Division 15 – Mechanical and Plumbing

1.03 QUALITY ASSURANCE

A. Perform work in accordance with the following: Sheet Metal and Air Conditioning Contractors National Association (SMACNA) - Architectural Sheet Metal Manual.

1.04 SUBMITTALS

A. Shop drawings shall clearly detail shaping, jointing, length of sections, fastenings, installation details, and methods of handling thermal expansion/contraction and waterproofing.

B. Submit details of end conditions, areas of discontinuity, and where specific job conditions differ from typical details.

1.05 PROTECTION

A. Exercise care when working on or about roof surfaces to avoid damaging or puncturing roofing materials.

B. Place plywood panels on roof surfaces adjacent to work of this section and on access route. Keep in place until completion of work.

1.06 WARRANTY

A. Provide Owner with a warranty stating that metal flashings will properly shed water and protect felts from physical damage for a minimum period of two years from date of Substantial Completion of Work, and that damage resulting from failure to provide above stated performances will be repaired to satisfaction of Owner at no additional cost.

1.07 STORAGE AND HANDLING

A. Stack preformed material to prevent twisting, bending and abrasion, and to provide ventilation.

PART 2 - PRODUCTS

2.01 SHEET MATERIALS

A. Factory Finished Galvanized Steel: ASTM A 526; minimum 24 gage with a minimum 1.25 oz./sq. ft. galvanized coating.

2.02 ACCESSORIES

A. Fasteners: Concealed clip type, of same material as flashings unless otherwise noted; sized as shown, or when not shown, to suit application. Provide at 2'-0" o.c. minimum, unless noted as continuous.

B. Building Paper: No. 15 plain paper, Federal Specification No. HH-R-595B, 15 lb.

C. Solder and Flux: Type recommended for materials being used.

D. Sealing Compound: Type recommended by roofing manufacturer.

E. Bituminous Paint: Acid and alkali resistant type; black color.

F. Sheet Metal Sealant: Liquid or preformed ribbon (with release paper) of polybutene based mastic, non-drying, non-skinning, non-hardening.

G. Sealant Tape: Polyvinyl chloride foam tape with pressure sensitive adhesive as manufactured by Norton, or equal.

H. Bedding Compound: Rubber-asphalt type.

I. Plastic Cement: Asphaltic base cement.

2.03 FABRICATION

A. Form components true to shape, accurate in size, square, and free from distortion or other defects detrimental to appearance or performance.

B. Form pieces in longest practical lengths. Make allowance for thermal expansion and contraction at joints.

C. Fabricate cleats and starter strips of the same material as sheet, minimum 1 inch wide, interlockable with sheet.

D. Seams shall be as noted or, when not noted, shall be butt type with 8" wide back-up plate, except corners. Fabricate corners minimum 18" x 18" mitered and soldered as one piece.

E. All joints in gutters and downspouts shall be riveted and soldered to form watertight units.

F. Wipe and wash clean soldered joints, to remove traces of flux immediately after soldering.

G. Hem exposed edges of flashing on underside 1/2 inch; miter and seam corners.

H. Backpaint concealed metal flashing surfaces with bituminous paint to a minimum dry film thickness of 15 mil, or use plastic tape where expected to be in contact with cementitious materials or dissimilar metals.

2.04 FINISH

A. Prime and paint raw galvanized steel conforming to Section 09900 of these specifications prior to installation.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Conform to drawing details in SMACNA manual.

B. Secure material in place as indicated and using specified type fasteners. Do not use exposed fasteners unless otherwise noted. When using exposed fasteners, they are to be of same finish as flashing.

C. Fit components tight into place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles. Solder joints at corners.

D. Provide one layer of building paper under metal flashings. Lap paper over metal wall flashings and lap with building papers supplied by other trades in shingle stepped fashion to provide positive shedding of water.

E. Do not use sealant unless specifically called for on the drawings.

F. Provide separation of dissimilar metals to prevent galvanic action by use of sealant tape, or other method as reviewed by Architect prior to installation.

G. Completed work shall provide watertight, weather-resistant performance, free from potential buckling or rupturing due to thermal expansion and contraction.

END OF SECTION

SECTION 07900
JOINT SEALERS

PART 1-GENERAL

1.01 SUMMARY

A. Section includes but is not limited to:

1. Cleaning and preparing sealant substrate surfaces to receive sealant materials.
2. Sealants and backing material for the following:
   a. Perimeters of aluminum window frames.
   b. Miscellaneous exterior joints not specified elsewhere.
   c. Miscellaneous interior joints not specified elsewhere.

1.02 RELATED WORK

A. Section 06200: Finish Carpentry

B. Section 07600: Flashing and Sheet Metal

C. Section 08500: Aluminum Windows

D. Section 09250: Gypsum Board

1.03 SYSTEM DESCRIPTION

A. System performance to achieve moisture-tight joint seals.

1.04 SUBMITTALS

A. Product Data: Provide manufacturer's product data indicating sealant chemical characteristics, performance criteria, substrate preparation, installation instructions, product limitations and colors available.

B. Samples: Two 6-inch-long samples of each sealant exposed in finished work.

1.05 QUALITY ASSURANCE

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.07 WARRANTY

A. Warranty shall provide for repairing and replacing, at no cost to the Owner, sealants used on exterior joints which fail to perform as intended, because of either leaking, crumbling, hardening, shrinkage, bleeding, sagging, staining or loss of adhesion, within a minimum period of two years from date of Substantial Completion of Work.

PART 2 - PRODUCTS

2.01 SEALANTS

A. Acrylic Sealant: ASTM C920, single component, solvent curing, non-staining, non-bleeding, non-sagging; color as selected.
   1. Elongation Capability 7.5 to 12 percent
   2. Service Temperature Range -13 to 180 degrees F
   3. Shore A Hardness Range 25 to 50

B. Polyurethane Sealant: ASTM C920, single component, chemical curing, non-staining, non-bleeding, non-sagging (for vertical applications) or self-leveling (for horizontal applications); color as selected.
   1. Elongation Capability 25 percent
   2. Service Temperature Range -40 to 180 degrees F
   3. Shore A Hardness Range 20 to 35

C. Silicone Sealant: ASTM C920, single component, solvent curing, non-sagging, non-staining, fungus resistant, non-bleeding; color as selected.
   1. Elongation Capability 25 percent
   2. Service Temperature Range -65 to 180 degrees F
   3. Shore A Hardness Range 15 to 35

2.02 ACCESSORIES

A. Primer: Non-staining type recommended by sealant manufacturer to suit application.

B. Joint Cleaner: Non-corrosive and non-staining type recommended by sealant manufacturer, compatible with joint forming materials.

C. Joint Backing: ASTM D 1056; round, closed cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width; suitable for use with specified sealants.

D. Bond Breaker: Pressure-sensitive tape recommended by sealant manufacturer to suit application.

PART 3 - EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Verify that substrate surfaces and joint openings are ready to receive work.

B. Remove loose material and foreign matter which might impair adhesion of sealant.

C. Verify that joint backing and release tapes are compatible with sealant.

D. Maintain workmanship of the highest quality in accordance with best trade practice. Perform preparation in accordance with ASTM C 804 for solvent release sealants.

E. Examine joint dimensions and size materials to achieve required width/depth ratios. Use joint filler to achieve required joint depths to allow sealants to perform properly. Use bond breaker where required and where joint backing is not used.

3.02 INSTALLATION

A. Clean and prime seal joints in accordance with manufacturer's instructions.

B. Install sealant in accordance with manufacturer's instructions.

C. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

D. Tool joints concave, free of air pockets, embedded matter, ridges and sags.

3.03 SCHEDULE

	Location	Type	Color
A.	Exterior walls, window and door frames.	Polyurethane	Match adjacent finish
B.	Under thresholds	Polyurethane	Black
C.	Interior joints at toilet rooms, wet areas	Silicone	Match adjacent finish
D.	Interior joints not listed above	Acrylic	Match adjacent finish
E.	Sheet metal joints	Butyl	Gray

END OF SECTION

SECTION 08210
WOOD DOORS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes but is not limited to:

1. Furnishing and installation of wood doors.
2. Factory preparation (pre-machining) for finish hardware.
3. Finishing.

1.02 RELATED WORK

A. Section 06200: Finish Carpentry

B. Section 08710: Door Hardware

C. Section 08800: Glass and Glazing

1.03 SUBMITTALS

A. Product Data and Shop Drawings: Manufacturer's specifications and shop drawings for doors proposed for use. Indicate door core and edge materials and construction, veneer species, jointing methods, hardware locations and factory machining criteria.

B. Submit W.I.C. Certificate of Compliance prior to delivery of materials.

C. Shop drawings shall bear the W.I.C. stamp.

1.04 QUALITY ASSURANCE

A. Wood doors shall be manufactured in accordance with the National Wood Window & Door Association (NWWDA) Industry Standard I.S. 1-a, "Architectural Wood Flush Doors."

B. Manufacturers shall be qualified to affix each door with NWWDA Seal of Acceptance or quality certification stamp.

C. Allowable Fabrication Tolerances: In accordance with NWWDA Industry Standard I.S.1.5.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of NWWDA I.S.1, Appendix, "How to Store, Handle, Finish, Install and Maintain Wood Doors," as well as with manufacturer's instructions.

1.06 WARRANTY

A. Submit written agreement on door manufacturer's standard form signed by manufacturer, installer and Contractor, agreeing to repair or replace defective doors that warp (bow, cup, or twist), show telegraphing of core construction in face veneers, delaminate or do not conform to tolerance limitations of specified quality standards for the lifetime of the original installation. Include re-

installation required due to repair or replacement of defective doors where defect was not apparent prior to hanging.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Weyerheuser Co. (five ply)

B. Cal-Wood Door (five ply)

C. T.M. Cobb Company (five ply)

D. U.S. Plywood (five ply)

E. Or approved equal manufacturers, members of NWWDA, if above manufacturers are unable to meet Project schedule in providing specified wood veneered doors.

2.02 MATERIALS

A. Standard flush faced type wood doors: 1-3/4 inches thick; solid core construction with medium density overlay paint grade close-grain hardwood. Prime paint wood doors.

B. Adhesives: CS 171, Type II.

C. Edge and Cut Sealer: Compatible with specific paint finish.

2.03 FABRICATION

A. Fabricate doors in accordance with requirements of W.I.C. Quality Standards for Premium Grade.

B. Make cut-outs for and provide glass of size and type indicated on drawings. Preinstall glazing and stops at factory. Refer to Section 08800.

C. Bevel strike edge 1/8 inch in 2 inches.

D. Prefit and premachine doors. Coordinate preparation of doors with hardware requirements specified in Section 08710, "Door Hardware."

E. Comply with the tolerance requirements of NWWDA for prefitting.

F. Provide the following door clearances, unless otherwise noted:

1. Provide 1/16 inch at head and jambs.

2. Provide 3/8 inch to finish floor.

G. Sizes: As shown on the drawings. Coordinate with installation to determine the actual sizes and clearances.

H. Solid Core: NWWDA PC-5 with 5-inch top rail and 8-inch bottom rail.

2.04 FINISHING

A. Doors shall be finished as shown on the drawings. Refer to Section 09900, "Painting."

B. Comply with appropriate W.I.C. Technical Bulletins.

PART 3 - EXECUTION

3.01 PREPARATION

A. Condition doors to average prevailing humidity in installation area prior to hanging.

3.02 INSTALLATION

A. Install doors in accordance with manufacturer's instructions. Install plumb and square, with a maximum diagonal distortion of 1/16 inch.

B. Install hardware in accordance with requirements of Section 08710.

C. Seal concealed job site-cut surfaces with two coats of door manufacturer's recommended sealer before final hanging of doors.

3.03 ADJUSTING AND CLEANING

A. Replace or re-hang doors which are hinge-bound and do not swing or operate freely.

B. Refinish or replace finished doors damaged during installation as directed by the Architect at no additional expense to Owner.

END OF SECTION

SECTION 08500
ALUMINUM WINDOWS

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes but is not limited to:

1. Furnishing all necessary materials, labor and equipment for a complete installation of exterior and interior aluminum windows including glass, glazing and hardware as shown on the drawings and as specified herein.

1.02 RELATED WORK

A. Section 06100: Rough Carpentry

B. Section 06200: Finish Carpentry

C. Section 07620: Flashing and Sheet Metal

D. Section 07900: Joint Sealers

E. Section 08800: Glass and Glazing

F. Section 09250: Gypsum Board

1.03 QUALITY ASSURANCE

A. Exterior Window, General: Provide a water-tight window system weatherstripped to minimize air infiltration. Insure that all joints, gaps, penetrations, and all other surfaces are made water-tight and have been sealed.

B. Standards: Comply with applicable standards and recommendations published by the National Association of Architectural Metal Manufacturers (NAAMM), and the Architectural Aluminum Manufacturer's Association (AAMA).

1. Windows shall meet or exceed ANSI A134.1 (AAMA) specification PA-2.

C. Except as otherwise indicated, comply with air infiltration tests, water resistance tests, uniform load deflection tests, and uniform load structural tests specified in ANSI/AAMA 101-88 for type and classification of window units required in each case.

1. Air Infiltration:
   a. With the window ventilators closed and locked, test unit in accordance with ASTM E-283 at a static air pressure difference of 6.24 psf.
   b. Air infiltration shall not exceed a maximum value of .06 cfm/ft. for sash.

2. Water Resistance:
   a. With the window ventilators closed and locked, test unit in accordance with ASTM E-331 at static air pressure difference of minimum 8.0 psf.
   b. There shall be no water leakage as defined in ASTM E-331 at this specified static air pressure difference to meet the performance requirement.
   c. Test shall be completed with or without exterior applied screens.

3. Uniform Load Structural:
   a. With window ventilators closed and locked, test unit in accordance with ASTM E-330 at a static air pressure difference of minimum of 52.5 lbs. psf with high pressure applied first on one side of the unit and then on the other side.
   b. Static air pressure difference shall be 1½ times the design load pressure specified.
   c. At conclusion of test, there shall be neither glass breakage, permanent damage to fasteners, hardware parts, support arms or actuating mechanisms nor any other damage, which would cause the window to be inoperable.
   d. Permanent deformation of any window, sash or ventilator member shall not exceed 4% of its span.

4. Condensation Resistance Factor (CRF):
   a. With window sash and ventilators closed and locked, test unit in accordance with AAMA 1502.7 using test size of 4'-0" x 6'-0" and framing configurations specified in the AAMA Specification Standards.
   b. Condensation resistance factor shall not be less than 49.

5. Thermal Transmission (Conductive U-Value)
   a. With window sash and ventilators closed and locked, test unit in accordance with AAMA 1503.1 using same test unit size and configuration as used in 4a above.
   b. Conductive thermal transmission (U-Value) shall not be more than .58 BTU's/Hr./s.f./0 degrees F.

D. Certificates (Qualification Data): Submit product certificates signed by manufacturer, certifying materials comply with specified performance characteristics and physical requirements.

E. Design components to comply with the Americans with Disabilities Act (ADA) and the 1995 CBC.

F. Drawings and Specifications for exterior windows are based on the 5200 Series Aluminum Windows as manufactured by the Kawneer Company, Inc., and for interior sliding windows on the Nissen Series "F" Aluminum Window. Whenever substitutes are to be considered, supporting technical literature, samples, drawings and performance data must be submitted five (5) days prior to bid opening.

G. Installer shall be a company specializing in installation of aluminum glazing systems with a minimum of three years of experience.

H. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction, approving application method.

1.04 DELIVERY, STORAGE AND HANDLING

A. Ordering: Comply with manufacturer's ordering instructions and lead time requirements to avoid construction delays.

B. Packing, Shipping, Handling, and Unloading: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.

1.05 SUBMITTALS

A. Field measure all openings, slopes, etc. prior to preparation of shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

B. Coordinate with all suppliers and installers of adjacent materials. Show all connections to adjacent assemblies on shop drawings.

C. Shop Drawings: Indicate system and component dimensions, components within assembly, window schedules showing locations, wall elevations, typical unit elevations and large-scale detail sections of every typical composite member; profiles including anchorage, hardware, operators, finish colors and textures, and other components not included in manufacturer's standard data; framed opening requirements and tolerances; anchorage and fasteners; glass; and affected related work. Include glazing details.

D. Samples:

1. Submit three 12-inch long extrusions of proposed aluminum window extrusion with specified finish for Architect's review and approval.

2. Submit two samples of each type of sealant and gasket.

1.06 WARRANTY

A. Submit two copies of written warranty signed by the Manufacturer, Installer and Contractor, agreeing to replace window wall units which fail in materials or workmanship within three years of date of acceptance. Failure of materials or workmanship shall include (but not be limited to) excessive leakage or air infiltration, excessive deflections, deterioration of finish or metal in excess of normal weathering, and defects in accessories, weatherstripping and other components of the work.

1.07 PROTECTION AND REPLACEMENTS

A. Use all means necessary to protect the materials of this Section before, during and after installation and to protect the work and materials of all other trades.

B. In the event of damage, immediately make all repairs and replacements necessary at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. For the purpose of designating type and quality, specifications for exterior aluminum windows are based on Kawneer 5200 Series Aluminum Windows and interior aluminum windows on Nissen Series "F." Reviewed equivalent products by other approved manufacturers may be acceptable.

B. Substitutions: Refer to item 1.03.F. above for substitution requirements. Products must be of the same size and meet or exceed the performance requirements of the specified system.

2.02 MATERIALS

A. Aluminum Extrusions: Extrusions shall be 6063-T5 alloy and temper (ASTM B221 alloy G.S. 10A-T5). Fasteners, where exposed, shall be 300 Series stainless steel. Perimeter anchors shall be aluminum or steel, providing the steel is properly insulated from the aluminum.

B. Glazing: Refer to drawings and to Specification Section 08800 for glass and glazing type requirements. Glazing materials shall be of material compatible with aluminum, conforming to the window manufacturer's recommendations. Sealants and sealing materials used in composite structure which have direct contact with the gasket shall be of material compatible with aluminum. Standard exterior glazing gasket shall be a dry glazed closed cell elastomer in accordance with AAMA 806-1 or silicone sealant with a compatible backup. Interior glazing shall be with aluminum glazing beads of the snap-in type and compression wedge of dense elastomer per ASTM C864.

C. All glass pockets, fixed and ventilators, shall be weeped to provide positive drainage. Water shall be weeped to the exterior via frame weep slots protected by snap-in weep covers or integral drips.

D. Weatherstripping: Weatherstripping shall be a high quality material capable of meeting environmental exposure and performance requirements.

E. Finishes:

1. All exposed surfaces shall be free of scratches and other blemishes and shall receive a Kynar coating, color to be selected by Architect.

F. The continuous track for the interior sliding window shall be nylon.

2.03 FABRICATION

A. All window framing and vent members shall be no less than 1-7/8" in depth. Frame and ventilator extrusions have a nominal wall thickness of not less than .070" (.050" beads).

B. Ventilators shall be tubular and corner construction shall be mitered with clip, epoxy, stake attachment. All frame corners and meeting rail intersections shall be coped and tenon joined and forged. All corners and intersections shall be made permanently leakproof. Minimum depth of glazing rabbet shall be 13/16".

C. Hardware: Hinging hardware shall be heavy-duty 4-bar hinges conforming to AAMA 904.1. Hinges shall have a positive stop and an adjustable friction shoe. Locking hardware, strikes, keepers and pole rings shall be high-pressure die-cast zinc. All hardware fasteners penetrating frame or inside plane of window shall be factory sealed with resilient non-hardening compound.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The aluminum windows shall be installed square, plumb and level in a secure and professional manner to assure neat and weather-tight construction in accordance with the ANSI/ASTM Specification F-737-80. At exterior window, a permanent weather-tight joint shall be made at the junction of the sill and side frame members of the master frame with a good grade of sealant that shall meet AAMA Specification 803. Windows shall be properly caulked with a compound meeting AAMA 808, "Specifications for Exterior Perimeter Sealing Compounds," to accomplish a thoroughly weather-tight installation around the perimeter of the window master frame.

3.02 EXAMINATION

A. Site verification of conditions: Verify substrate conditions are acceptable for product installation in accordance with manufacturer's instructions. Notify Architect in writing of unsatisfactory conditions for necessary corrections.

3.03 PREPARATION

A. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.

3.04 RE-INSTALLATION

A. Items identified by the Architect as defective or as substandard installation shall be re-installed by the Contractor at no additional cost to the Owner.

3.05 ADJUSTING AND CLEANING

A. Adjusting: Verify that all installations are level, square and plumb. Make necessary adjustments as required by field conditions.

B. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to County's acceptance. Remove all temporary labels and clean all surfaces thoroughly. Remove construction debris from project site and legally dispose of debris.

C. Protection: Protect installed product's finish surfaces from damage during construction.

END OF SECTION

SECTION 08710
DOOR HARDWARE

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes but is not limited to:

1. Furnishing and installation of finish hardware for doors.

1.02 RELATED WORK

A. Section 06200: Finish Carpentry

B. Section 08210: Wood Doors

1.03 QUALITY ASSURANCE

A. Finish hardware shall comply with applicable fire and building codes, including provisions for accessibility by the physically handicapped required by the California Building Code (CBC), California Code of Regulations (CCR), Title 24, part 2, and the Americans with Disabilities Act (ADA).

1.04 SUBMITTALS

A. Provide for Architect's review copies of a Finish Hardware Schedule of all materials, listing manufacturer's catalog number, templates, door details, index, exact location in the Work, and any other pertinent information by location. Submit such Schedule on 8-1/2" x 11" sheets reproducible by photocopying. Hardware suppliers shall resubmit eight (8) complete corrected copies for final review including one (1) copy for the Owner for maintenance purposes. Submit copies of catalog cuts of each specific type of hardware specified (including each type of lockset and door control/closer). Do not submit complete manufacturer's catalog but only the cuts of the specific hardware types. Such Schedule shall be prepared under the direct supervision of a regular member of the Society of Architectural Hardware Consultants, and shall be identified as having provided such supervision. Review of such Schedule shall not relieve the Contractor from responsibility for errors or omissions therein.

B. The Contractor shall provide one (1) copy of the reviewed Hardware Schedule to the Wood Door Subcontractor and one (1) copy to all other subcontractors whose work may be affected. The Contractor shall also provide one (1) copy of the reviewed Shop Drawings of the above mentioned Subcontractors to the hardware supplier.

C. Review of the Hardware Schedule by the Architect shall not relieve the Contractor from the responsibility for furnishing all required finish hardware.

D. The hardware supplier shall notify the lock company's representative as soon as possible to meet with the Owner's maintenance personnel to assist in reviewing the Hardware Schedule before sending the hardware order to the factory.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver hardware to factory, shop, or mill of subcontractors and manufacturers requiring it or directly to the Project site as required.

B. Packaging for each article of hardware shall conform to the reviewed Hardware Schedule.

1.06 PROJECT CONDITIONS

A. All hardware shall be manufactured to template. It is the responsibility of the Contractor to provide templates and, if necessary, the actual hardware to subcontractors of doors and frames in ample time to facilitate the work.

1.07 WARRANTY

A. Warrant all hardware to be free from defects in manufacture and capable of performing the required duties for a period of two (2) years from date of final acceptance by the Owner. Hardware failing to comply with warranty shall be removed and replaced with new material, including labor, at no cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General Requirements:

1. The following specification is intended to cover all doors in the Project and establish a type and standard of quality, but it is the responsibility of the Contractor to furnish proper hardware for all openings and for a complete installation, whether specified or not.

2. If there are omissions in the specifications required for a complete installation, it shall be called to the attention of the Architect when the Hardware Schedule is submitted. No extra cost will be allowed because of changes or corrections necessary to facilitate the proper installation of any hardware.

2.02 HARDWARE FINISHES

A. All hardware unless otherwise noted shall be fabricated of bronze metal or steel, as indicated, and shall be polished and finely finished with satin finish: US26D BHMA No. 652 at interior and US26D BHMA No. 626 at exterior. All finishes should match US26D.

2.03 ITEMS

A. Hardware of the following listed manufacturers may be used. All numbers used in the Hardware Groups are taken from manufacturer's catalogs. Verify numbers from the manufacturer prior to submitting Hardware Schedule.

B. Some existing doors, indicated on the drawings, require selective replacement hardware which is included as separate hardware groups.

C. Hardware Groups:

Group #1	(Door 101)		
	Hinges (3)	FBB 199 NRP	Stanley
	Lockset (1)	8204 LW1L	Sargent
	Closer (1)	Series 350	Sargent
	Electric Strike (1)	310-2¾"	Folger Adam
	Electronic Keypad	Series 6000	Corby
	Stop (1)	407 x 626	Ives
Group #2	(Doors 103, 104, 105, 201)		
	Hinges (3)	FBB 199	Stanley
	Lockset (1)	8205 LW1L	Sargent
	Wall Stop (1)	50	Glynn-Johnson
Group #3	(Door 106, 109)		
	Hinges (3)	FBB 199	Stanley
	Lockset (1)	8204 LW1L	Sargent
	Wall Stop (1)	50	Glynn-Johnson
Group #4	(Door 107)		
	Flush Pulls (2)	17N	Hager
	Heavy-duty track (1)		
	Rubber bumper (1) mounted inside pocket per ADA requirements		
Group #5	(Doors 108, 203, 204)		
	Hinges (3)	FBB 199	Stanley
	Lockset (1)	8265 LW1L	Sargent
	Wall Stop (1)	50	Glynn-Johnson
Group #5A	(Doors 205, 206)		
	Hinges (3)	FBB 199	Stanley
	Lockset (1)	8265 LW1L	Sargent
	Wall Stop (1)	50	Glynn-Johnson
	Automatic Door Bottom	434ARL	Pemko
	Adhesive Jamb Weatherstrip	S88D	Pemko
Group #6	(Door 202)		
	Hinges (3)	FBB 199	Stanley
	Push Plate (1)	1001-1	Trimco
	Pull Plate (1)	1010-1	Trimco
	Closer (1)	Series 350	Sargent
	Wall Stop (1)	50	Glynn-Johnson
Group #7	(Door E1)		
	Lockset (1)	8205 LW1L	Sargent

Group #8 (Door E4, E5, E6)
Replace existing cylinder (1) with new to match existing for re-keying of temporary Police Department facilities. Also replace lockset if compatible cylinder is unavailable. Immediately prior to final acceptance of the Work, re-key to Fire Department's requirements.

B. Hinges: All lockable doors shall have non-removable pins. Provide concealed bearing and interior, self-lubricating bushings.

1. Type: Five-knuckle, Stanley, Hager, McKinney, or accepted equal.
2. Exterior Out-Swinging: Stainless steel material.
3. Unless otherwise noted, the size of hinges will be determined by the following:
   a. Doors 1-3/4 inches thick and up to 41 inches wide: 4-1/2 inches.
4. Furnish two hinges for doors up to 5 feet high and one additional hinge for each 2-1/2 feet of height or fraction thereof over 5 feet.
5. Provide ball-bearing hinges for doors with closers.

C. Standard Locksets and Latchsets: Sargent 8100 heavy duty mortise design with 2-3/4 inch backset, unless otherwise noted. Provide each with a box strike; provide strikes with extended lips unless not required to protect adjacent trim from being marred by the latch bolt. Provide each box strike with a cushion of sponge to deaden sound. Provide each door with the following as required.
   1. Each lockset or latchset shall have Sargent Model No. 1445H lever handles unless otherwise noted.
   2. Roses shall be cast construction Sargent Model No. 695LN wrought rose.

D. Door Closers: All closers to be provided by one manufacturer. Provide bracket, arms and all necessary mounting and operating hardware. All closers shall have adjustable spring power and shall meet handicapped accessibility and fire codes. All closers to have independent swing, latch, and back check valves standard, with non-critical valve adjustments. All to be of rack and pinion construction with heavy-duty cylinder construction made of cast iron to ensure longevity and minimum service. All closers to be sized and supplied by hardware supplier.

E. Doorstops: Install where required to prevent door or hardware from striking an adjacent wall or obstruction.
   1. Design: Wall-type, unless otherwise scheduled.

F. Door Silencers shall be pneumatic rubber, installed in all frame stops on all doors. Furnish three per jamb (Glynn-Johnson GJ-64).

G. Electronic Keypad: Confirm compatibility of keypad and system capacity with existing system prior to ordering. Extend circuits including low-voltage wiring from existing transformer to each new key pad locations.

H. Pocket Door Hardware: Provide heavy-duty track sized for weight of door, flush pulls with 26D finish, and any other required accessories for smooth operation.

I. Automatic Door Bottoms: Aluminum case surrounding a movable drop bar seal, sound-tested to ASTM E 90-90 and ASTM E 1408-91.

J. Adhesive Jamb Weatherstrip: Pemko SiliconSeal pressure-sensitive door gasketing, sound-tested to ASTM E 90-90 and ASTM E 1408-91, or approved equal.

K. Keying: All lock cylinders shall be furnished and installed by the Contractor. Locks shall be keyed and registered at lock factory in accordance with Owner's key-control requirements.

L. Fastenings: Of suitable sizes, quantity, and material. Exposed fastenings shall match hardware material and finish.

M. All new hardware, except door closers, shall be satin chrome plate, 626. Door closers shall be primed to paint to match door.

PART 3 - EXECUTION

3.01 INSTALLATION AND APPLICATION

A. Finish hardware shall be neatly and properly installed in accordance with the best practices as prescribed by the manufacturer.

B. Items of hardware not definitely specified herein but necessary for the proper operation of a door assembly shall be provided at no additional cost to the Owner. Such items shall be of the type and quality suitable for the service required and comparable to adjacent hardware.

C. Modification to specified hardware, required by reason of construction characteristics, shall provide the specified operational and functional features, and shall be provided in the specified quality and finish.

D. Protect installed hardware as needed. Retain or reinstall manufacturer's protective covering where feasible. Remove protection just prior to final acceptance of the building, as directed, or as needed for performance of other work. Damaged items shall be replaced at no additional cost to Owner.

3.02 HARDWARE MOUNTING HEIGHTS

A. Hinges:
1. Type: Five-knuckle Hager, McKinney, or accepted equal.
2. Top: 5 inches from head to top of hinge leaf.
3. Bottom: 10 inches from bottom of hinge to finished floor.
4. Intermediate: Equal distance between top and bottom hinges, 3'-0" maximum.
5. Door or frame manufacturer's standard top and bottom hinge mounting locations if at variance to the above are acceptable.

END OF SECTION

SECTION 08800
GLASS AND GLAZING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Section includes but is not limited to:

1. Glass and glazing materials except where specified elsewhere.

1.02 RELATED WORK

A. Section 06200: Finish Carpentry

B. Section 08100: Hollow Metal Frames

C. Section 08200: Wood Doors

D. Section 08500: Aluminum Windows

1.03 REFERENCES

A. Flat Glass Marketing Association (FGMA): Glazing Manual.

B. FGMA: Glazing Sealing Systems Manual.

1.04 QUALITY ASSURANCE

A. Comply with Uniform Building Code (UBC 1994 Edition), Chapter 54, "Glass and Glazing," Section 5406.

B. Comply with Flat Glass Marketing Association (FGMA) "Glazing Manual" and "Glazing Sealing Systems Manual," except where more stringent requirements are indicated.

1.05 SUBMITTALS

A. Samples: Approximately 6"x 6" of each specified glass shall be submitted for review by Architect.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. PPG Industries/Glass Division

B. Libbey Owens-Ford Glass Co.

C. ASG Industries, Inc.

2.02 GLASS MATERIALS

A. Exterior window glass shall have a minimum shading coefficient of 0.72.

B. Non-Tempered Float Glass: Clear, meeting requirements of ASTM C1036.

1. Thickness: Unless specified otherwise, as recommended by manufacturer for size of light to be glazed and design loads, but not less than ¼ inch.

C. Tempered Float Glass: Float glass as specified above and conforming to requirements of FS DD-G-1043, kind fully tempered; glazing quality; 1/4-inch thick, clear, unless otherwise recommended by fabricator for size of light to be glazed.

2.03 GLAZING MATERIALS

A. Sealants:

1. Interior Glazing: Single component acrylic; shore "A" hardness of 15-25; Tremco Mono or Pecora Unicrylic 60.

2. Exterior Glazing: Use exterior sealant appropriate to window to make watertight.

B. Gaskets: Neoprene or flexible PVC gaskets designed for glazing applications. Color: black

C. Glazing Tape: Preformed butyl tape; NAAMM No. SS-1B-68, with integral spacing device; 10-15 durometer hardness; paper release; black color; manufactured by Tremco, Norton or PTI.

D. Setting Block: Neoprene; 70 durometer hardness; three inch long x 3/32 inch thick x ¼ inch high.

2.04 FABRICATION, GENERAL

A. Provide correct glass size for each opening, within tolerances and necessary dimensions established.

B. Factory-label each pane of glass. Do not remove labels until final acceptance is obtained.

PART 3 – EXECUTION

3.01 GENERAL

A. Comply with combined printed recommendations of window, door frame and glass manufacturers and manufacturers of sealants, gaskets, and other glazing materials, except where more stringent requirements are indicated, including those of referenced glazing standards.

B. Compression Gaskets: Provide adequate anchorage to ensure that gasket will not "walk" out when installation is subjected to movement.

C. Clean contact surfaces and wipe dry.

D. Glazing Option: Use either the dry, wet, or combination glazing method.

3.02 INSTALLATION

A. Glazing of aluminum windows shall be accomplished by bedding glass against glazing stop with glazing tape. Glass shall be firmly and continuously compressed against bedding tape with a beveled roll-formed, or extruded, aluminum glazing bead incorporating a vinyl gasket.

B. All installations of glass and glazing shall be in accordance with shop drawings and with recommendations of Flat Glass Marketing Association.

3.03 CLEANING

A. After installation mark glass with large "X" by using tape or removable paste.

B. Immediately remove droppings from finished surfaces. Remove non-permanent labels after work is completed.

END OF SECTION

SECTION 09250
GYPSUM BOARD

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Section includes but is not limited to:

1. Furnishing and installing gypsum wall board.
2. Acoustical sealant.
3. Taped and sanded joint treatment.
4. Accessories.

1.02 RELATED WORK

A. Section 06100: Rough Carpentry

B. Section 07200: Building Insulation

C. Section 08100: Hollow Metal Frames

D. Section 08500: Aluminum Windows

E. Section 09300: Ceramic Tile

1.03 QUALITY ASSURANCE

A. Provide products manufactured by or recommended by manufacturer of gypsum board to maintain single-source responsibility.

B. Comply with the requirements of the following standards:

1. UBC Chapter 47, 1994 edition
2. Gypsum Association (GA) publication GA-216, "Recommended Specifications for the Application and Finishing of Gypsum Board."
3. ASTM C 754

C. Installer Qualifications: A company specializing in work similar to that required on this Project and with not less than 5 years of documented successful experience.

1.04 PROJECT CONDITIONS

A. Maintain temperature at not less than 55 degrees F. (13 degrees C.) for at least 24 hours before installation begins and for not less than 48 hours after joint finishing has been completed.

B. Provide controlled ventilation during joint-finishing operations to eliminate excessive moisture. Avoid drafts during hot, dry weather to prevent excessively fast drying of joint compound.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Georgia-Pacific

B. Gold Bond

C. United States Gypsum

2.02 GYPSUM WALL BOARD

A. General: Provide materials in accordance with ASTM C840.

B. Gypsum Wall Board: ASTM C36, Type "X"; maximum permissible lengths; ends square cut, tapered edges, 5/8 inches thick.

C. Water-Resistant Gypsum Wall Board: For showers.

D. Georgia-Pacific Dens-Shield tile backer board: Behind ceramic tile other than showers.

2.03 GYPSUM WALL BOARD ACCESSORIES

A. Provide accessories in accordance with manufacturer's recommendations.

B. Corner Beads: Metal.

C. Edge Trim: LC bead or L bead.

D. Metal Reinforcements and Casing: Electrogalvanized, conforming to C1047.

E. Screw Fasteners: Phillips head with bugle shape, Type S, conforming to ASTM C1002, sizes as required by code and recommended by wall board manufacturer.

F. Joint-Treatment Materials: Provide products by manufacturer of gypsum boards which comply with ASTM C475, GA-216 and manufacturer's recommendations for specific project conditions.

G. Furnish components not specified herein but shown on the drawings and other items required to complete the installation.

2.04 ACOUSTICAL ACCESSORIES

A. Acoustical Sealant: Paintable, non-shrinking, non-cracking type recommended for use in conjunction with gypsum board.

B. Resilient Channels: 25 gauge, ½" minimum thickness.

PART 3 - EXECUTION

3.01 PREPARATION

A. Inspect all framing and review mechanical and electrical requirements prior to installation. Contact the Architect if discrepancies occur or if framed walls are out of plumb or inadequately fastened to

structure. Commencement of work will imply acceptance of conditions as being satisfactory and adequate.

3.02 GYPSUM BOARD INSTALLATION

A. General:

1. Comply with requirements of ASTM C840, GA-216 and manufacturer's recommendations, except where exceeded by other requirements.
2. Install wall boards in a manner which will minimize butt end joints in center of wall area. Stagger vertical joints on opposite sides of walls.

B. Single-Layer Application:

1. Apply gypsum board with long dimension either parallel or perpendicular to framing, with ends and edges occurring over firm bearing.
2. Install gypsum board by means of screw attachment at spacing recommended by manufacturer. Stagger screws on abutting edges or ends.

C. Apply applicable shape metal edge trim at all exposed edges of wallboard and where otherwise shown.

1. Gypsum Board Abutting Other Materials: Allow 1/8-inch clearance to allow for caulking.

D. Apply metal corner beads at all exterior corners and apply trim at interior corners where gypsum board intersects metal or other dissimilar material. Install in longest lengths practicable.

E. Control Joints: Provide in accordance with ASTM C840 recommendations and as required to maintain rating at fire-rated assemblies.

F. Coordinate installation with acoustical ceiling system installer.

G. Remove and re-do defective work.

H. For conditions not specified herein or shown on the drawings, follow procedures recommended by U.S. Gypsum Company.

3.03 ACOUSTICAL ACCESSORIES INSTALLATION

A. Place acoustical sealant at partitions indicated on drawings to receive sound batt insulation. Install in accordance with manufacturer's recommendations.

B. Install resilient channels behind gypsum board where indicated on drawings.

3.04 TAPING AND FINISHING

A. General:

1. Apply finishing compounds in accordance with manufacturer's directions.
2. Conceal flanges of metal reinforcement with minimum two coats compound. Compound shall extend 8 to 10 inches each side of metal nosing.
3. Shovel measures for mixing compounds shall not be permitted.

4. Tape, fill and sand exposed joints, edges, corners and openings to produce surface ready to receive surface finishes. Feather coats onto adjoining surfaces so that out of plane tolerance is 1/32 inch maximum.

B. Finishes: In accordance with GA and industry association recommended specification, "Levels of Gypsum Board Finish."

1. At locations indicated to be painted: Level 5.

C. Texture: Gypsum wall board surfaces to be smooth "flat wall".

END OF SECTION

SECTION 09251
GYPSUM BOARD-RESILIENT CHANNEL INSTALLATION INSTRUCTIONS FOR WALLS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Section includes but is not limited to:

1. Furnishing and installing gypsum wall board on resilient channels

1.02 RELATED WORK

A. Refer to Section 09250: Gypsum Board

1.03 QUALITY ASSURANCE

A. Refer to Section 09250: Gypsum Board

1.04 PROJECT CONDITIONS

A. Refer to Section 09250: Gypsum Board

PART 2 - PRODUCTS

2.04 ACOUSTICAL ACCESSORIES

A. Acoustical Sealant: Paintable, non-shrinking, non-cracking type recommended for use in conjunction with gypsum board.

B. Resilient Channels: 25 gauge, ½" minimum thickness.

PART 3 - EXECUTION

Attach channels directly to wall studs only. Do not install channels on gypsum board, shear plywood, or like material.

a. Attaching Channels

1. Attach resilient channels at 24-inch center-to-center spacing perpendicular to studs. See Figure A attached.

2. Use 1-inch type S Bugle Head dry wall (or similar) screws.

3. Attach channels with the gypsum board mounting flange facing up and prepunched holes facing down.

4. Drive screws through holes in channel mounting flange.

5. Hold back ends of channels 1/2 inch from intersecting surfaces.

6. Splice channels only at studs and overlap butt ends no more than 1-1/2 inches. Screw attach through both flanges.

7. Locate channels a maximum of 3 inches from framing at base and head of wall.

8. Channel shall not touch base or head plate or other horizontal framing member.

9. Add additional framing if necessary so that channels are cantilevered no more than 6 inches.

b. Attaching Gypsum Board

1. Apply gypsum board of maximum practical length, the long edge parallel with and centered on channels. Orienting the long edge vertically is acceptable on walls where a single sheet of gypsum board extends from floor to ceiling.

2. Mark location of all framing members, piping, and other material that could impair the resiliency of the channel. Locate screws at least 2 inches away from the marked areas.

3. Fasten gypsum board using type S Bugle Head dry wall screws (or equal) of appropriate length to prevent penetration into framing. Space screws 12 inches center-to-center in field of gypsum board and along all edges.

4. Hold back edges of resiliently hung gypsum board edges 1/4 inch at all intersecting surfaces.

c. Two-layer Option

1. When a construction with two layers of gypsum board on resilient channels is recommended, apply the face gypsum board layer in the same manner as the base layer, except offset the long edge joints by 24 inches and the short edge joints by 48 inches.

2. Fasten the face layer panel to channels using type S Bugle Head dry wall screws (or equal) spaced 12 inches on center in field of panels and along butting edges. Use screws of appropriate length to prevent rigid contact with framing.

3. Offset face layer screw pattern 6 inches from base layer screws along all channels. Face layer screws must not penetrate into framing.

4. Hold back edges of resiliently hung gypsum board 1/4 inch at all intersecting surfaces.

d. Caulking Gypsum Board/Resilient Channel Construction

1. For all constructions, caulk the perimeter void full and airtight with an acoustical sealant.

2. Recessed light fixtures, junction boxes, fire sprinkler pipes, and other penetrations must be sealed airtight with acoustical sealant.

e. Baseboard and Trim Attachment

1. Do not rigidly attach baseboard or other finishing trim to framing through resiliently suspended gypsum board.

2. Screw attach baseboard to channels. Gluing baseboard to gypsum board could also be considered.

END OF SECTION

SECTION 09252
GYPSUM BOARD-ACOUSTIC CEILING RECONSTRUCTION

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Section includes but is not limited to:

1. Furnishing and installing gypsum board ceilings in rooms 102,103, 106, 108 & 109

1.02 RELATED WORK

A. Refer to Section 09250: Gypsum Board

1.03 QUALITY ASSURANCE

A. Refer to Section 09250: Gypsum Board

1.04 PROJECT CONDITIONS

A. Refer to Section 09250: Gypsum Board

PART 2 - PRODUCTS

2.04 ACOUSTICAL ACCESSORIES

A. Acoustical Sealant: Paintable, non-shrinking, non-cracking type recommended for use in conjunction with gypsum board.

B. Resilient Channels: 25 gauge, ½" minimum thickness.

PART 3 - EXECUTION

1. Demolition: Remove light fixtures and molding

2. Gypsum board treatment: Demolish gypsum board ceiling and glue two layers of 5/8-inch gypsum board to underside of plywood sub-flooring.

3. Insulation: Install 9 inches of batt insulation into existing joist cavities.

4. Attaching Channels

   a. Attach resilient channels at 24-inch center-to-center spacing perpendicular to the joists.

   b. Use 1-inch type S Bugle Head dry wall (or similar) screws.

   c. Drive screws through holes in channel mounting flange.

   d. Attach channels with mounting flanges facing in only one direction.

e. Hold back ends of channels 1/2 inch from intersecting surfaces.

f Splice channels only at joists and overlap butt ends no more than 1-l~2 inches.

Drive screws through both flanges.

g. Butter backs and side of electrical junction boxes to seal them airtight.

5. Attaching Gypsum Board

a. Using gypsum board of maximum practical length, locate the long edge parallel

with and centered on channels.

b. Mark locations of all framing members, piping, and other material that could impair resiliency of channel. Locate screws at least 2 inches away from the marked areas.

C. Fasten gypsum board to channels using type S Bugle Head dry wall *screws (or* equal) of appropriate length. Do not screw into joists.

d. Locate gypsum board ceiling 1/4 inch from intersecting surfaces.

6. Two-layer Option

a. When a construction with two layers of gypsum board on resilient channels is recommended, apply the face gypsum board layer in the same manner as the base layer, except offset the long edge joints by 24 inches and the short edge joints by 48 inches.

b. Fasten the face layer panel to channels using type S Bugle Head d_7 wall screws (or equal) spaced 12 inches on center in field of panels and along butting edges.

c. Offset face layer screw pattern 6 inches from base layer screw pattern along all channels. Face layer screws must not penetrate into framing.

d. Hold back edges of resiliently attached gypsum board 1/4 inch at all intersecting surfaces.

7. Caulking Gypsum Board/Resilient Channel Construction

a. Caulk the perimeter void frill and airtight with an acoustical sealant.

b. Recessed light fixtures, junction boxes, fire sprinkler pipes, and other penetrations must be sealed airtight with acoustical sealant.

END OF SECTION

SECTION 09300
CERAMIC TILE

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Section includes but is not limited to:

1. Furnishing all necessary materials, labor and equipment for a complete installation of tile work as shown on the drawings and specified herein.
2. Ceramic floor tile.
3. Ceramic wall tile.

1.02 RELATED WORK

A. Division 3: Concrete

B. Section 07900: Joint Sealers

C. Section 09250: Gypsum Board

D. Section 10800: Toilet and Bath Accessories

E. Division 15: Plumbing

1.03 QUALITY ASSURANCE

A. Conform to recommended standards of the Tile Council of America (TCA).

1.04 SUBMITTALS

A. Submit manufacturer's technical information and installation materials product data. Include all certifications to demonstrate compliance to the specifications.

B. Submit samples of each of the following:

1. All Tiles: Panel for each color and type. Minimum 12"x12" size, showing pattern, color and grouted joints.

2. Grout color samples.

C. Submit layout drawing showing color, texture, trims and shapes for areas of tile work.

D. Provide manufacturer's certification that tile meets or exceeds static coefficient of friction requirements of ADA for slip resistance.

1.05 PRODUCT LABELING, DELIVERY AND HANDLING

A. All materials must be delivered to the job site and stored in their original unbroken cartons.

B. Materials should be stored in a dry, covered area.

C. Manufactured mortars and grouts shall contain seal of approval certifying compliance with referenced standards, and shall be types recommended by tile manufacturer for application.

1.06 PROJECT CONDITIONS

A. Protect adjoining work surfaces before tile work begins and maintain protection throughout course of work.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. American Olean

B. Dal-Tile

C. Crossville

D. Other approved equal.

2.02 FLOOR TILE

A. Floor tile shall be Dal-Tile unglazed porcelain ceramic mosaic, or approved equal.

1. Color: As noted on drawings
2. Size: 2x2
3. Grout: Manufacturer to submit samples of grout to match tile color
4. Abrasive particles: 7% abrasive grain content

2.03 WALL TILE

A. Wall tile shall be Dal-Tile glazed wall tile with cushion edges, or approved equal.

1. Color: As noted on drawings
2. Size: 4-1/4" x 4-1/4"
3. Grout: Manufacturer to submit samples of grout to match tile color

B. Water: Clean, fresh and free of deleterious substances.

2.04 MATERIALS

A. Installation Materials: The subcontractor shall be a qualified installer and shall furnish all labor, materials and equipment necessary to install setting and grouting materials on floors and walls as denoted in specifications and drawings. The installation shall conform to the most recent edition of the Tile Council of America (TCA) Handbook. Thinset mortars must include a latex additive that is suitable for use with porcelain tile. Consult with installation materials manufacturer for specific recommendations.

B. Grouting Materials: Conform to TCA Handbook specifications. Color to be selected by Architect.

2.05 MIXING

A. Mix and proportion cementitious materials as recommended by the handbook for ceramic tile installations.

B. Mix and proportion pre-mix bond coat and grout materials in accordance with manufacturer's instructions.

PART 3 - EXECUTION

3.01 PREPARATION OF SURFACES

A. Prior to beginning tile work, verify acceptability of wall and floor surface for required tile work. Report all unsatisfactory surface conditions to Architect. Commencement of work will imply acceptance of conditions as being satisfactory and adequate.

B. Ensure existing concrete surfaces are level, with maximum surface variation of +/- 1/8 inch in 10 feet (1/480).

C. Ensure surfaces are well cured, clean and free from dust, dirt, oil, grease, paint, wax sealers, curing compounds or any other deleterious substances which may reduce or prevent adhesion.

D. Provide a new layer of 5/8-inch thick exterior grade plywood overlay over existing wood subfloor with 1/4-inch gap between sheets, per TCA Handbook.

3.02 LAYOUT

A. Layout all tile work so as to minimize cuts less than ½ tile in size. Proposed layouts shall be reviewed by Architect prior to start of tiling.

B. Locate tile cuts in both walls and floors so as to be least conspicuous.

C. Align all wall, floor and base joints to give straight uniform grout joints that are plumb and level.

3.03 INSTALLATION

A. Install tile in accordance with the latest edition of the Tile Council of America Methods and applicable ANSI installation specifications.

1. Wall Tile over Studs: W243 or W242
   a. Organic Adhesive: ANSI A136.1 Type I
      or Latex Portland Cement Mortar: ANSI A118.4
   b. Grout: Latex Portland Cement ANSI A118.6
2. Floor Tile over Concrete Subfloor: F113
   a. Mortar: Latex Portland Cement Mortar ANSI A118.4
   b. Grout: Latex Portland Cement Grout ANSI A118.4
3. Floor Tile over Wood Subfloor: F143
   a. Mortar: Epoxy Mortar ANSI A118.3
   b. Grout: Epoxy Grout ANSI A118.3

B. Ensure tile joints are watertight, without voids, cracks, excess mortar or grout.

C. Allow tile to set for a minimum of 48 hours prior to grouting.

D. Completed installation to be free of broken, damaged, or faulty tile.

E. Grouting Method: Follow grout manufacturer's recommendations as to grouting procedures and precautions. Remove all grout haze and residues, observing grout manufacturer's recommendations as to use of acid and chemical cleaners.

F. Prohibit foot and wheel traffic from using the newly tiled floors for a minimum of 3 days after grouting is completed.

G. Protect installed product's finish surfaces from damage during construction.

3.04 ADJUSTING AND CLEANING

A. Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance. Remove construction debris from project site and legally dispose.

END OF SECTION

SECTION 09650
RESILIENT FLOORING AND BASE

PART 1 - GENERAL

1.01 WORK INCLUDED

A. This section includes but is not limited to:

1. Furnishing and installation of resilient flooring and base.

1.02 SUBMITTALS

A. Samples: 12 x 12 inch samples of resilient floor tile; 6 inch long samples of base.

B. Product Data: Manufacturer's product literature of all proposed materials, including color charts.

PART 2 – PRODUCTS

2.01 VINYL COMPOSITION TILE

A. Acceptable Manufacturers: Armstrong, Azrock, or approved equal.

B. Materials: Vinyl Composition Tile: Armstrong Standard Excelon Imperial Texture, 12x12 inch. Tile shall be free of asbestos and shall conform to FS SS-T-312 Type III; 1/8" thickness.

C. Color: To be selected by Architect.

2.02 BASE MATERIALS

A. Acceptable Manufacturers: Burke Flooring Products or approved equal.

B. Materials: Burke Topset Base, conforming to FS SS-W-40; 4 inch high, 1/8 inch thick including remolded end stops and external corners.

C. Color: To be selected by Architect.

2.03 ACCESSORIES/ADHESIVES/SEALERS

A. Edge Strips: 1/8 inch thick homogeneous vinyl, tapered or bullnose edge.

1. Color: To be selected by Architect.

B. Sub-floor Filler: White premix latex, mix with water to produce cementitious paste.

C. Primers and Adhesives: Waterproof; of types recommended by resilient flooring manufacturer for specific material.

D. Sealer and Wax: Type recommended by resilient flooring material manufacturer for material type and location.

PART 3 – EXECUTION

3.01 SITE AND SUBSTRATE CONDITIONS

A. Ensure floor surfaces are smooth and flat with maximum variation of 1/8 inch in 10 feet.

B. Maintain manufacturer's recommended air temperature and humidity levels for three days prior to, during and for 24 hours after installation.

C. Store flooring materials in area of application. Allow three days for material to reach temperature equal to area of application.

3.02 LEVELING

A. Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.

B. Clean floor and apply, trowel and float filler to leave smooth, flat, hard surface. Prohibit traffic until filler is cured.

3.03 INSTALLATION – FLOORING

A. Open floor tile cartons, enough to cover each area, and mix tile to ensure shade variations do not occur within any one area.

B. Clean substrate. Spread cement evenly in quantity recommended by manufacturer to ensure adhesion over entire area of installation. Spread only enough adhesive to permit installation of flooring before initial set.

C. Install with minimum tile width ½ full size at room or area perimeter, to square grid pattern with all joints aligned, with pattern grain parallel for all units and parallel to width of room.

D. Terminate resilient flooring at centerline of door openings where adjacent floor finish is dissimilar.

E. Install edge strips at unprotected or exposed edges where flooring terminates.

F. Scribe flooring to walls, cabinets and other appurtenances to produce tight joints.

3.04 INSTALLATION – BASE

A. Fit joints tight and vertical. Maintain minimum measurement of 18 inches between joints.

B. Miter internal corners. Use premolded sections for external corners and exposed ends.

C. Install base on solid backing. Adhere tightly to wall and floor surfaces.

D. Scribe and fit to door frames and other construction.

E. Install straight and level to variation of plus or minus 1/8 inch over 10 feet.

3.05 PROTECTION

A. Prohibit traffic from floor finish for 48 hours after installation.

3.06 CLEAN-UP

A. Remove excess adhesive from floor, base and wall surfaces without causing damage.

B. Clean, seal and wax floor and base surfaces in accordance with manufacturer's recommendations.

C. The flooring shall be protected as recommended by the flooring manufacturer from damage by other trades and by the installation of fixtures and furnishings.

END OF SECTION

SECTION 09680
CARPET

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes but is not limited to:

1. Furnishing and installation of carpet and accessories.

B. Related work specified under separate sections:

1. Resilient Flooring, Section 09560
2. Cast-in-Place Concrete, Section 03300
3. Rough Carpentry, Section 06100

1.02 SUBMITTALS

A. Verification Samples: Three 12" x 18" minimum samples of carpet prepared from same material and color as that to be used in the Work.

B. Submit carpet layout showing all seams for approval before carpet is ordered.

C. Closeout: Manufacturer's maintenance instructions including recommended methods and cleaning frequencies for maintaining optimum conditions of materials under anticipated traffic and exposures.

1.03 QUALITY ASSURANCE

A. Qualifications: Firm specializing in carpet installation, with not less than 5 years of experience in installation of carpet similar to that required for this Project.

B. Face yarns shall be of same dye batch, and finish material shall be of one mill run. It shall be the responsibility of the manufacturer's agent to supervise the installation to a point at which he feels that installation mechanics are performing their duties in a satisfactory manner.

C. Performance Requirements:
1. Flammability:
   a. DOC-FF1-70: Pass
   b. NFPA 258 (Smoke Density): 450 or less
   c. ASTM E648 (Floor Radiant Panel Test): 0.45 or higher.
2. Static: Carpet shall develop less than 2.5 kilovolts of static at 70 degrees F. and 20 percent humidity.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original factory wrappings and in containers clearly labeled with identification of manufacturer, brand name, fire-hazard classification, lot number, roll number, and quality or grade. Carpet without roll numbers in sequence are subject to rejection at site.

B. Allow carpeting to reach room temperature or minimum temperature recommended by manufacturer before installation or follow the CRI 104 Standard.

1.05 WARRANTY

A. Submit a written warranty, executed by the Contractor and installing subcontractor agreeing to repair, replace, or re-set carpeting which fails in materials or workmanship.

1. Warranty Period: 2 years.

B. Warrant the surface pile against abrasive wear of more than 10-percent within 10-years for carpet as properly installed and maintained. Misuse, damage, or improper cleaning methods shall not apply.

PART 2 – PRODUCTS

2.01 CARPET

A. Acceptable Manufacturer: Bentley, "Pebble Pointe" multi-level textured loop, 1/8" gauge, .156" high, 32 ounce tufted yarn weight. Monsanto Ultron VIP nylon yarn content.

B. Backing: Prestige Plus attached polyurethane cushion.

C. Installation method: Single glue-down with "Enriched Polymeric Latex."

D. Colors: To be selected by Architect.

2.02 ACCESSORIES

A. Adhesives: Water-resistant, non-staining type as recommended by carpet manufacturer, complying with flammability requirements for installed carpet.

B. Seaming Adhesive: Hot-melt seaming adhesive or similar product recommended by carpet manufacturer for taping seams and buttering cut edges at backing to form secure seams and preventing pile loss at seams.

C. Carpet Edge Guard: Extruded aluminum fold-down edge guard.

D. Miscellaneous Materials: Tape, thread, and other items as recommended by carpet manufacturer and as selected by installer to meet Project circumstances and requirements.

PART 3 - EXECUTION

3.01 PREPARATION

A. Follow carpet manufacturer's recommendations and instructions to ensure that each substrate is properly prepared to receive type of carpet to be installed.

B. Clean floors of dust, dirt, solvents, oil, grease, paint, and other substances which would be detrimental to the proper performance of adhesive and carpet. Allow floors to dry thoroughly.

C. Use a cementitious filler approved by carpet manufacturer to patch cracks, holes and for leveling. Ensure floors are level with maximum surface variation of ¼ inch in 10 feet.

D. Maintain floor temperature and relative humidity at levels and for periods recommended by carpeting manufacturer before, during, and after installation.

3.02 INSTALLATION

A. General:
1. Apply carpet with adhesive in accordance with manufacturer's instructions and requirements of CRI 104 and using the recommended trowel notch size. This recommended trowel size shall be maintained during the entire installation.
2. Follow manufacturer's instructions for cutting the carpet, using tools designed for type of carpet being installed.
3. Butt edges together with proper pressure to produce tightest joint possible without distortion.
4. Install edge guard at exposed carpet edge. Apply with adhesive and bond securely to substrates in straight, true lines. Center edge strips under doors where carpet terminates at a door opening.
5. Take care not to nick or mar walls, base, doors and door trim.
6. Install carpet with grain and pattern in one direction.
7. Use contrasting color carpet strip at stair top and bottom treads.

B. Adhesive: Apply uniformly with a notched trowel. Use proper trowel for adhesive and carpet being installed and substrate. Trowel notches shall be maintained during installation.
1. Cover only that amount of area that can be covered by carpet within the recommended working time of adhesive.
2. Do not soil adjacent areas with adhesives. Promptly remove spillage.
3. Clean trowel, and rework patches to assure even application.

C. Carpet:
1. Lay tight in length and breadth to true and even surfaces.
2. Cut and fit closely and evenly at walls and to and through thresholds.
3. Hold cross seams to an absolute minimum. Match carpet lines and patterns at seams in both width and length.
4. Treat all seams with sealer. Ensure that seams are straight, not overlapped or peaked, and free of gaps.
5. Fill strips, where required; minimum width 9 inches, minimum length 36 inches.

D. Install edge strips where carpet terminates at non-carpeted areas or where under-floor access is required or indicated, unless otherwise directed. Use full length pieces only. Butt tight to vertical surfaces. Where splicing is unavoidable, butt ends tight and flush.

E. Lightly roll carpet after application to remove air bubbles and to ensure bond.

F. Remove spots. Replace carpet where spots cannot be removed. Use sharp scissors to remove any protruding face yarn.

END OF SECTION

SECTION 09900
PAINTING

PART 1 – GENERAL

1.01 WORK INCLUDED

A. Section includes but is not limited to:

1. Unless otherwise noted, finishing of all exposed surfaces of interior and exterior of building and building equipment, excluding prefinished items.

2. Filling and sanding cracks and holes in finish surfaces.

1.02 SUBMITTALS

A. Product Data: Manufacturer's data sheets of materials proposed for use. Provide a certificate from each manufacturer stating that the material is their top quality line and that it is suitable for the intended use on this project.

B. Samples: Each specified color shall be submitted on 12-inch by 12-inch boards. Samples shall be resubmitted as requested until required sheen, color, and texture are achieved. Identify each sample as to finish, formula, color name and number, sheen name and gloss units.

C. Schedule: A detailed schedule of paints, coatings, primers and accessories for each type of surface to be painted, listing name of manufacturer, materials to be used, and the surfaces on which they will be applied.

1.03 QUALITY ASSURANCE

A. To the maximum extent practicable, select a single manufacturer to provide all materials required by this section, using additional manufacturers to provide systems not offered by the selected principal manufacturer.

B. For each individual system:

1. Provide primer and other undercoat paint produced by same manufacturer as finish coat.
2. Use only thinners approved by paint manufacturer, and use only within recommended limits.

C. Applicator: Firm with not less than 5 years of successful experience in painting work similar in scope to work of this project. Maintain throughout duration of the work a crew of painters who are fully qualified to satisfy the requirements of the specifications.

D. Field Quality Control:

1. Finish a 3-foot by 3-foot area of gypsum board stud walls for each color scheme required at locations selected by the Owner's Representative.
2. Request review by the Owner's Representative for color, texture, and workmanship.
3. Use acceptable panel as the Project standard for each color scheme.

1.04 DELIVERY, STORAGE AND HANDLING

A. Materials delivered to the project site shall be in sealed, full containers bearing the manufacturer's name, type of paint, brand name, color designation and instructions for mixing and reducing.

B. Take precautionary measures to prevent fire and health hazards.

C. Provide adequate storage facilities. Store paint materials at minimum ambient temperature of 45 degrees F. in well ventilated area.

1.05 JOB CONDITIONS

A. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture contents of surfaces are below following maximums:

1. Gypsum wall board: Twelve
2. Interior-located wood: Fifteen
3. Exterior-located wood: Twelve

B. Ensure surface temperatures or the surrounding air temperature is above 40 degrees F. before applying finishes. Minimum application temperatures for latex paints for interior work is 45 degrees F. for 24 hours before, during and 48 hours after application of finishes.

1.06 PROTECTION

A. Adequately protect other surfaces from paint and damage. Repair damage as a result of inadequate or unsuitable protection.

B. Furnish sufficient drop cloths, shields and protective equipment to prevent drips from fouling surfaces not being painted, particularly in storage and preparation area.

C. Place cotton waste, cloths and material that may constitute a fire hazard in closed metal containers and remove daily from site.

D. Remove electrical plates, surface hardware including door hardware, fittings and fastenings prior to painting operations. Removed items are to be carefully stored, cleaned and replaced upon completion of work in each area. Do not use solvent to clean hardware that may remove permanent lacquer finish.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers for Paint Materials: Dunn-Edwards, Sinclair, or approved equal.

B. Claims concerning unsuitability of any material specified (or subcontractor's inability satisfactorily to produce the work) will not be entertained, unless such claim is made in writing to the Architect before the work is started.

2.02 MATERIALS

A. Paint Accessory Materials: Materials not specifically indicated herein but required to achieve the finishes specified shall be of high quality and recommended by paint manufacturer. Use recommended primers for surface type and specified finish.

B. Ready-mixed except field catalysed coatings. Paints to have good flowing and brushing properties and be capable of drying or curing free of streaks or sags.

PART 3 – EXECUTION

3.01 INSPECTION

A. Thoroughly examine surfaces scheduled to be painted prior to commencement of work. Report to Architect in writing any condition that may potentially affect proper application. Correct defects and deficiencies in surfaces and do not commence until such defects have been corrected. Commencement of work will imply acceptance of surface to be painted.

3.02 PREPARATION

A. General: Verify that surfaces to be painted are dry, clean, smooth, and free from deleterious materials. Remove finish hardware, name plates, switch plates, instruments, gages, stainless steel, aluminum, and other surfaces that are not to be painted to ensure a neat job.

B. Prepare surfaces in accordance with manufacturer's recommendations and included in the PDC "Architectural Specification Manual."

C. Remove dirt, oil, grease and sand if necessary to provide adhesion when asphalt or bituminous surfaces require a paint finish. Apply compatible sealer or primer.

3.03 FACTORY FINISHING AND PRIMING

A. Pertinent Work and Requirements Specified Elsewhere: Review all specification sections for products that are to be factory finished or factory (shop) primed.

B. Touch-up abrasions in prime coat immediately after products arrive on job site and as required prior to application of finish coats.

3.04 APPLICATION

A. Shop-fabricated and finished metal and millwork items shall be shop spray finished to the greatest extent possible.

B. Do not apply initial coating until moisture content of porous surfaces are within limitations recommended by paint manufacturer and/or as specified herein.

C. Apply paint with suitable brushes and rollers at a rate of application not exceeding that recommended by paint manufacturer for surface involved. Spray application shall not be permitted without prior approval by the Owner's Representative.

D. Comply with recommendation of product manufacturer for drying time between succeeding coats.

E. Finish coats shall be smooth and free from brush marks, streaks, laps or pileup of paints, and skipped or missed areas.

F. Make edges of paint adjoining other materials or colors clean and sharp with no overlapping.

G. Refinish whole wall where portion of finish is not acceptable.

H. Paint visible surfaces flat black behind vents, registers, or grills.

I. Do not paint over fire-rating labels or sprinkler heads.

J. Use "flow" additive product to paints at all areas where paint is to be applied by brush to reduce appearance of brush marks.

K. Exposed Plumbing, Mechanical and Electrical Items: Items without factory finish such as conduits, pipes, access panels, and items of similar nature shall be finished to match adjacent walls and ceiling surfaces, unless otherwise directed. Wire mold exposed to view shall be painted.

L. Finish on doors to be applied to top and bottom of doors, as well as to faces and sides.

M. Paint all exposed galvanized metal to match adjacent surface color unless otherwise indicated.

3.05 CLEANING

A. As work proceeds and upon completion, promptly remove paint where spilled, splashed or spattered.

B. During progress of work, keep premises free from any unnecessary accumulation of tools, equipment, surplus materials and debris.

3.06 PAINT SYSTEMS

A. This specification shall serve as a guide and is meant to establish procedure and quality. Confer with the Architect to determine exact finish desired.

B. Number of coats scheduled is minimum. Additional coat shall be applied at no additional cost if necessary to completely hide base material, produce uniform color, and provide satisfactory finish result.

C. Acceptance of Final Colors: Final coat of paint shall not be applied until colors have been accepted by the Owner's Representative.

Paint Systems:

1. Gypsum Board – Typical walls and ceilings, eggshell:
   - 1st Coat Pigmented PVA Sealer
   - 2nd and 3rd Eggshell flat acrylic latex finish; color: to be selected by Architect

2. Gypsum Board – Toilet Rooms, Janitor's Closet and Electrical Room, walls and ceilings, semi-gloss:
   - 1st Coat Pigmented PVA Sealer
   - 2nd and 3rd Semi-gloss acylic latex enamel; color: to be selected by Architect

3. Ferrous Metal, Shop Primed: Semi-Gloss Enamel
   - 1st Coat Red Oxide Primer; touch-up marred shop coated surfaces
   - 2nd Coat Enamel Undercoat
   - 3rd Coat Alkyd semi-gloss enamel; color: to be selected by Architect

4. Wood-veneer doors:
   - 1st Coat Pigmented PVA Sealer
   - 2nd Coat Enamel Undercoat
   - 3rd Coat Alkyd semi-gloss enamel; color: to be selected by Architect

5. Galvanized Metal - Visible Ducts behind grills and registers:
   - Pretreatment Vinyl Wash Primer if not shop-primed
   - 1st Coat White Primer

2nd Coat Acrylic latex enamel; color: flat black

END OF SECTION

SECTION 10200
LOUVERS

PART 1 – GENERAL

1.01 WORK INCLUDED

A. Factory fabricated metal louvers.

1.02 RELATED WORK

A. Section 06100: Rough Carpentry

B. Section 07600: Flashing & Sheet Metal

C. Section 07900: Joint Sealants

D. Section 08210: Wood Doors

E. Section 09250: Gypsum Board

F. Division 15: Mechanical

1.03 SHOP DRAWINGS AND PRODUCT DATA

A. Submit shop drawings and product data in accordance with Section 01001.

B. Indicate general construction, configurations, jointing methods, reinforcements, anchorage methods, hardware locations, and installation details.

1.04 SITE CONDITIONS

A. Take site dimensions affecting this work.

B. Ensure openings affecting this work are properly prepared and that flashings are correctly located to divert moisture to exterior.

C. Protect louvers and finishes from damage during delivery and installation.

D. Protect adjacent surfaces, finishes, and materials from damage during installation of louvers.

1.05 QUALITY ASSURANCE

A. Louvers shall bear Air Movement and Control Association (AMCA) Certified Ratings Seals for air performance and water penetration ratings.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. The Airolite Corporation.

B. Construction Specialties, Inc.

C. Nemostat.

D. Substitutions: Items of same function, performance, and appearance may be submitted for approval in accordance with Section 01001.

2.02 EXTERIOR WALL LOUVERS

A. Louvers shall be stationary, drainable, continuous blade type of manufacturer's stock design. Blades shall be welded or tenoned to frame. Louvers shall be constructed entirely of extruded aluminum, alloy 6063-T5, minimum 018" wall thickness.

B. Louvers shall be high security tamper- and burglar-proof and shall only be removable by screws from the interior.

C. Louvers shall be Airolite Company Model CB609 or reviewed equal.

D. Provide ½" square mesh x .063" diameter aluminum bird screen in a rewirable extruded aluminum frame.

E. 4" louver depth unless otherwise noted.

F. Finish shall be factory-finish Kynar, color to be selected by Architect.

2.03 INTERIOR DOOR LOUVERS

A. Interior door louvers shall be Nemostat Model AFDL inverted Y non-vision or reviewed equal.

B. 1-3/4" louver depth.

C. Cold-rolled steel, 18-gauge frame, 22-gauge blades.

D. Shop-prime steel louvers for field painting.

2.04 FABRICATION

A. Accurately form and cut mitered corners of welded type frames. Weld on inside surfaces. Grind welded joints to smooth uniform finish.

B. Exterior louvers shall be factory primed and finished after assembly with a Kynar 500 resin coating in a color to be selected by the Architect. Interior door louvers shall be shop-primed for field painting.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Install louvers in openings, properly aligned and level.

B. Secure louver rigid with concealed fasteners (burglar-proof and interior-side-mounted for exterior louvers) of non-corrosive metals to suit materials being encountered.

C. Coordinate installation method with application of adjacent backing and structural elements, and mechanical work.

D. Set and tie into flashings to ensure diversion of moisture to exterior.

E. Install bird screen fixed to inside.

F. Install all louvers in doors to Title 24 Handicapped height requirements.

END OF SECTION

SECTION 10800
TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Section includes but is not limited to:

1. Toilet and bath accessories
2. ADA and Title 24 toilet room signage

1.02 RELATED WORK

A. Section 06100: Rough Carpentry for wall blocking required to secure accessories

B. Section 09250: Gypsum Board

C. Section 09300: Ceramic Tile

1.03 SUBMITTALS

A. Submit manufacturer's data for each item specified for Architect's approval:

1. Product data sheets including installation instructions
2. Service and parts manual

1.04 QUALITY ASSURANCE

A. Manufacturers: Toilet room accessories shall be manufactured by Bobrick Washroom Equipment, Inc. as a standard of quality, or approved equal.

1. Accessories shall be the products of a single manufacturer. Accessories with tumbler locks shall be keyed alike with the exception of coin boxes in vending equipment.

B. Regulatory Requirements:

1. Operation of accessories and mounting heights shall comply with guidelines set forth by the Americans with Disabilities Act and by California Title 24, whichever is more stringent. Documentation and samples to be provided to Architect upon request.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver items in manufacturer's original unopened protective packaging.

B. Store materials in original protective packaging to prevent physical damage or wetting.

C. Handle so as to prevent damage to accessories.

1.06 WARRANTY

A. Furnish one-year guarantee against defects in material and workmanship on all accessories

1.07 REFERENCES

A. California Building Code – Chapter 11 Accessibility

B. Title 24, California Code of Regulations, Parts 2, 3, and 5.

C. ADA, Accessibility Guidelines for Buildings and Facilities, Federal Register Volume 56, Number 144, Rules and Regulations.

PART 2 - PRODUCTS

2.01 TOILET ROOM ACCESSORIES

A. As indicated on Drawings.

2.03 TOILET ROOM SIGNAGE

A. ADA- and Title 24-compliant signs, centered on toilet room doors at 60 inches above finish floor:

1. Unisex Toilet Room (First Floor): ¼-inch thick acrylic plaque, 12-inch diameter circle, and a ¼-inch thick acrylic equilateral triangle with 12-inch sides inscribed and superimposed on the circle. Light-colored symbols of a female and a male figure and text reading "RESTROOM" on contrasting dark-colored background. Sign finish shall be non-glare. Colors to be selected by Architect.

PART 3 - EXECUTION

3.01 INSPECTION

A. Inspect and confirm suitability of walls for dimensions and plumbness of blocking or frames that would affect installation of toilet accessories.

B. Verify location of plumbing fixtures that affect installation of toilet room accessories.

3.02 INSTALLATION

A. Install accessories at locations indicated, straight, plumb, level and in accordance with manufacturer's installation instructions and accessibility codes.

B. Install items with non-corrosive, tamper-proof anchoring devices.

C. Installation methods shall conform to manufacturer's recommendations for backing and proper support.

D. Conceal evidence of drilling, cutting, and fitting to room finish.

E. Fit flanges of accessories snugly to wall surfaces.

3.03 ADJUSTMENT AND CLEANING

A. Upon completion of the work, or when directed, remove all traces of protective coatings or paper.

B. Adjust accessories for proper operation. Test mechanisms, hinges, locks and latches and, where necessary, adjust and lubricate.

C. Clean and polish exposed surfaces prior to final installation.

D. Deliver accessories schedule, keys, and parts manual as part of project closeout documents.

END OF SECTION

SECTION 10824
SHOWER COMPARTMENTS AND ACCESSORIES

PART 1 – GENERAL

1.01 WORK INCLUDED

A. Section includes but is not limited to:

1. One-piece seamless fiberglass showers
2. Shower doors
3. Shower accessories

1.02 RELATED WORK

A. Section 06100: Rough Carpentry for wall and roof blocking required to secure shower compartments and accessories

B. Section 09250: Gypsum Board

C. Section 15100: Plumbing

1.03 SUBMITTALS

A. Submit manufacturer's data for each item specified for Architect's approval:

1. Product data sheets including installation instructions
2. Shop drawings clearly indicating shower compartment and door layouts, swing of doors, elevations, anchorage and mounting details and relevant dimensions including toilet compartment aisle
3. Service and parts manual
4. Color chart

1.04 QUALITY ASSURANCE

A. Manufacturers: one-piece seamless fiberglass shower, shower door and shower drain shall be manufactured by Kohler Fixtures as a standard of quality, or approved equal.

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver items in manufacturer's original unopened protective packaging.

B. Store materials in original protective packaging to prevent physical damage or wetting.

C. Handle so as to prevent damage to accessories.

1.06 WARRANTY

A. Furnish one-year guarantee against defects in material and workmanship on all accessories.

PART 2 – PRODUCTS

2.01 SHOWER COMPARTMENTS

A. Kohler Puebla Shower Module, 32-1/8" x 36 x 76-1/2" one-piece seamless fiberglass shower #K-1592. Color to be selected from manufacturer's standard full color line.

2.02 SHOWER DRAIN

A. Kohler K-9132 , Polished Chrome

2.03 SHOWER DOOR

A. Kohler K-9886-B 29"-31" x 70" pivot shower door, Obscure glass, Finish Nevada Silver

PART 3 - EXECUTION

3.01 INSPECTION

A. Inspect and confirm suitability of walls and ceilings for dimensions, plumbness of blocking or frames that would affect installation of shower compartments and accessories.

B. Verify spacing of plumbing fixtures that affect installation of shower compartment and accessories.

3.02 INSTALLATION

A. Install shower compartment and accessories at locations indicated, straight, plumb, level and in accordance with manufacturer's installation instructions.

B. Install items with non-corrosive, tamper-proof anchoring devices.

C. Installation methods shall conform to manufacturer's recommendations for backing and proper support.

D. Conceal evidence of drilling, cutting, and fitting to room finish.

E. Fit flanges of accessories snugly to wall surfaces.

3.03 ADJUSTMENT AND CLEANING

A. Upon completion of the work, or when directed, remove all traces of protective coatings or paper.

B. Adjust shower door for proper operation. Test mechanisms, hinges, locks and latches and, where necessary, adjust and lubricate.

C. Clean and polish exposed surfaces prior to final installation.

D. Deliver parts manual as part of project closeout documents.

END OF SECTION

SECTION 12505
WINDOW BLINDS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. This section includes but is not limited to:

1. Furnishing and installation of window blinds and operating hardware.

1.02 SUBMITTALS

A. Submit three (3) 12-inch long samples of window blinds illustrating blind materials, finish and color and rod type and color.

B. Product Data: Manufacturer's product literature of all proposed materials, including color charts.

PART 2 – PRODUCTS

2.01 WINDOW BLINDS

A. Acceptable Manufacturers: Springs Window Fashions Division, or approved equal.

B. Acceptable Product: Springs Bali Classics Mini Blinds, or approved equal.

C. Materials:

1. Slats: USA-manufactured 5086H19 cold-rolled aluminum, nominally 1" wide in .006" thickness.
2. Headrail: 1" high x 1-1/2" wide, U-shaped channel of .024" thick phosphate-treated steel with vinyl primer and polyester-baked enamel finish coat. Hardware shall be enclosed in the headrail without mechanical cleats.
3. Bottomrail: tubular shaped, .024" thick phosphate-treated steel with vinyl primer and polyester-baked enamel finish coat. Top of bottomrail shall be fully enclosed.
4. Tilter: worm and gear design in a fully enclosed gear case housing.
5. Cord: braided polyester

D. Color: To be selected by Architect.

PART 3 – EXECUTION

3.01 EXAMINATION AND PREPARATION

A. Verify that openings are ready to receive work.

3.02 INSTALLATION

A. Install blinds in accordance with manufacturer's instructions.

B. Secure in place with concealed fasteners.

C. Adjust blinds for smooth operation.

END OF SECTION

SECTION 15000
GENERAL REQUIREMENTS - MECHANICAL

PART 1- GENERAL

1.01 CONDITIONS AND REQUIREMENTS:

A. The General Conditions, Supplementary General Conditions, and Division 1 - General Requirements of the Contract Documents are hereby made a part of this Section of the Specifications as fully as if repeated herein.

1.02 DESCRIPTION OF WORK:

A. Provide all labor, equipment and materials that are required, to provide a complete, properly operating and safe mechanical installation. The extent of the work is indicated on the drawings and as described in these specifications, and shall include all that may be reasonably inferred to be required for proper execution of installation work and/or systems' operation.

B. Verify sizes, capacities, and location of all existing construction systems, services and utilities before ordering equipment, materials and proceeding with construction.

C. Provide cutting and patching as required for execution of work performed under this Section unless specifically provided for, under other Sections.

D. Repair or replace, to the satisfaction of the Owner, any damage to work of this Section, damage caused by leaks or breaks in systems of this Section, and damage caused by work of this Section.

E. Coordinate with new work performed by other Sections, in order to accommodate the requirements of this Section, and to assure adequate space and proper location for all necessary work of this project whether or not work is under this Section.

F. Provide all necessary rigging equipment and manpower to set new equipment and materials in place.

G. Provide all seismic restraints required by code, or this specification, for all equipment, duct, pipe, and materials furnished under this Section. This Contractor is responsible for the design of the restraints and for proof of adequacy of the restraints. Equipment, ductwork, and piping shall be restrained in all directions to handle the forces described here-in.

H. Prepare and submit to the Architect large scale (minimum 1/4" = 1'-0") coordination drawings of all congested areas showing location and elevations of all ducts, piping, conduits, structural, and other items in the area. These drawings shall be fully coordinated with other trades. Check routing and elevations of all ductwork and equipment before fabricating. Report any conflicts that cannot be solved in the field to the Architect. Extra charges shall not be allowed due to lack of coordination prior to, or during, construction.

I. Valves and trim not specifically indicated but required for proper functioning and balancing of equipment shall be furnished and installed by the craft furnishing the equipment.

J. Provide all labor and material required to set and adjust the installation so that it performs in accordance with the design intent included in the drawings and these specifications.

1.03 CODES AND STANDARDS:

A. The work installed under this Section shall conform to all applicable federal, state and local codes, regulations, and standards.

B. Do not construe anything contained in these Specifications or drawings to permit work to be installed that does not conform to code.

C. Consider interpretations and rulings of the enforcing agencies as part of these Specifications if commonly known to the trade.

D. Comply with drawings and Specifications showing work exceeding minimum code requirements.

E. The Contractor shall furnish, without any extra charge, additional materials and labor required for the compliance with any rules and regulations.

1.04 QUALITY ASSURANCE:

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of the specified products, of types, materials, and sizes required, and whose products have been in satisfactory use in similar service for not less than 5 years.

B. Contractor's Qualifications: Regularly engaged in construction on projects of similar sizes using types of equipment, material and methods as specified herein - for minimum of 5 years. A letter from the contractor certifying these qualifications must be provided to the General Contractor before signing the construction contract.

C. By accepting to work, the contractor agrees that he visited the site, has understood the intent of the design and is reasonably sure that it can be accomplished by proceeding in accordance with these drawings and specifications.

1.05 DRAWINGS AND SPECIFICATIONS:

A. Consider all drawings and all Divisions of this Specification as a whole and provide work of this Division shown anywhere therein.

B. Absolute accuracy of the drawings and Specifications is not guaranteed. While reasonable effort has been made to coordinate the location of equipment and materials with the structure and other trades, it is the responsibility of this Contractor to coordinate exact requirements and locations as governed by actual job conditions, manufacturer's recommendations etc. Check all information, structural and architectural drawings and report any discrepancies to the Architect before fabrication or purchasing any equipment and in time to avoid unnecessary work.

1.06 LICENSES, PERMITS AND FEES:

A. Building permit fees and utility connection fees shall be paid by this Contractor.

B. Upon completion of the work, deliver to the Architect, all certificates of approval signed by the controlling authorities.

1.07 VISIT TO PREMISES:

A. Prior to submission of bid, visit the site and become familiar with all existing conditions. No extra payment will be made for additional work that would have been made necessary by Contractor's failing to properly observe the existing conditions.

1.08 SUBMITTAL DATA:

A. General: Submit 6 (six) sets of ¼" = 1'-0" scale ductwork shop drawings and material submittals for approval by Architect.

1.09 SPACE REQUIREMENTS:

A. Consider all space requirements for all work indicated in the contract documents and subsequent drawings before installing any portions of the work. Space conflicts which occur during or after installation of work, caused by failure to consider all such requirements, shall be resolved by the Contractor to the satisfaction of the Architect at the Contractor's expense.

B. Install equipment and materials with all working parts readily accessible for inspection, repair, and renewal. The right is reserved to make reasonable changes in locations of equipment on the drawings prior to rough-in without involving additional expense to the Owner.

C. Confer with the Owner/Architect to establish exact locations, mounting heights, and arrangements of all the finish work prior to roughing in.

1.10 WORKMANSHIP AND MATERIALS:

A. Workmanship shall be first class throughout and performed only by competent and experienced workmen in a manner satisfactory to the Owner. Constant supervision of the work, either by the Contractor or his competent representative, shall be maintained.

B. All work shall be performed based upon dimensioned and accurate shop drawings that have been approved.

C. Work shall be installed so as not to delay the progress of construction and shall be properly coordinated with other trades.

D. Use only new materials in perfect condition. Inspect all materials upon arrival at job site and immediately remove defective items from site.

1.11 CUTTING AND REPAIRING:

A. Include all cutting and repairing necessary and required for this installation that is not covered by other trades. Structural members shall not be cut except with the written approval of the Architect. Repairing shall be performed by workmen skilled in the trades involved in a manner satisfactory to the Architect.

1.12 PROTECTION:

A. Throughout the progress of the work, protect all pipe, conduit, ducts, fixtures, and equipment from intrusion by rain, dirt, and foreign matter, and from damage of any kind. Thoroughly clean all metallic, plastic, and painted surfaces of equipment prior to final inspection.

B. Replace with new materials any damaged work, without additional cost to the Owner, so that the entire installation will be left in new condition.

1.13 NOISE AND VIBRATION:

A. The limiting of transmission of noise and vibration is extremely important. This Contractor is to pay particular attention that piping, equipment, and ductwork is installed so as not to chatter or rub against other materials, equipment, and the building structure. Provide isomode pads, insulation, or other suitable materials to avoid direct contact and noise conditions unacceptable to the Owner or tenants. Consider, in particular, proper shields at pipe hangers and pipe and duct penetrations of walls and floors.

1.14 MANUFACTURER'S INSTALLATION DETAILS:

A. Follow manufacturer's installation details except as specifically modified on the drawings, and provide any valves or special fittings or other specialty items called for by them as required in order to make the equipment perform as intended. If there is any discrepancy between manufacturer's in installation details and work shown on the drawings notify the Architect immediately and await for further directions before proceeding with the installation.

1.15 CLEANING:

A. Flush pipes and ducts free from foreign substances before installing valves, stops, or making final connections.

B. After all other work has been accomplished, clean all exposed piping, ductwork, fixtures, equipment, and supports. Remove all debris of work of this Section from site.

1.16 TESTING AND ADJUSTING:

A. Upon completion of the work, test and regulate all systems to the intent of their design and to the Owner's satisfaction. Furnish the Owner a binder of the equipment data and instruct his representatives as to the proper operation of all systems.

1.17 FINAL OBSERVATION:

A. Architect shall make final observation of the job and note unacceptable items in a punch list. Final acceptance shall not be made until all items on this list have been corrected.

1.18 GUARANTEE/WARRANTY:

A. All materials, parts, equipment, modifications made, and workmanship shall be guaranteed for a period of one year from date of acceptance of the work.

B. Should such parts, materials, or workmanship be found to be defective during this period, they will be rectified at no cost to the Owner. All labor required to rectify such defects will be performed during the normal working hours of the trade involved.

C. This guarantee is contingent upon the system being properly maintained by a qualified mechanic familiar with this equipment and that the equipment is not abused. Excluded is normal wear and tear, replacement of filters and belts, and acts of God.

D. A written guarantee to this effect shall be submitted prior to final payment and acceptance.

1.19 RECORD DRAWINGS:

A. Record of Job Progress: Keep an accurate, dimensioned record of the as-built locations of all work. Keep an up-to-date on blueline prints as the job progresses and make them available for inspection at all times.

B. Final as-built, reproducible drawings shall be submitted prior to final acceptance and shall include the following: Locations of duct, and equipment including height of main ducts, pipes, and equipment in the ceiling space.

C. Ceiling access panel locations.

PART 2 - MATERIALS

2.01 UNIFORMITY:

A. All items of similar nature shall be by the same manufacturer. Trim for major items shall be furnished by the same manufacturer as the item.

2.02 FINISHES AND PAINTING:

A. Provide all equipment with a factory finish.

B. Touch up scratches in factory finished surfaces to match original. Obtain touch-up paint from the manufacturer of the piece of equipment.

2.03 PIPES AND FITTING:

A. Cast Iron Soil, Plain End (No-hub): (Aboveground)

1. Pipe and Fittings: ANSI A112.5.1, hubless, service weight, bituminous coated interior and exterior.
2. Joints: Neoprene sleeve with stainless steel shield, CISPI 301 and ASTM C564.

B. Galvanized Steel Drainage:

1. Pipe: ASTM A120, schedule 40, galvanized.
2. Fittings: ANSI B16.21, black, coated.
3. Joints: ANSI B2.1 pipe threads.

C. Copper Pressure Type L; Hard Temper: Joints 95/5 Solder

1. Tubing: ASTM A88.
2. Fittings: ANSI B16.22, wrought copper.
3. Flanges: ANSI B16.24, 150 PSIG rating.
4. Solder: ASTM B32, alloy grade; 95% tin, 5% antimony or other lead free solder.

D. Copper Drainage; Type M

1. Tubing: ASTM B88
2. Fittings: ANSI B16.29, wrought copper
3. Solder: ASTM B32, alloy grade 50A; 50% tin, 50% lead

E. Copper Pressure Type L; Hard Temper: Joints Silver brazed

1. Tubing: ASTM B88
2. Fittings: Wrought copper solder joint fittings, ANSI B16.22
3. Solder: Silver brazing alloy melting at or above 1100 degrees F; 15% silver, 80% copper, 5% phosphorus.

2.04 DIELECTRIC CONNECTIONS:

A. General: Isolate ferrous from nonferrous materials in piping systems and equipment connections with dielectric unions.

B. Dielectric Unions:

1. 2" and Smaller: EPCO Model FX, or approved substitute, 250 WOG, with standard gaskets for plumbing and high temperature gaskets for heating.
2. 2-1/2" and Larger: EPCO Model X, or approved substitute, brass half-union, ANSI B16.1, 175 WOG, to flange.

2.05 GENERAL USE VALVES (PLUMBING):

A. Provide Jenkins, Stockham, Demco, Grinnell, Dezurik, or Nibco valves. All ball or butterfly valves for general use shall have EPT seats. Valve handles, except in ground, shall be infinite throttling with memory stop. Connections shall be threaded or flanged only (soldered types are not acceptable).

B. Hand Valves:

1. 1/2" through 2" - Ball Valve - Threaded: Stockham Figure S-214-BR-R-T.
2. 2-1/2" and above - Butterfly Valve: Demco Series NE, lug type. Provide infinite throttling and memory stop handle. Valves to permit removal of piping on either side with valve in place.

C. Balance Valves:

1. 1/2" through 2" - Ball Valve: Same as hand valve.
2. 2" and above - Plug Valve: Homestead Figure 1522 (semi-steel body).

D. Check Valves:

1. 2" and Smaller - Threaded - Stockham Figure B-319.
2. 2-1/2" and Larger - Flanged - Stockham Figure G-931.

E. Globe Valves:

1. 2" and Smaller - Threaded - Stockham Figure B-13T.
2. 2-1/2" and Larger - Flanged - Stockham Figure G-512.

F. Safety and Relief Valves: Kunkle, Crosby, Watts or approved substitute.

1. Constructed, rated, and stamped per ASME. Relief valves for unheated liquids. Safety relief valves for heated liquids.
2. Set pressure, as indicated on drawings, must not be above the pressure rating of protected equipment.
3. Size and Capacities: Size valves so that maximum energy of protected equipment is released with pressure not exceeding 10% above valve set pressure.

2.06 PIPE HANGERS AND SUSPENDED EQUIPMENT, SUPPORTS AND PENETRATIONS:

A. Supports and Hangers:

1. Use Super Strut, Unistrut, B-Line, Elcen or Grinnell hangers and structural attachments to properly support the piping system according to good standard practice and according to the manufacturer's recommendations. Minimum safety factor of 5.0.
2. No water piping (HVAC or domestic water) shall have direct contact with the hanging and support system or the structure. On pipes that are insulated, run the insulation continuous through the hanger and provide sheet metal shields of proper length and gages under the insulation to prevent crushing. On uninsulated copper piping, use Stoneman "trisolator" or similar Unistrut or Super-Strut device at each hanger or support point.
3. Size hangers properly to fit around bare pipe, isolator, hanger shield, or insulation as required.
4. Space hangers for horizontal cast iron above ground pipes with the maximum distance between hangers as follows:

Nominal Size	Maximum Span (Feet)	Minimum Rod Size (Inches)
4" & smaller	6	1/2

5. Space hangers for horizontal steel pipes with the maximum distance between hangers as follows:

Nominal Size	Maximum Span (Feet)	Minimum Rod Size (Inches)
1/2"	5	3/8
3/4"	6	3/8
1"	6	3/8
1 1/4"-1 1/2"	6	3/8
2"	6	3/8
2 1/2"	6	1/2
3"	6	1/2
4"	6	5/8

6. Space hangers for horizontal copper tube/pipe with the maximum distance between hangers as follows:

Nominal Size	Maximum Span (Feet)	Minimum Rod Size (Inches)
3/4"	6	3/8
1"	6	3/8
1-1/4" - 1-1/2"	6	3/8
2"	6	3/8
2-1/2"	6	1/2
3"	6	1/2
4"	6	5/8

7. Trapeze suspension (trapeze hangers may be used for parallel lines if pipes pitch same direction): Size channel assembly in accordance with manufacturer's published load ratings. No deflections shall exceed 1/180 of a span with a safety factor of 5.
8. Use cadmium plated or galvanized hangers, attachments, rods, nuts, bolts and other accessories.
9. Do not use wire, plumber's tape, or other make-shift devices for hangers.
10. Do not burn or weld any structural member without the written approval of the Owner or Architect.
11. No valve or piece of equipment shall be used to support the weight of any pipe for pipes 1-1/2" and larger.
12. Provide a support or hanger close to each change of direction the pipe, either horizontal or vertical.
13. When piping is installed using a trapeze hanger, bolt the pipe to the trapeze using a pipe clamp, strap or "U" bolt. Do not weld the pipe to the trapeze.

B. Attachments to Building Structure: (Figure numbers included are Grinnell unless otherwise noted.) Select attachment for building structure type (wood, etc).

1. Beam Supports: Support equipment and piping larger than 4" diameter beneath centerline of beam. Do not cause eccentric loads on beams.
2. Concrete Slab Supports: Load at each support point not to exceed 500 pounds. Distance between support points not less than 3'. Applies to both poured-in-place concrete slabs and concrete on metal decking.
3. Anchor Bolts: Material, diameters, and lengths for 3,000 PSI.
4. Concrete Inserts: Figure 282. Place reinforcing steel through insert as recommended by manufacturer for recommended loads.
5. Poured-in-Place Concrete on Metal Decking: Superstrut Figure C-475.
6. Beam Clamps: Figure 87, 226, or 229.
7. Welded Beam Attachment: Figure 66.
8. Side Beam Brackets: Figure 202 or 203.
9. Hanger Rods: ASTM A107, hot rolled steel with ANSI B1.1 threads. (Minimum safety factor of 5.0)

C. Hanger Rod Fixtures:

1. Turnbuckles: Figure 230.
2. Linked Eye Rod: Figure 278X.
3. Clevis: Figure 299.

D. Pipe Attachments: (Figure numbers by Grinnell)

1. Hanger: Figure No. CT-95
2. U-Bolt: Figure 137.
3. Stanchion: Figure 259.
4. Vertical Pipe Supports: Figure 261.

E. Penetrations and Escutcheons: Provide UL listed fire stopping materials where work of this Division passes through fire rated partitions, walls, floors, concrete slabs or exterior walls. Provide galvanized steel sleeves by Pipe Shields, Inc. for insulated piping penetrations of nonrated walls and floors (model numbers as listed below):

1. Noninsulated Piping:
   a. Nonrated wall: Seal annular space with fiberglass.

2. Insulated Piping:
   a. Nonrated Wall or Floor: Model WFB-CS and WFB-CS-CW.

3. Pipes through Exterior Wall: Seal annular space with fiberglass and caulk weathertight.
4. Pipes through Below Grade Walls or Floors: Provide Thunderline Corporation Link Seal, or approved equal.

F. Provide escutcheon plates that are neat, rigid, securely attached where work of this Section penetrates the structure. Provide stainless steel or chrome plated brass in finished areas or where required for proper appearance and galvanized steel elsewhere.

2.07 PIPE AND EQUIPMENT INSULATION:

A. General:

1. The term piping herein, shall include pipe and fittings. Apply Hi-Lo Temp insulation to the fittings and cover with "Zeston" fitting closures. Tuck the ends of the Hi-Lo Temp insulation into the throat of the fitting and the edges adjacent to the pipe covering tufted and tucked in, fully insulating the fitting before applying fitting cover. Secure the fitting cover by banding or taping the ends to the adjacent pipe covering. Extend the insulation on the valves up to the valve bonnet. Leave strainer cleanout plugs accessible. At unions: miter insulation at 45 degrees and coat exposed insulation with insulating cement.
2. Insulate all domestic hot water supply piping.
3. Use mastics and adhesives undiluted unless noted otherwise. Dilute Foster 30-36 no greater than 1 part water to 5 parts 30-36.
4. Butt insulation at each end and seal the joints with pressure sensitive tape.
5. Install all insulation to allow for the operation of all moving parts and to permit viewing of all name plates, controls, instruments, dampers and valve bonnets and stems.
6. Thoroughly clean, test and have approved, all piping and equipment before installing insulation.
7. Install insulation with the highest quality workmanship. All ends shall be neatly trimmed and sealed.
8. Manufacturer: Owens-Corning Fiberglass, Armstrong, Manville, or Certain-Teed.

B. Type and Thickness:

1. General: In accordance with Title 24 energy regulations.

2.08 EQUIPMENT SUPPORTS:

A. All rotating equipment and equipment capable of transmitting vibration into the space shall be mounted on vibration isolators and bases. The isolators and bases shall be properly sized by the isolator manufacturer, taking into account the piece of equipment, its center of gravity, anchor points, weight of bases, and the structure upon which it is setting, so that vibration transmitted to the structure is held to a level acceptable to the Owner.

B. All connections to vibrating equipment such as piping, conduits, and ductwork shall be installed so that short circuiting does not occur.

1. Conduits shall have flexible connections looped in at 90 degrees to allow for movement.
2. Piping shall have flexible connectors where specified or shall have sufficient spring legs or changes in direction before the first hanger to dampen vibration and assure that piping is not work hardened.

2.09 SEISMIC RESTRAINTS:

A. General: Provide seismic restraints per applicable code and standards as specified and/or indicated. Design and provide restraints to prevent permanent displacement in any direction caused by lateral motion, overturning or uplift. Restraints shall not short circuit vibration isolated equipment under normal operation.

B. Requirements:

1. Criteria: Design restraints for piping and ductwork per SMACNA "Seismic Restraint Manual Guidelines for Mechanical Systems", or any similar preapproved hanger manufacturer's details. Submit required structural calculations for rigidly attached equipment.
2. Seismic Force Criteria: Rigidly attached 0.45 G(SMACNA SHL A)
   Flexibly attached: 0.90 G
3. For all items not specifically covered by SMACNA, contractor to submit Seismic Restraint calculations that are signed by a structural engineer registered in California. Calculation must confirm the adequacy of the restraints and their anchoring to the bulding structural elements.
4. Restraint to include the following:
   a. Exhaust fans.
   b. Ducts and ceiling air outlets (provide four wires each where installed in T-bar ceilings)

2.10 ELECTRICAL:

A. General:

1. All equipment shall be selected to suit power available; this requirement supersedes other portions of the Specifications.
2. All equipment shall conform to the National Electrical Manufacturer's Association Standards, and shall bear Underwriter Laboratories label where applicable.
3. Load and line voltage connections to equipment will be made by the Electrical Division unless specifically noted otherwise. Coordinate work with the Electrical Division. Furnish the Electrical Division with shop drawing information for indicating ratings and control circuits required for the actual equipment furnished.

B. Motors:

1. Provide motors for equipment of this Division. Motors shall be minimum size as indicated but shall have sufficient starting torque to start equipment.
2. Motors shall be open drip-proof for general use, totally enclosed for wet or exterior use and explosion proof for hazardous duty where specified.
3. Electric motors shall be selected for quiet operation. All motors shall be rated for continuous operation at 115% of nameplate amperage.
4. All motors shall be premium energy efficient motors to comply with current energy efficiency requirements.

C. Starters:

1. Starters for standard motors shall be furnished and installed under Division 16. Connection to starters furnished by this Section shall be under Division 16. Coordinate work to provide a completely operative system with auxiliary contacts and necessary interlocking.

2.11 ACCESS DOORS AND PANELS:

A. Where required: Wherever a piece of equipment or valve and operator is inaccessible and requires access for maintenance, repair or adjustment.

B. Size: Size is dependent upon the relationship of the door to the product being serviced; therefore, the size of the door shall be selected to provide convenient access to its contents.

C. Manufacturer: Inryco/Milcor, or equal Bilco, Cesco, or Karp.

2.12 SPECIAL TOOLS:

A. Furnish to Owner the following: One set of any special tools required to operate, adjust, dismantle, or repair any equipment in this Division. "Special Tools" means those not normally possessed by mechanics or maintenance personnel.

PART 3 - EXECUTION

3.01 PIPING INSTALLATION:

A. General:

1. System layouts as indicated on drawings are generally diagrammatic, but shall be followed as closely as actual construction and work of other trades will permit.
2. Drawings and Arrangement: Install equipment and materials with all working parts readily accessible for inspection, repair, and removal.

B. Piping:

1. Any section of pipe for which size is not shown or any intermediate section erroneously shown obviously undersized shall be the same size as the largest line connecting to it.
2. Thoroughly clean all pipe and maintain in such condition throughout construction. Temporarily cap off plug ends of unprotected pipe.
3. Install threaded joint unions at connections to equipment, on service side of valves and elsewhere as required or shown to facilitate maintenance.
4. Install dielectric insulating connections between all dissimilar metals unless otherwise indicated.
5. Run all piping generally level, free of unnecessary traps and bends, and arrange to conform to the building requirements and to suit necessities of clearance for other work.
6. Arrange piping and hangers to allow for expansion, contraction, and structural settlement. Do not install piping in contact with the building structure.
7. Make changes in size or direction with manufactured fittings. The use of bushings, reducing flanges, or bending of a pipe is not allowed.
8. Install piping full size through shut-off valves, balancing valves, etc. Change pipe size within three pipe size diameters of the final connection to fixtures and equipment.
9. Unless specifically indicated otherwise, install piping concealed above ceilings, beneath the floors, or in walls. Route piping to linear beams, columns, obstructions and the work of other trades.
10. Sloping, Air Venting, and Drainage:
    a. Slope piping as indicated, true to line and grade and free of traps and air pockets. Unless indicated otherwise, slope piping in direction of flow as follows:

Service	Inclination	Slope
Domestic Water	Level	
Vent	Up	1/8" min per ft
Waste	Down	1/4" min per ft

11. Domestic Water: Connect copper tubing to fixtures with copper fittings; chrome-plate where exposed. Prevent damage to finished surfaces. Provide 12" high air chambers at fixture connections.
12. Copper: Crimping of copper tubing is prohibited. Isolate copper pipe and tubing from contact with steel. For branch drops and rises to plumbing fixtures, anchor branch to waste and vent piping.

13. Pipe Ends: Perform pipe cutting and end preparation so as to result in clean ends with full inside diameter. Grind and ream as necessary.
14. Threaded Joints: Apply Teflon tape to male threads.
15. Welded Joints:
    a. Welding of pressure piping shall be done by NCPWB qualified welders. Perform welding per applicable codes, including ASME Boiler Construction Code and ANSI Code for Pressure Piping.
    b. Where required, peen and wheel-grind welds. Ends of pipe may be burned for welding, however, grind-bevel and remove scale before welding joint. Ragged edges with metal beads, poor alignment, and other inferior work will be rejected.
    c. Perform welding with oxyacetylene or electric-arc process.
16. Soldered Joints: Clean surfaces to be jointed of oil, grease, rust, and oxides. Clean socket of fitting and end of pipe thoroughly with emery cloth so as to remove rust and oxides. After cleaning and before assembly or heating, apply flux to joint surface and spread evenly. Clean refrigerant piping as recommended by Air Conditioning equipment manufacturer. Back purge piping with nitrogen during brazing.
17. Coatings: Reapply coal tar coating on buried piping, after installation, to surfaces from which coating has been removed or scraped.
18. Seal all piping penetrating the roof with 4 lb. sheet lead flashing with 8" skirt and counterflashing rim sealed with a nonhardening mastic.
19. Do not cover or enclose the piping work before it has been tested, inspected, and approved.
20. Pipe the discharge of each relief valve, air vent, auto drain, and similar device full size to floor sink, floor drain, exterior, or other acceptable location whether indicated or not on the drawings and per code requirements.

C. Pipe Testing:

1. Test piping as noted below with no leak or loss of pressure. Repair or replace defective piping until tests are accomplished successfully.

TEST SCHEDULE

System	Test Medium	Test Pressure	Test Time
Domestic Water	Water	150 PSIG	4 hours
Soil & Waste	Water	15 feet	2 hours
Vent	Water	15 feet	2 hours

3.02 CLOSING IN UNINSPECTED WORK:

A. Do not cover up or enclose work until it has been properly and completely inspected and approved.

B. Should any of the work be covered up or enclosed prior to all required inspections and approvals, uncover the work as required and, after it has been completely inspected and approved, make all repairs and replacements with such materials as are necessary to the approval of the Architect.

3.03 EXCAVATING, TRENCHING, AND BACKFILLING:

A. General: Lay pipe to required lines and grades. Place fittings at required locations and with joints centered, spigots home.

B. Excavating and Trenching: Excavate trenching for underground utility lines to required depths. Tamp bottom of trenches hard; grade to secure required fall. Excavate bell holes so pipe will rest on solid ground for its entire length.

C. Backfilling: Prior to backfilling, clean trenches and pits of trash and debris. Compact backfill as required by Division 2.

3.04 VALVES:

A. If no shut-off valve is indicated, provide a hand or gate valve at the outlet and the inlet connections to all equipment. Provide the proper valve trim for service intended.

B. Install all valves so their stems are located above horizontal plane of the pipe in which they are installed. In general, locate valves out from under equipment, and in accessible locations with adequate clearance for easy operation.

C. Provide all valves, cocks, and strainers full pipe size unless indicated otherwise.

3.05 EQUIPMENT INSTALLATION:

A. Position equipment to result in good appearance, easy access to all components for maintenance. Install the piping and pipe line accessories so that they do not interfere with equipment access.

B. Install equipment level, secure, and out of moisture. Provide shims, anchors, support straps, angles, grouted bases, etc. as required to accomplish this.

C. Only use galvanized screws, nuts, bolts, rods and washers. After fabrication, hot dip galvanized unfinished ferrous items for outdoor use or other areas subject to moisture.

D. Start up: Secure the services of the manufacturer's representative to start up all equipment that is special and/or which Contractor's personnel does not have adequate experience with.

E. Manufacturer's Directions: Follow the manufacturer's directions where these directions cover points not included on drawings or in specifications.

3.06 IDENTIFICATION:

A. Identification of New Material:

1. Provide pipe with manufacturer's identification and service on each length of pipe as required by ASTM Specifications.
2. Provide all pressure vessels with ASME Stamp of Approval.

B. Piping:

1. Identify all pipelines with adhesive markers, indicating the contents and direction of flow. See below for maximum spacing. Markers shall be installed where piping changes direction or passes through walls or floors. Markers to be Brady or Perma-Color, with the background color coding as follows. Coat with clear lacquer after installation.

System	Color
Domestic Cold Water	Yellow
Domestic Hot Water	Yellow

2. Identify piping 2-1/2" and smaller with 3/4" minimum height lettering, every 20' where exposed to view, and at valves where concealed.
3. Identify piping 3" and larger with 1-1/4" minimum height lettering, every 25' where either concealed or exposed to view, and at valves where concealed.
4. Provide arrows 6" long at each marker indicating direction of flow. If in both directions, provide double arrows.
5. Where piping is provided with insulation, provide the size letters scheduled above in accordance with the outside dimensions of insulation.
6. Use markers and adhesive suitable for the humidity and for surface temperatures ranging from -40 degrees to +150 degrees F.

C. Ductwork:

1. Identify all ducts "supply", "return", "transfer", "relief", or "exhaust" with directions of airflow. Labels shall be as specified for piping above and applied every 25 feet of duct length with minimum of one label above each room with accessible ceiling or inside each mechanical fan room.

D. Equipment Identification:

1. Identify each new and existing AC unit fan, motor, motor starter, and similar equipment with laminated black plastic tags with engraved white core lettering. Use tags with a minimum thickness of 1/16", a minimum size of 1-1/2" x 4", and with 1" high lettering. Acceptable manufacturers: Seton, W.W. Wilcox, or Brady. Secure tags to equipment by means of screws or bolts.
2. All equipment shall have brass plates or tags that reference the maintenance manuals and the required routing maintenance action to be performed on the equipment.

E. Warning Signs:

1. Identify each valve with a brass tag, minimum 16-gauge and 1-1/2" diameter, with engraved lettering on both sides identifying the number and service of the valve. Number valves consecutively. Secure tags to valve with stainless steel wire or approved rings.

3.07 WATERPROOF CONSTRUCTION:

A. Maintain the waterproof integrity of penetrations through materials intended to be waterproof. Provide flashings at exterior wall and roof penetrations. Caulk watertight penetrations of foundation walls and floors. Provide membrane clamps at penetrations of waterproof membranes.

3.08 ADJUSTMENTS TO SYSTEMS:

A. Adjust all equipment and system components as scheduled on drawings or as required, to result in the intended system operation.

B. Thereafter, as a result of system operation or as directed by the Owner, make readjustments as necessary to refine performance.

3.09 PRELIMINARY OPERATION:

A. Operate any portion of the installation for the Owner's convenience if so required by the Owner. Such operation does not constitute acceptance of work as complete. Cost of utilities, such as gas and electrical power, will be borne by the owner if operation is required by the owner.

3.10 START-UP SERVICES:

A. Prior to start-up, ensure that the systems are ready, including the following: Proper equipment rotation, proper wiring, auxiliary connections, lubrication, venting controls, all filters in place and properly set relief and safety valves.

B. Personnel performing start-up services shall be fully qualified, experienced, and normally engaged in this type of work. If the Contractor does not have such personnel available from his own company, he shall hire, at his own expense, Subcontractors who are qualified.

C. The Contractor shall designate one field person who is overall responsible for start-up procedures and to coordinate with owner provided balancing contractor. He shall directly supervise the start-up operations and be available for required coordination before, during, and after start-up.

D. A final and complete start-up report shall be submitted prior to final acceptance and payment. This report shall be signed by each person doing the start-up task and by the responsible field person. Report shall include, but not be limited to: date of test, instrument used, date of last calibration, temperatures, set points, rpm, voltage, amperage, pressures, stability, vibration, etc.

**** END OF SECTION ****

SECTION 15100
PLUMBING

PART 1 - GENERAL

1.01 CONDITIONS AND REQUIREMENTS:

A. The general conditions, Supplementary General Conditions, and Division 1 - General Requirements of the Contract Documents are hereby made a part of this section of the specifications as fully as if repeated herein.

1.02 DESCRIPTION OF WORK:

A. Extent of Plumbing system work required by this section is indicated on drawings and schedules, and by requirements of this section.

B. Types of work specified in this section include the following:

1. Sanitary drainage and vent systems complete, to Point of Connection as shown on drawings.
2. Potable water systems complete to Point of Connection as shown on drawings.
3. Plumbing fixtures and trim as specified including all required accessories.
4. Access Panels as required for wall, floor and grade cleanouts and valves.
5. Secure and pay fees for permit, licenses, inspections and royalties required for work of this section.
6. Other necessary items required and incidental to completing all Plumbing work as indicated on the Drawings and designated herein.

C. Flashings required in conjunction with soil, waste, and water systems are included as work of this section.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

A. The following work is included in other sections. Where coordination is necessary, it shall be provided by this subcontractor.

1. Mechanical General Requirements - Section 15000.

1.04 QUALITY ASSURANCE:

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of plumbing systems products, of types, materials, and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer's Qualifications: Firm with at least 3 years of successful installation experience on projects with plumbing systems work similar to that required for project.

C. Codes and Standards:

1. Plumbing Code Compliance: Comply with applicable portions of Local Plumbing Code pertaining to selection and installation of plumbing materials and products.
2. ANSI Compliance: Comply with applicable ANSI standards pertaining to materials, products, and installation of soil waste and storm drainage systems.
3. ASSE Compliance: Comply with applicable ASSE standards pertaining to materials, products, and installation of soil and waste systems.
4. PDI Compliance: Comply with applicable PDI standards pertaining to products and installation of soil and waste systems.

PART 2 - PRODUCTS

2.01 PIPING:

A. General: Refer to pipe material, joints, and fitting requirements in Section 15000.

B. Sanitary Soil, Waste, and Vent System, Storm Drainage System:
Aboveground: Cast iron; soil, plain end (hubless).
Aboveground Contractor option: Galvanized steel; drainage or DWV drainage may be used for pipe sizes 2-1/2" and smaller.

C. Water Systems:

1. Domestic Cold Water: Copper; pressure Type L; joints 95/5 solder.
2. Domestic Hot Water: Copper; pressure Type L; joints, 95/5 solder.

2.02 VALVES:

A. General: Refer to Section 15000 for valve requirements. Sweat end valves may be used for copper pipes size 2" and smaller.

2.03 BURIED PIPE WRAPPING AND COATING:

A. Buried Piping: Wrap uninsulated, buried steel and copper piping as follows:

1. Cleaning: Remove loose scale, rust, dirt, oil, and grease before wrapping. Wire-brush as required; use solvent for removal of oil and grease.
2. Coating: Johns-Manville #22 primer adhesive.
3. Wrapping: Johns-Manville VID-20, 20 mil thick polyvinyl tape. Stretch tape tight during application. Overlap tape so as to result in double thickness.

B. Repair any holidays per recommendations of wrapping or coating manufacturer.

2.04 DRAINAGE AND PIPING SPECIALTIES:

A. Manufacturers: Smith, Josam, Wade, Jonespec, or Zurn. 100% U.S.A manufactured components only.

B. Cleanouts: Provide where shown; types and sizes as scheduled.

C. Drains: Provide where shown; types and sizes as scheduled.

D. Trap Primer: Install where shown or required by code. Precision Plumbing Products differential pressure operated.

E. Traps: Provide for drains, floor-mounted service sinks, and similar type fixtures. Provide clean-out plug in all sink P-traps.

F. Water Hammer Arrestor: Provide where shown. Size per manufacturer's recommendations and PDI Standard.

G. Air Chambers: Provide on all cold and hot water connections without a water hammer arrestor, 18" high and diameter same size as supply. Nibco Model 620L.

2.05 PLUMBING FIXTURES:

A. General: Provide factory-fabricated fixtures of type, style and material indicated. For each type fixture, provide manufacturer's standard trim, carrier, seats, and valves as indicted by their published product information; either as designed and constructed, or as recommended by the manufacturer, and as required for a complete installation. Where more than one type is indicated, selection is Installer's option but all fixtures of same type must be furnished by single

manufacturer. Where type is not otherwise indicated, provide fixtures complying with governing regulations.

B. Manufacturers:

1. Fixtures: American Standard, Kohler, Eljer, or Crane. Selection based on American Standard unless otherwise noted.
2. Fixture Trim: American Standard, Kohler, Chicago Faucet, or Symmons.
3. Flush Valves: Sloan, Zurn or approved substitute.
4. Water Closet Seats: Olsonite, Church, Sperzel, or Beneke.

C. Vitreous China Fixtures: CS20.

D. Fixture Supplies and Stops:

1. Lavatories: Speedway CRSST-1912-A, or approved substitute.
2. Sinks: Speedway CRSST-1912-K, or approved substitute.
3. Flush Valves: Lockshield key operated stops.

E. Fixture Flow Controls: To comply with Title 24 at each fixture as follows. Model numbers are for Dole:

1. Lavatories: Type FMB, 0.5 GPM except faucets with integral 0.5 GPM flow control.
2. Sinks and Service Sinks: Type SR, 2.2 GPM.

F. Lavatory and Sink Traps: 17 gauge adjustable "P" traps, cleanout plug, tubing to wall. Polished chrome plated.

G. Fixture Color: White.

H. Plumbing Fixture: Refer to schedule on drawings.

I. Trim Finish: Polished chrome plated.

1. Handicapped Requirements:
   a. All designated fixtures for handicapped shall be installed per California Code of Regulations, Title 24, Part 2, handicapped requirements.
   b. Wrap P-Trap, cold and hot water tubing and stops with Truebro Models 101 and 102 to protect against scalding and scraping.

J. Other Materials:

1. All other materials not specifically described but required for a complete and proper installation shall be new, first quality of their respective kinds, and subject to the approval of the Architect.

PART 3 - EXECUTION

3.01 GENERAL:

A. Inspections:

1. Prior to all work of this section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.
2. Verify that all plumbing may be installed in strict accordance with all pertinent codes and regulations and the approved shop drawings.

B. Discrepancies:

1. In the event of discrepancy, immediately notify the Architect.

2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

C. Coordination:

1. Coordinate work with related trades to prevent undue delay in job progress.
2. Provide materials in sufficient quantities on job site to complete work and to accommodate minor unforeseen changes and additions in the scope of work.

3.02 PIPING:

A. Installation: See Section 15000.

B. Pipe Testing: See Section 15000.

C. Sterilization of Pipes:

1. After preliminary purging, cleaning, and flushing of the system, chlorinate the entire potable domestic water system in accordance with the current recommendations of the American Water Works Association and in accordance with all pertinent state and local health codes and regulations.
2. Chlorinate only when prescheduled and provide proper warning signs at outlets.
3. Upon completion of the sterilization, thoroughly flush the entire potable water system and immediately fill the system.
4. When sterilization and flushing are complete, arrange with pertinent agencies for all required tests on mains and systems.

3.03 FIXTURE INSTALLATION AND CONNECTIONS:

A. General:

1. Set fixtures to equal height, plumb, or at right angles to wall. Connect to waste and water supplies in neat, uniform, and finished manner. Provide necessary trim and appurtenances for complete installation. See architectural drawings for fixture heights, spacing, arrangement, etc.

B. Inspection and Preparation:

1. Examine roughing-in work of domestic water and piping systems to verify actual locations of piping connections prior to installing fixtures. Also examine floors and substrates, and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping, and other unsatisfactory conditions for installation of plumbing fixtures. Do not proceed with work until unsatisfactory conditions have been corrected.
2. Fasten plumbing fixtures securely to indicated supports or building structure; and ensure that fixtures are level and plumb. Secure plumbing supplies behind or within wall construction so as to be rigid, and not subject to pull or push movement. Support piping independent of wall construction.

C. Cleaning and Protection:

1. Clean plumbing fixtures of dirt and debris upon completion of installation.
2. Protect installed fixtures from damage during the remainder of construction period.

D. Field Quality Control:

1. Upon completion of installation of plumbing fixtures and after units are water pressurized, test fixtures to demonstrate capability and compliance with requirements. When possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.
2. Inspect each installed unit for damage to finish. If feasible, restore and match finish to original at site; otherwise, remove fixture and replace with new unit. Feasibility and

match to be judged by Architect. Remove cracked or dented units and replace with new units.

3.04 CLEANING UP:

A. Prior to acceptance of the buildings, thoroughly clean all exposed portions of the plumbing installation, removing all labels and all traces of foreign substance, using only a cleaning solution approved by the manufacturer of the plumbing item and being careful to avoid all damage to finished surfaces.

B. Submit a signed copy of all test reports to the Architect.

*** * END OF SECTION * ***

SECTION 15200
HEATING, VENTILATING AND AIR CONDITIONING

PART 1 – GENERAL

1.01 CONDITIONS AND REQUIREMENTS:

A. The general conditions, Supplementary General Conditions, and Division 1 - General Requirements of the Contract Documents are hereby made a part of this section of the specifications as fully as if repeated herein.

1.02 DESCRIPTION OF WORK:

A. Extent of HVAC system work required by this section is indicated on drawings and schedules, and by requirements of this section.

B. Types of work specified in this section includes but is not limited to the following:

1. Provide new fans, ductwork, air outlets, controls and all accessories.
2. Provide all duct insulation as specified and according to Title 24 energy regulations.
3. Provide complete check-out, testing and start-up.
4. Remove all debris and clean up all equipment before final acceptance by Owner.
5. Other necessary items required and incidental to completing all HVAC work as indicated on the Drawings or designated herein.

1.03 RELATED WORK SPECIFIED ELSEWHERE:

A. The following work is included in other Sections. Where coordination is necessary, it shall be provided by this Subcontractor.

1. Mechanical General Requirements - Section 15000.
2. Electrical - Division 16.

PART 2 – PRODUCTS

2.01 DUCTWORK:

A. General:

1. Construct with gauges, joints, bracing, reinforcing, and other construction details per UMC, ASHRAE, or SMACNA unless specified otherwise, and comply with the requirements of NFPA. Comply with most stringent.
2. Construct ductwork of low carbon galvanized sheet metal of lock forming quality (LFQ), and minimum 1.25 oz. per square foot galvanized, except where otherwise indicated. Sheet metal gauge and LFQ visibly marked thereon by manufacturer.
3. Diagonally or transversely crossbreak panels on metal rectangular ducts over 18" in either direction.
4. Duct dimensions indicated are net, inside, clear dimensions. For internally lined ducts, add lining thickness to determine metal duct dimensions.
5. Classifications: Classify and construct ducts per latest SMACNA classifications as follows:
   a. All Supply, Return and Exhaust Air Ducts: +/-2" static pressure rating; 2,000 FPM maximum, seal Class B.
6. Provide all necessary transitions and additional fittings as required to clear obstructions, maintain clearances, and coordinate with other trades at no extra cost to the Owner.
7. Joint Sealing: Seal all transverse and longitudinal joints of all ductwork to comply with CCR Title 24. Seal duct joints using Hardcast PS-S tape or DT tape and HD-20 adhesive as recommended by manufacturer. At Contractor's option, United Hi-Vel sealer may be used for duct joint sealing.

B. Round Duct Fittings: Fittings shall be manufactured by United Sheet Metal, or approved substitute, or may be manufactured by the Contractor is of equal quality and pressure loss.

1. Elbows shall be five piece with centerline radius equal to 1-1/2 times the diameter for medium pressure ducts. For low pressure ducts, elbows may be adjustable, centerline radius shall be minimum 1 times the diameter. Seal all joints between segments.
2. Fittings shall be smooth on the inside and shall be designed for minimum pressure drop and minimum noise generation.
3. Pleated and non-standard "jury-rigged" fittings not allowed.

C. Rectangular Duct Fittings: Fittings shall be manufactured according to SMACNA standards.

1. The throat radius of all bends shall be 1-1/2 times the width of the duct wherever possible and, in no case, shall the throat radius be less than one width of the branch duct. Provide square elbows with double thickness turning vanes where space does not permit the above radius or where square elbows are shown.
2. The slope of transitions shall be approximately one to five and no abrupt changes or offsets of any kind in the duct system shall be permitted without prior approval.

D. Flexible Ducts:

1. Thermaflex, Cody/West, or approved substitute, flexible ducts with inner plastic liner and outer fiberglass reinforced metalized vapor barrier cover, R-4 insulation, helical support wire. UL Class I air duct to comply with UL-181. Flame spread index of not more than 25 and smode developed of not more than 50.
2. Low Pressure Duct: Thermaflex M-KE, or approved substitute. Use for final connections to all ceiling supply air outlets. Limited to 5'-0" in length.

2.02 DUCTWORK SPECIALTIES:

A. Flexible Duct Connections: Ventfabrics, Ventgals, or approved equal. Ventlon if exposed to weather. Install to maintain not less than 2" metal to metal separation.

B. Turning Vanes: Double thickness, airfoil-type (provide for all square throat elbows).

C. Bird Screens: 14 gauge, 1/2" galvanized wire mesh, set in galvanized steel frame.

D. Duct Access Doors: Insulated with hinges and latches, Ventlok, or approved substitute. Insulated as specified for ducts in which installed. Size as required for proper access.

2.03 AIR OUTLETS:

A. Acceptable manufacturers are Titus, Price, Tuttle & Bailey, Metal Aire, Krueger. First manufacturer listed is the basis of design. Other manufacturers may be required to provide different sizes to result in intended performance and equivalent noise levels.

B. Outlets may be steel or aluminum unless indicated otherwise.

C. Provide factory-baked white enamel unless otherwise indicated. Flat black interiors on perforated face outlets.

D. Provide gaskets at supply outlet flanges.

E. On grilles, diffusers, or registers utilizing a plenum box, provide box fabricated of 22 gauge, zinc coated steel with internal surfaces internally lined with minimum 1" thick duct liner as specified under INSULATION.

F. Types and sizes as scheduled.

2.04 DAMPERS:

A. Balancing Dampers:

1. Construct balancing damper per SMACNA. Use single blade or multi-blade dampers per ASHRAE/SMACNA recommendations.
2. Provide hand locking quadrant.

B. Fire Dampers: U.L. listed and California Fire Marshal approved.

1. Supply Air: Air Balance Inc., 119BLX, 100% free area.
2. Return Air: Air Balance Inc., 119BLX, 100% free area.
3. Ceiling: Air Balance Inc., assembly A-2 with FD-30 fire damper.
4. At wall outlet or louver: Air Balance Inc., 119AF.

2.05 FANS:

A. Provide fans constructed and factory-tested in accordance with AMCA and ARI. Fan wheels statically and dynamically balanced. Fan types, sizes, and accessories as scheduled on the drawings.

B. Manufacturers: Trane, Carrier, Penn, ILG, Greenheck or approved substitute.

C. Bearing Life: AFMBA L-10 life of 40,000 hours minimum, 200,000 hour average.

D. Motor and Drive Guards: See Section 15000.

2.06 INSULATION:

A. Ductwork Insulation:

1. Wrap all unlined sheet metal supply and return ducts with minimum 1-1/2" thick duct wrap with reinforced foil facing, Fiberglas RFK 75 insulation as manufactured by Owens Corning Fiberglas Corporation, Manville, or Certain-Teed. Adhere to duct surfaces with Foster #81-99, or approved substitute, adhesive, applied in strips about 6" wide on approximately 12" centers. Lap all circumferential joints and longitudinal joints a minimum of 2". On circumferential joints, the 2" flange of the facing shall be secured using 9/16" flare door staples applied 6" on center and taped with a minimum of 3" wide foil reinforced craft tape. All pin penetrations or punctures in facing shall also be taped.
2. Provide acoustical lining in rectangular supply and return air ducts in all mechanical and fan rooms and where indicated on the drawings. Per SMACNA Duct Liner Application Standard and as follows: lining shall be 1" thick, except where noted otherwise. 1-1/2# minimum density J-M Microcoustic, Fiberglas, or Certain-Teed with black coating and shall comply with UL-181. Cement the lining in place with 100% coverage of adhesive and coat all butt joint edges and joints with sealants. Cover all joints and exposed edges of duct liner with 6 oz. canvas cemented in place with Arabol. No bare fiberglass edges shall be left exposed to air stream. Adhesive and sealants shall be UL listed or classified Type I per Adhesive and Sealant Council Standard ASC-A-7001. Note: Duct sizes shown are net inside dimensions.
3. Ductwork Insulation: General: Insulation materials inside and outside of duct where in return plenums) shall have a flame-spread developed rating of not more than 25 and a smoke developed rating of not more than 50.

2.07 CONTROLS:

A. The extent of Controls work is indicated on drawings and schedules.

PART 3 – EXECUTION

3.01 GENERAL:

A. System layouts as indicated on drawings are generally diagrammatic, but shall be followed as closely as actual construction and work of other trades will permit. Provide access doors as required to render concealed material accessible. Coordinate access door locations with Architect. Avoid cutting or boring holes through structural members where possible. Obtain Architect's written approval prior to cutting or boring the structure.

B. Drawings and Arrangement: Install equipment and materials with all working parts readily accessible for inspection, repair and removal. The right is reserved to make reasonable changes in locations of equipment shown on drawings prior to roughing-in without involving additional expense to the Owner.

C. Prior to all work of this Section, carefully inspect the existing and installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

D. Verify that the system may be installed in strict accordance with all pertinent codes and regulations and the approved shop drawings.

3.02 DUCTWORK AND SHEET METAL:

A. The installation of all ductwork, louvers, dampers, etc., shall be according to the SMACNA standards.

B. Ducts shall be hung with galvanized 1" x 18 gauge duct straps with spacing as recommended by SMACNA, ASHRAE or as required by local codes, whichever is most stringent.

C. Provide sway bracing on all ductwork in accordance with the local codes and seismic requirements outlined in Section 15000.

D. Provide 18" x 12" minimum access doors in ductwork and furring to provide easy access to each fire damper. Use insulated access doors in insulated ducts.

E. Fire dampers shall be installed according to state and local codes and exactly as tested by UL to develop fire ratings.

3.03 AIR BALANCING:

A. Balancing contractor to be independent from the mechanical contractor. Mechanical contractor to leave all balancing dampers locked in wide-open position. Balancing Contractor to provide air balancing report in AABC format.

3.04 MAINTENANCE AND OPERATING INSTRUCTIONS:

A. Furnish three (3) complete sets of operating and maintenance instructions bound in a hardboard binder and indexed. Start compiling the data upon approval of list of materials. Final payment will not be made until booklets are approved by Architect.

B. These sets shall incorporate the following:

1. Complete operating instructions for each item of equipment.
2. Test data and air balancing reports as specified.
3. Typewritten maintenance instructions for each item of equipment listing in detail the lubricants to be used, frequency of lubrication, inspections required, adjustments, etc.
4. Manufacturer's bulletins with parts numbers, instructions, etc., for each item of equipment, properly separated and assembled.

**** END OF SECTION ****

DIVISION 16 – ELECTRICAL
SECTION 16010
ELECTRICAL GENERAL REQUIREMENTS

1.00 GENERAL

1.01 CONDITIONS & REQUIREMENTS

A. Refer to the General Conditions, Supplementary General Conditions, and Division 1 General Requirements.

B. Provisions of this Section shall apply to all Sections of Division 16.

C. The equipment and materials installed by the Division 16 Contractor shall not contain any asbestos or PCBs. Contractor shall certify in writing that equipment and materials installed under this Division 16 contain no asbestos or PCB.

1.02 SCOPE OF WORK

A. Sections covered in Division 16 are related to one another and shall be considered as a whole. The separation into sections and articles is for clarity purpose only.

B. Furnish and install all materials and equipment and provide all labor required and necessary to complete the work shown on the drawings and/or specified in all Sections of Division 16 and all other work and miscellaneous items, not specifically mentioned, but reasonably inferred for a complete installation including all accessories and appurtenances required for testing the system. It is the intent of the drawings and specifications that all systems be complete and ready for operation.

C. All equipment and materials furnished and installed on this project shall be in accordance with the requirements of all codes and be suitable for its intended use.

D. Obtain a separately metered temporary power source for construction power. Coordinate with PG&E. Separately itemize cost.

E. Provide demolition as indicated and as necessary to preserve existing systems from damage during structural upgrade. Field verify.

F. Provide new lighting systems as indicated. Rewire existing lighting fixtures as required for indicated switching patterns.

G. Provide new power receptacles and branch circuiting as indicated .

H. Provide telephone system conduit and back boxes.

I. Provide data system conduit and back boxes.

J. Provide special communication systems as indicated.

K. Provide wiring and terminations for mechanical and plumbing systems provide by others.

L. Provide control wiring as required. Coordinate with mechanical contractor.

1.03 CODE COMPLIANCE

A. All work and materials shall comply with the latest rules, codes, regulations, applicable laws and ordinances of Federal, State and local authorities including, but not limited to the following:

1. Occupational Safety and Health Act Standards (OSHA).

2. NFPA #70 - National Electric Code. Before starting installation, contact the City electrical inspector and determine which edition of the Code is being enforced.

3. NFPA #101 - Life Safety Code.

4. All other NFPA standards including but not limited to 72A, 72B, 72C, 72D, 72E, 12A, 72G, 72H, 101, 1221 and Article 760.

5. California State Safety Orders and California Electrical Code Title 24.

6. All other applicable Federal, State and local laws and regulations.

B. Code compliance is mandatory. Nothing in these Drawings and Specifications permits work not conforming to these codes. Where work is shown to exceed minimum code requirements, comply with drawings and specifications.

C. No work shall be concealed until after inspection and approval by proper authorities. If work is concealed without inspection and approval, the Contractor shall be responsible for all work required to open and restore the concealed areas in addition to all required modifications.

D. Modifications required by authorities having jurisdictions shall be made without additional charge to the owner.

1.04 LICENSE, FEES AND PERMITS

Arrange for required inspections and pay all license, permit and inspection fees.

1.05 CONDITIONS AT SITE

A. Visit to site is required of all bidders prior to submission of bid. All will be held to have familiarized themselves with all discernible conditions and no extra payment will be allowed for work required because of these conditions, whether specifically mentioned or not.

B. Lines of other services shown on the drawings as existing or visibly evident at the site that are damaged as a result of this work shall promptly be repaired at no expense to the Owner to the complete satisfaction of the Owner.

1.06 DRAWINGS AND SPECIFICATIONS

A. All drawings and all Divisions of these specifications shall be considered as a whole and work of this Division shown anywhere therein shall be furnished under this Division.

B. Drawings are diagrammatic and indicate the general arrangement of equipment and wiring. Most direct routing of conduits and wiring is not assured. Exact requirements shall be governed

by architectural, structural and mechanical conditions of the job. Consult all other drawings in preparation of the bid. Extra lengths of wiring or addition of pull or junction boxes, etc., necessitated by such conditions shall be included in the bid. Check all information and report any apparent discrepancies before submitting bid.

C. Any reasonable changes in locations indicated, up to 5'0" and prior to roughin, shall be made by the contractor without additional cost to the owner.

1.07 SAFETY AND INDEMNITY

A. Safety: The Contractor shall be solely and completely responsible for conditions of the job site, including safety of all persons and property during performance of the work. This requirement will apply continuously and not be limited to normal working hours. See also General Conditions and Supplemental General Conditions.

B. No act, service, drawing review or construction review by the Owner, the Architect, the Engineer or their Consultants is intended to include review of the adequacy of the Contractor's safety measures, in, on, or near the construction site. See also General Conditions and Supplemental General Conditions.

C. Indemnity: The Contractor will hold harmless, indemnify and defend the Owner, the Architect, the engineer, their Consultants and each of their officers, employees and agents, from any and all liability claims, losses or damage arising or alleged to arise from the performance of the work described herein, but not including the sole negligence of the Owner, the Architect, and their consultants, and each of their officers, employees and agents.

1.08 RECORD DRAWINGS

A. The Contractor shall maintain a complete set of "Record Drawings", reflecting an accurate dimensional record of all buried or concealed work. The "Record Drawings" shall also include a set of prints of the final "Signed-Off Contractor's Coordination Drawings" prepared by the Subcontractors. "Record Drawings" shall be marked to show the precise location of concealed work and equipment, and all changes and deviations in the Electrical work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without definite instructions from the Architect or Engineer. Prior to commencing work, the Contractor shall obtain from the Engineer a set of black line prints to be used for the daily "Record Drawings".

B. The Contractor and the Electrical Subcontractor shall mark all "Record Drawings" on the front lower right hand corner with a rubber stamp impression that states "Record Drawing" followed by the Contractors Name.

C. Upon completion of the Work, the Contractor shall certify the "Record Drawings" for correctness by adding the verbiage "Certified Correct" and signing each sheet.

B. Prior to final acceptance of the Work of this Division, the Contractor shall submit properly certified "Record Drawings" to the Architect and Engineer for review and shall make changes, corrections, or additions as the Architect may require to the "Record Drawings". After the Architect's and Engineer's review, the "Record Drawings" shall be delivered to the Owner.

1.09 GUARANTEES

All materials and equipment furnished under this Specification and/or Drawings shall be guaranteed in writing for a period of one (1) year from the date of final acceptance against defective material, design and workmanship. In addition, the Contractor shall guarantee in writing that the system as a whole shall be free of defects for a period of one (1) year from the date of final acceptance, the system shall operate perfectly, and all apparatus shall perform in accordance with their individual Specifications.

Upon receipt of notice from the Owner of failure of any material, equipment or section of the system, during the guarantee period, the Contractor shall make all necessary corrections promptly and without expense or inconvenience to the Owner. Replace or repair defects arising in work of this Division and any damage resulting therefrom.

1.10 DEFINITIONS AND ABBREVIATIONS APPLICABLE TO DRAWINGS AND SPECIFICATIONS

Refer to the National Electrical Code Article 100 for definitions related to electrical work. The specifications and notes on the drawings are directed as instructions to the Contractor and the words "the contractor shall" are hereby included in each instruction which uses the verb Furnish, Install, Provide, Rough-in, Use. Provide shall be interrupted to mean "contractor shall provide and install."

1.11 UTILITY COMPANY COST

Provide facilities for the utility company connections and metering for temporary construction power.

Pay utility company charges and fees.

2.00 PRODUCTS

2.01 REFERENCED STANDARDS

ANSI - American National Standards Institute
IEEE - Institute of Electrical and Electronic Engineers
NFPA - National Fire Protection Association
NEMA - National Electrical Manufacturers' Association
U.L. - Underwriter's Laboratories, Inc.

2.02 MATERIAL APPROVAL

A. The design, manufacture and testing of electrical equipment and materials shall conform to or exceed latest applicable NEMA, IEEE and ANSI standards.

B. All materials must be new, in good condition and bear U.L. label.

2.03 SHOP DRAWINGS AND MATERIALS LIST

A. Submit five (5) copies of shop drawings and materials lists for all products specified. Compliance with Specification is Contractor's responsibility.

B. Submittals shall include the following statement "Submittal is certified to comply with the requirements of the Contract Documents" and be signed by the equipment manufacturer and the contractor.

C. Submittals must be sufficiently early and complete so as not to delay the work. Additionally, within two weeks after notice to proceed, Contractor shall submit a list of all equipment he intends to furnish for engineers review.

D. Specific manufacturer and model trade names are used to establish standards. Where more than one name is given, the first listed is the basis of the project design and will be described fully. Other names indicate product lines of generally comparable quality but are alternate items subject to proof of conformance to specified features and performance for acceptance. Where no specific make of material or equipment is mentioned, an appropriate product conforming to the referenced standards may be used, provided it conforms to the requirements of the system.

E. Each submittal shall reference the project name and specification section.

F. Four (4) copies of submittals will be returned marked " Final Reviewed" requiring no action, "Reviewed, Exceptions Noted" requiring corrective action by the contractor or "Resubmit" requiring corrective actions and complete resubmission of submittal to Engineer.

G. Submittals shall indicate equipment will fit in space allocated on contract documents with all required clearances.

2.04 OPERATING AND MAINTENANCE MANUALS

General: Compile and submit data describing care, operation and maintenance of products furnished under the contract, with particular emphasis on lighting, fixtures, fire alarm and special systems specifically designated under these specifications include all certificates, warranties, testing results, to be put in a separate section of the binder. The above data is to be submitted using 8-1/2" X 11" binders as required. Each binder shall have a table of contents with index tabs between sections.

A. Submit three sets of Operating and Maintenance Manuals of equipment as specified in this Division.

B. For specific requirements, see the Sections in which the equipment is specified.

C. Final field review. Upon acceptance of the operating and maintenance instructions and record drawings, the Engineer shall make the last observation of the job and note unacceptable items in a final field review. Project acceptance shall not be made until all items in this report have been corrected and proven to be satisfactory to the Owner and Engineer. The Contractor shall provide a representative to open or operate equipment, remove and replace covers, provide tests, or any other means deemed necessary in order to verify the acceptability of the project either partial or whole. Allow 4 hours to assist the Engineer in this final observation.

D. Instruct the Owner's personnel in the care, operation and maintenance of the above.

2.05 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver, store, and handle materials in a manner to prevent damage.

B. Protect equipment from weather, dampness, vandalism and theft.

3.00 EXECUTION

3.01 WORKMANSHIP AND CONTRACTOR'S QUALIFICATIONS

A. Only quality workmanship will be accepted. Haphazard or poor installation practice will be cause for rejection of work.

B. Provide the same foreman in charge of this work for the entire length of this project.

3.02 COORDINATION

A. Coordinate work with other trades to avoid conflict and to provide correct rough-in and connection for equipment furnished under trades that require electrical connections. Inform Contractors of other trades of the N.E.C. required access to and clearances around electrical equipment to maintain serviceability and code compliance.

B. Verify equipment dimensions and requirements with provisions specified under this Section. Check actual job conditions before fabricating work. Report necessary changes in time to prevent needless work.

C. Contractor shall coordinate the efforts of all trades. Contractor shall prepare and maintain "coordination drawings" indicating equipment actually purchased and exact routing for all conduits and shall obtain similar information and sign off from other trades to demonstrate lack of conflicts prior to proceeding.

D. Coordinate with electrical and telephone utility companies.

3.03 MANUFACTURER'S INSTRUCTIONS

A. Where the specifications call for an installation to be made in accordance with manufacturer's recommendations, a copy of such recommendations shall at all times be kept in the job superintendent's office and shall be available to the Owner's representative.

B. Follow manufacturer's instructions where they cover points not specifically indicated on drawings and specifications. If they are in conflict with the drawings and specifications, obtain clarification from the Architect before starting work.

3.04 QUALITY ASSURANCE

A. Provide a meaningful quality assurance program. To assist the Contractor in this program, the specifications contained herein are set forth as the minimum acceptable requirements. This does not relieve the Contractor from executing other quality assurance measures to obtain a complete operating facility within the scope of this project.

B. The Contractor shall insure that all workmanship, all materials employed, all required equipment and the manner and method of installation conforms to accepted construction and engineering practices, and that each piece of equipment is in satisfactory working condition to satisfactorily perform its functional operation.

C. Quality Assurance Tests and Operational Check.

Provide quality assurance tests and operational check as specified in Section 16110 as a minimum. All equipment shall be tested by the Contractor for correct function.

3.05 CUTTING AND PATCHING

All cutting and patching required for work of this Division is included herein. Coordination with General Contractor and other trades is imperative. Cutting of, welding to or drilling of structural members requires written approval from the California Licensed Professional Structural Engineer of record for the building. Provide all reinforcement required because of cutting. Patching shall be of the same workmanship, materials and finish as, and shall match accurately, all surrounding construction. Contractor shall bear the responsibility for and the added expense of adjusting for improper holes, supports, etc.

Provide all equipment, labor, and material for core drilling holes where conduit penetrates existing concrete walls or floors. Drill holes 1" larger than O.D. of pipe, except where sizes are noted. Verify the location of every core drilled hole with the Architect. Protect all surrounding areas from damage by water or dust while core drilling.

3.06 FIRE RATED WALLS, CEILINGS AND FLOORS

Refer to other appropriate drawings and Divisions of Specification to determine scope of work.

Recessed lighting fixture, flush mounted panels, cabinets and other electrical wiring methods shall not violate fire rated walls, ceilings, floors and other construction elements. If such conditions are indicated on the drawings, notify the Engineer prior to commencing work in this area.

Cooperate fully with other Divisions to maintain the fire rating of the construction. Do not remove sprayed-on or other fireproofing materials unless specifically approved.

3.07 EXCAVATION AND BACKFILL:

A. All excavation and backfill required because of this work shall be included. Excavation of trenches shall be sequenced to minimize "open time" and inconvenience. All existing concrete and asphalt that needs to be cut shall be saw cut in straight lines.

B. Trenches shall be cut straight and true and shall be shored and braced where required. Refer to detail on plans.

C. Concrete Work: Concrete shall conform to requirements of Section 03300 - CONCRETE.

3.08 ACCEPTANCE DEMONSTRATION

Upon completion of the work, at a time to be designated by the Owner, the Contractor shall demonstrate for the Owner the operation of the electrical installation, including any and all special items installed by him or installed under his supervision. Allow 8 hours of demonstration time.

3.09 CONSTRUCTION REVIEW

The Engineer's field representative will provide his client with a continuing source of professional advice, opinions and recommendations based on the field representative's observations of the Contractor's performance of work.

All services rendered by Engineer are professional opinions and recommendations. Under no circumstances is it the intent of the Engineer to directly control the physical activities of the Contractor or his employees.

3.10 PRE-JOB CONFERENCE

Within ten days after award of Contract, arrange to attend pre- construction conference in the office of the Project Director for general review of scope, methods and materials.

3.11 EQUIPMENT NOISE AND VIBRATION

A It is the intention to specify and for the Contractor to provide equipment and systems that shall be quiet and free of apparent noise and vibration in operation.

B. It is intended that vibration shall not be apparent to the senses in occupied areas of the building. To this end, both the balancing of rotating machinery and the installation of vibration isolation at various locations are required.

C. It shall be the responsibility of the Contractor to obtain equipment that is quiet in operation as compared to the other available equipment of its size, capacity, and type, and to install equipment so that a minimum amount of noise and/or vibration is transmitted to the building.

D. Any additional precautions deemed necessary to provide a quiet installation shall be done as part of the Work of this Division, subject to review by the Engineer and Architect and without additional cost to the Owner.

E. After the system is in operation, it shall be the responsibility of the Contractor to make any changes to equipment or Work installed as may be required to provide a system which is quiet in operation as defined herein.

F. The occupied space noise level shall be equal to or less than NC 40 unless otherwise specified herein. This shall include all areas occupied by the Tenant, including areas adjacent to the electric closets.

END OF SECTION

SECTION 16020
BASIC CONSTRUCTION METHODS AND MATERIALS

1.00 GENERAL

1.01 CONDITIONS & REQUIREMENTS

A. Refer to the General Conditions; Supplementary General Conditions, and Division 1 General Requirements.

1.02 DESCRIPTION

A. Work included in this Section are conduits, wires, and other miscellaneous materials not specifically mentioned in other Sections of Division 16, but necessary or required for equipment or system operation or function.

B. Related work included in other Sections: All other Sections of Division 16.

1.03 INCORPORATED DOCUMENTS

Section 16010, Electrical General Provisions, applies to this Section.

1.04 SUBMITTALS

A. Materials list with manufacture, style, series or model identified.

B. Manufacturer's descriptive literature and/or sample if requested by the Architect or Engineer.

2.00 PRODUCTS

2.01 CONDUITS AND OTHER RACEWAYS

A. Rigid Steel: Hot dipped galvanized or sherardized.

B. Intermediate Metal Conduit (IMC): Hot-dipped galvanized or sherardized.

C. Electrical Metallic Tubing (EMT): Electro-galvanized or sherardized.

D. Plastic: Schedule 80, approved for use as non-metallic raceway for 90°C conductors, Carlon, Kraloy, or Stauffer. Conduit, fittings and glue shall be the product of one manufacturer.

E. Wireway: Code gauge steel, with knockouts and hinged cover. Corrosion resistant gray baked enamel finish.

F. Provide fittings and accessories approved for the purpose and equal in all respects to the conduit or raceway. EMT connectors and couplings shall be steel set-screw type indoors and steel compression type in wet locations for outdoors. Connectors shall have insulated throats. Die or pressure cast competitive grade fittings will not be allowed.

G. Wiremold, associated fittings, and boxes shall be the product of one manufacturer.

H. Minimum size power conduit shall be 3/4".

2.02 WIRES AND CABLES:

A. For power and lighting systems 600V or less:

1. Conductor

#12 and #10 AWG - solid copper
#8 AWG and larger - stranded copper
Minimum size - #12 AWG

2. Insulation type

#12 to #1 AWG - THWN for wet or underground locations and THHN for dry locations.

#1/0 through #4/0 AWG - XHHW (55 Mils).
#250MCM and larger - XHHW (65 Mils).
When installed in underground conduits, RHW, USE (95 Mils).
Grounding wire - TW

3. Conductor pulling tensions shall not exceed manufacturer's recommendations. Where necessary,UL listed lubricants compatible with the type of insulation involved may be used. American Polywater Corp. type J, Electro-Compound Co. Poly-eason Y-ErEase or Ideal Industries "Wire Lube" will be acceptable.

B. For signal and communications circuits

1. Special cables shall be as specified on drawings.

C. Acceptable products:

General Electric, Anaconda, Okonite, Paranite, CyprusRome, Pirelli-General or Triangle products conforming or exceeding applicable ICEA standards.

2.03 OUTLET BOXES, JUNCTION AND PULL BOXES

A. Outlet boxes: Hot-dipped galvanized or sherardized of required size, 4" square, minimum, for flush mounted devices and lighting fixtures. Cast type with gasketed covers for outdoor or wet locations.

B. Junction and pull boxes: Use outlet boxes as junction boxes wherever possible. Larger junction and pull boxes shall be fabricated from sheet steel, sized according to code, with screw-on covers, finished gray baked enamel.

C. All outlet boxes for the fire detection system components shall be as required by the manufacture's submittal and catalog cut sheets.

2.04 WIRING DEVICES

A. Line voltage, 20 amp Wall Switches shall be acquiet, heavy duty, white specification grade Decora style as noted below. Equivalent Slater "Medallist", Hubbell or Sierra are acceptable.

Single Pole Switches	Leviton #5621-2W
Three Way Switches	Leviton #5623-2W
Wall Motion Switch	Watt Stopper # WS-120
Ceiling Motion Switch	Watt Stopper # W1000A
Relay Power Pack	Watt Stopper # A120-E

B. Duplex convenience receptacles - 3 pole grounded white finish, specification grade as noted below:

15AMP	Leviton #5262A-W
20AMP	Leviton #5362A-W
Isolated Ground	Leviton #5362-IGW

C. Ground fault interrupter (GFI) receptacles - 3 pole grounded white finish rated 20 amps, 125V. Leviton #6598W provide stainless steel plate for indoor and weatherproof lift cover for outdoor installation.

D. Other special purpose receptacles shown on drawings shall be of same quality such as isolated grounding type.

E. Telephone outlet: 4" single gang box with 3/4" conduit stubbed to telephone back board. Refer to telephone system Section 16740 for additional information.

F. Data Outlet: 4" single gang box with 3/4" conduit and pull string stubbed to hub location.

G. Device plates: Satin finish stainless steel for flush and galvanized steel for all surface mounted devices in warehouse or white Bakelite plates and devices in finished areas. Confirm all device plate colors with Architect before purchasing.

Weatherproof plates shall be stainless steel with hinged, gasketed covers, Sierra Electric "WKP" series or equal.

Gang all adjacent switches under a single cover plate. Provide barriers where required.

2.05 CONDUIT HANGERS

A. For individual conduit runs 1" in size or larger not directly fastened to the structure, use rod hangers manufactured by Caddy, Unistrut or Powerstrut. Clips supported by ceiling hanger wires are not allowed.

B. For multiple conduit runs, use Unistrut or Powerstrut trapeze type conduit support designed for maximum deflection not greater than 1/8". See section 16030 seismic calculations.

2.06 WIRE CONNECTORS

A. For wires size #8 AWG and smaller solid conductors - insulated pressure type (with live spring) rated 105°C, 600V. Scotchlok or Buchanan B-Cap.

B. For wires size #6 AWG and larger – T&B series 54200 or equivalent compression type with 3M #33+ or Plymouth "Slipknot Gray" tape insulation.

C. All #12 and smaller stranded conductors for NEC class 1, 2 or 3 wiring shall be terminated with AMP " PIDG" connectors and spliced in junction boxes with AMP "Plastic Grip" insulated butt splices.

D. Terminations at motors shall be made with bolted compression type ring connectors or lugs as manufactured by T&B, Burndy, OAA. Bolts shall be of required size for connectors used and shall be made up with locking washer and nut. Terminations shall be taped.

E. Termination shall use Thomas & Betts Series 54200 two hole connectors except where device cannot be furnished with 2 hole connectors T&B 54100 series single hole connectors with anti rotation restraint shall be used.

F. Tapping of copper conductors shall be with T&B series 54700 (or approved equal) compression taps.

2.07 SAFETY DISCONNECT SWITCHES

Heavy duty type, 600V, HP rated for motors, standard enclosure indoors and weathertight outdoors; fused or nonfused as required. General Electric, Square D, Westinghouse or ITE.

2.08 INDIVIDUALLY MOUNTED MOTOR CONTROLLERS

A. For Polyphase Motors: Combination disconnect and magnetic starter, with 3-leg overload protection. Provide two interlock contacts of the interchangeable open-close type. Provide hand-off automatic selector switch, motor running pilot light and reset button in cover. Circuits 300V and over shall be provided with individual 120V fused control transformers.

B. Starters for fractional horsepower 120V motors shall be manual type unless shown otherwise, equipped with built-in overload protection.

C. Acceptable manufacturers: General Electric, ITE, Square D, Westinghouse, and Allen Bradley.

2.09 CONDUIT SLEEVES AND ROOF JACKS

Sleeves for conduit penetrations: Pipe Shields, Inc., model WFB at walls and QDFB at floors. Roof jacks shall be lead with flashing and counter flashing where sleeves pass through rated walls or floors. Firestop sealing such as 3M Firebarrier Penetration Sealing System or Dow Corning 306548 Section RTV Foam shall be applied.

2.10 EQUIPMENT MOUNTING AND SUPPORT HARDWARE

Steel channels, bolts, washers, etc., used for mounting or support of electrical equipment shall be galvanized type. Where installed in corrosive environment, stainless steel hardware shall be used. Comply with Section 16030, Seismic Calculations.

A. The use of powder actuated devices will not be acceptable except for anchoring the basement floor cells to the concrete subfloor. Wire may be used only for support of fixtures in suspended ceilings. Use materials specifically intended for the use.

B. Provide the following supports and fastenings for locations as required.

1. Structural Steel: Beam clamps, welded studs, OAA.

2. Concrete: Rawl or Phillips anchors, OAA. The anchors shall be expandable by tightening the bolt. Red Head wedge type anchors shall not be used.

3. Wood: Lag screws, machine bolts, wood screws.

4. Wood Blocking in Shear: Wood screws.

5. Hollow Tile & Gypboard: Toggle bolts. These will be allowed for items weighing 5lb or less.

6. Equipment Supports & Trapeze Hangers: Formed galvanized channel, Unistrut, OAA.

7. Use galvanized or plated fasteners in all locations.

8 Hot-dip galvanize ferrous items after fabrication for exterior, underground or otherwise corrosive locations.

9. Where approved and coordinated with other Divisions, special clips may be used to support outlet boxes and 3/4" diameter maximum conduit to wire supports, channels and tees for suspended ceilings. Coordinate this with the ceiling installation to insure adequate support without causing deformation to the finished surface. Conduit support clips to ceiling support wires will be allowed only if acceptable to the local codes. Contractor to confirm acceptable with electrical inspector prior to using clips.

10. Provide metal backing behind all panels and terminal cabinets. Backing shall provide for attachment of the cans at a minimum of four outer corners.

3.00 EXECUTION

3.01 GENERAL

A. Electrical system layouts indicated on the drawings are generally diagrammatic, but shall be followed as closely as actual construction and work of other trades will permit. Govern exact routing of cable and wiring and the locations of outlets by the structure and the equipment served. Take all dimensions from architectural drawings.

B. Consult all other drawings. Verify all scales and report any dimensional discrepancies or other conflicts to Architect before submitting bid.

C. All home runs to panelboards, relay cabinets, control panels, etc., are indicated as starting from the outlet nearest the panel and continuing in the general direction of that panel. Continue such circuits to the panel and cabinets as though the routes were completely indicated. Terminate home runs of signal, alarm, and communications systems in a similar manner.

D. Avoid cutting and boring holes through structure or structural members wherever possible. See 16010.

E. Furnish and install all necessary hardware, hangers, blocking, brackets, bracing, runners, etc., required for equipment specified under this Section.

F. Provide necessary backing required to insure rigid mounting of outlet boxes.

3.02 WIRING METHOD

A. Install all wiring in conduit raceway, unless specifically shown otherwise.

B. Sizes for conduits, unless specifically shown otherwise, shall be determined from Table 3A for conductors #16 through #4/0 AWG and Table 3C for conductors 250 MCM or larger, Chapter 9 of the National Electric Code.

C. Conduit shall be rigid steel, IMC, EMT, or plastic as follows:

1. Above ground: Use rigid steel, IMC or EMT.

   a. Wet locations: Rigid steel or IMC only with Plastibond coating.

   b. Hazardous locations: Rigid steel conforming to NEC requirements.

   c. Locations subject to mechanical injury: Rigid steel or IMC only.

   d. In concrete walls or block walls: Rigid steel or IMC only.

   e. Dry locations and not subject to mechanical injury: EMT, IMC or rigid steel conduit.

2. Underground and under slab: Use wrapped rigid steel or plastic.

   a. Conduit shall be installed on 2" sand base and covered by sand backfill. In planting areas provide 2" concrete cap. Multiple runs shall maintain 1" minimum separation between runs.

3. Make all risers to grade with rigid steel conduit and fittings only. Concrete encase rigid steel does not need to be wrapped. Rigid steel conduit not in concrete and in contact with soil shall be wrapped.

4. Burial depth of conduits shall be as follows:

   a. Concrete encased: 24" minimum for 600V or lower systems to top of concrete encasement.

   b. Concrete capped: 24" minimum to top of conduit.

   c. Conduits without concrete encasement or cap: 24" minimum to top of conduit, deeper if code requires. Maintain 3" minimum cover in driveways and service yard.

   d. PG&E Primary and Secondary conduits shall be 30" below grade.

D. Underground conduit entering building shall be provided with one 10' section of rigid steel conduit at point of penetration of foundation, footing or basement wall, with approximately equal lengths inside and outside building line.

E. Use flexible conduits in the following applications only:

1. Recessed lighting fixtures.

2. Motor connections.

3. At expansion joints provided the City Electrical Inspector will accept flex as acceptable across expansion joints.

4. At transformers and other equipment which produces vibration.

5. At wet locations, flexible conduit shall be liquid tight type.

3.03 INSTALLATION OF CONDUITS AND BOXES

A. Run all conduits concealed unless otherwise noted or shown. Run no conduits in concrete slabs except at point of penetration. All penetrations shall be at right angles to slab surfaces.

B. Run exposed conduit parallel to or at right angles to center lines of columns and beams.

C. Support conduits with UL listed steel conduit supports at intervals required by NEC. Wires or sheet metal strips are not acceptable for conduit support. Use conduit hangers for all conduits not directly fastened to structure and for all multiple conduit runs. Do not attach any conduit to fan plenums. See details on drawings. If weight per hanger rod exceeds 250 pounds, special structural engineering is required by this section. See Section 16030.

D. Individual conduits 1/2" and 3/4" size may be supported from ceiling support wires with Caddy clips only if acceptable to local code. Only one conduit is permitted to be attached to any ceiling support wire. Hang such conduit so as not to affect level of ceiling.

E. Install conduits above ceilings to avoid obstructing removal of ceiling tiles, lighting fixtures, air diffusers, etc.

F. Provide conduit sleeves and chases wherever conduits pass through floors and fire-rated walls. Set in forms before concrete is poured. All penetrations of roofs and exterior walls by electrical work shall be flashed and counterflashed to preserve weatherproof integrity of building. Material and techniques used shall conform to roof or wall weatherproofing specification. All floor and wall penetrations shall be made watertight. Refer to drawings for details and specific requirements.

G. All underground conduits and ducts 2" and larger shall be proven clear by pulling through a mandrel 1/4" smaller than the inside diameter.

H. Outlet and junction boxes shall be sized per the N.E.C. based on wire size and quantity of wires as a minimum.

I. Outlet boxes shall be attached to studs and or backing in a rigid manner so they cannot be pushed back into the wall or ceiling space if the hole cut in the wall or ceiling finish material is misaligned.

J. Switch and plaster rings shall be a maximum distance of 1/8" from finish wall or ceiling material such as sheet rock or tile.

3.04 INSTALLATION OF WIRES - 600 VOLTS AND BELOW

A. Pull no wire into any portion of the conduit system until all construction work which might damage the wire has been completed.

B. Install all wire continuous from outlet to outlet or terminal to terminal. Splices in cables when required shall be made in handholes, pull boxes or junction boxes. Make branch circuit splices in outlet boxes with 8" of correctly color-coded tails left in the box. Feeders may not be spliced.

C. Splices in wires and cables shall be made utilizing materials and methods described hereinbefore.

D. Do not splice wire for the fire detection-alarm or public address systems in pull boxes or junction boxes. Install all wire continuous from terminal to terminal.

E. All cables and wires passing through manholes and handholes shall be full looped inside the manhole and handhole and supported on galvanized steel racks.

F. Make all ground, neutral and line connections to receptacle and wiring device terminals as recommended by manufacturer.

G. Install 1/8" diameter Tubbs Cordage Company yellow "polyline" pull line in all underground conduits provided under this contract that are intended for future use.

H. Use Brady OAA wiremarkers for identification of all conductors in outlet boxes, junction boxes, pull boxes, handholes, fixtures, distribution and branch circuit panelboards, terminal cabinets, annunciator panels or any place where the conductors are accessible. Branch circuit wires shall have circuit number and relay number, (if lighting). Panel identification is not required on the wire. Panel numbers, voltage, circuits numbers, relay numbers shall be written on white tape attached to the inside of the box so visible when the wires are in the box. The information required on the inside of the box shall be written on the cover of the box if it is an accessible junction or pull box. Use indelible black ink. Letters to be 1/4" minimum in height. Feeders thru pull cans require the same identification described above. See details on the drawing for further clarifications.

3.05 WIRE COLOR CODE

A. Color code all conductors. Wire sizes #8 AWG or smaller shall have integral color coded insulation. Wire sizes #6 AWG and larger may have black insulation but identified by color coded electrical tape at all junction, splice, pull, or termination points. Color tape shall be applied to at least 6" of the conductor.

B. Color code wires as follows:

120/208 Volts
Phases:
a-black
b-red
c-blue
neutral-white
ground-green

C. Color coding of wires used for signal and communication systems are specified under the respective sections for these systems.

3.06 MOUNTING HEIGHTS OF DEVICES

Mounting heights of devices shall be confirmed with the architect and meet ADA requirements.

3.07 CONNECTIONS TO EQUIPMENT

A. General

1. Furnish and install required power supply conduit and wiring to all equipment. See below for other wiring required.

2. Furnish and install a disconnect switch immediately ahead of and adjacent to each magnetic motor starter or appliance unless the motor or appliance is located adjacent and within sight of the serving panelboard, circuit breaker or switch and within 50 feet. Verify all equipment nameplate current ratings prior to installation. Provide all disconnect switches shown on the drawings.

3. Mount all motor starters and provide all power wiring to them, including those furnished under other sections of specifications.

4. Install all rough-in work for equipment from reviewed shop drawings to suit the specific requirements of the equipment.

5. Furnish and install all magnetic motor starters that are shown on the electrical drawings or specified under other Divisions to be furnished under this Division of work. Verify equipment nameplate ratings prior to installation and furnish adequately rated starters and heaters for the loads.

6. Furnish and install manual thermal protection for all motors not integrally equipped with thermal protection.

7. Furnish 120 volt power to each control panel and time clock requiring a source of power to operate.

B. Heating, Ventilating and Air Conditioning Equipment

1. Line and low voltage temperature control and interlock wiring and conduit and required connections thereto are a part of other Divisions unless specifically shown or noted on the electrical drawings as to be furnished under this section.

2. Provide 120 volt power supply to temperature control panels furnished and installed under other Divisions of work, whether or not shown on the electrical drawings.

C. Plumbing and Other Contractor-Furnished and Owner-Furnished Equipment

1. All required power and control conduit, wiring and connections are included under this Section of the work. Control sensing and alarm devices will be furnished under the respective section of the contract supplying the equipment unless noted otherwise.

Where these are located in pipes, ducts, vessels, tanks, etc., they will be mounted in place by the Contractor furnishing the devices. All others shall be mounted under this Section of the work.

2. Control panels for packaged equipment will be furnished under the respective section of the contract supplying the equipment unless otherwise noted. Installation and connection of the control panels are under this section of the work.

3.08 IDENTIFICATION

A. Provide engraved lamacoid nameplates of minimum 3" long x 1" wide for switchgear, panels, panelboards, motor starters, disconnect switches and all associated devices.

B. Card holders and directory card shall be provided for circuit identification in panelboard. Cardholders shall be permanently attached on the inside of the panel door and shall have a clear plastic front. Directory cards shall be typewritten. Circuit descriptions shall include location and names of items served.

END OF SECTION

SECTION 16450
GROUNDING

1.00 GENERAL

1.01 CONDITIONS & REQUIREMENTS

Refer to the General Conditions, Supplementary General Conditions, and Division 1 - General Requirements.

1.02 DESCRIPTION

A. Work included in this Section: Conduits, wires, ground rods, and other miscellaneous materials for electrical grounding system.

B. Related work included in other Sections:

1. Test: Section 16110

2. Basic Construction Materials and Methods: Section 16020

1.03 INCORPORATED DOCUMENTS

Section 16010, Electrical General Provisions, applies to this Section.

1.04 SUBMITTALS

Manufacturer's literature describing the product.

2.00 PRODUCTS

2.01 BARE COPPER GROUND WIRE

Medium hard drawn copper conductor, stranded, sizes as shown on drawings.

2.02 CONNECTION

All grounding connections shall be Cadwelded.

2.03 HARDWARE

Bolts, nuts, and washers, where allowed, shall be bronze, cadmium plated steel, or other non-corrosive material, approved for the purpose.

2.04 WATERPROOF SEALANT

Use Kearney "Aqua Seal" mastic sealant on all below grade clamp or compression type connections.

3.00 EXECUTION

3.01 EQUIPMENT GROUND

A. Ground non-current carrying metal parts of electrical equipment enclosures, frames, conductor raceways or cable trays to provide a low impedance path for line-to-ground fault current and to bond all non-current carrying metal parts together. Install a green insulated ground conductor in each raceway system. Equipment ground conductor shall be electrically and mechanically continuous from the electrical circuit source to the equipment to be grounded. Size ground conductors per NEC 250-95 unless otherwise shown on drawings.

B. Grounding conductors shall be identified with green insulation. Where green insulation is not available, on larger sizes, black insulation shall be used and suitably identified with green tape at each junction box or device enclosure.

C. Install metal raceway couplings, fittings and terminations secure and tight to insure good ground continuity. Provide grounding bushing and bonding jumper where metal raceway is not directly attached to equipment metal enclosure and at concentric knockouts.

D. Lighting fixtures shall be securely connected to equipment ground conductors. Outdoor lighting standards all 277 volt lighting and all fluorescent fixtures shall have a factory installed ground lug for terminating the ground wire. See detail on drawings.

E. Motors shall be connected to equipment ground conductors with a conduit grounding bushing and with a bolted solderless lug connection on the metal frame.

3.02 BUILDING STRUCTURAL FRAME AND NON-ELECTRICAL METAL OBJECTS AND PIPING

A. Miscellaneous metal objects including piping, vessels, and structural shapes within six feet of metallic objects connected to the ground system and which are not interconnected mechanically with the grounding system, shall be interconnected with a minimum #6 AWG bare copper conductor.

3.03 GROUNDING ELECTRODE SYSTEM

A. Existing grounding electrode system shall remain.

END OF SECTION

SECTION 16500
LIGHTING

1.00 GENERAL

1.01 CONDITIONS & REQUIREMENTS

A. Refer to the General Conditions, Supplementary General Conditions and Division 1 - General Requirements.

B. All lighting fixtures and ballast shall be certified to be in compliance with the California Administrative code, Title 24, Section 2-5314(b) minimum efficiency requirements.

1.02 DESCRIPTION

A. Work included in this Section:

1. Lighting fixtures and installation.

2. Lighting controls as shown on the drawings.

B. Related work included in other Sections:

1. Basic Construction Materials and Methods: Section 16020

2. Grounding: Section 16450

1.03 INCORPORATED DOCUMENTS

Section 16010, Electrical General Provisions, applies to all work in this Section.

1.04 SUBMITTALS

A. Shop drawings and/or manufacturer's literature describing product.

B. Photometric test data by an independent testing laboratory when requested.

C. Operating manuals shall include operation and maintenance instructions and parts list.

D. Submittal shall state all control devices and fixturescomply with Title 24 requirements.

2.00 PRODUCTS

2.01 GENERAL

A. Fixtures are designated on drawings by means of capital letters. See fixture schedule for fixture description and type of lamp required.

2.02 APPROVALS

A. Each lighting fixture shall have U.L. label for the location the fixture is installed.

B. Each fixture, ballast and control device be certified as complant with California Title 24.

2.03 LAMPS

A. Incandescent lamps shall be "Long Life type", rated 130 volts, 2500 hours minimum rated life.

B. Fluorescent lamps shall be energy saving T-8 type, General Electric SP35 or equivalent Sylvania.

C. High intensity discharge (H.I.D.) lamps shall be G.E., Sylvania or Westinghouse type as indicated on drawings.

D. Compact fluorescent lamps shall be as scheduled, 3500K and manufactured by GE or Osram.

2.04 FLUORESCENT LAMP BALLAST

A. Ballast shall be electronic, class P UL listed and CSA certified. Ballast shall have .95 pf or better, sound level "A", operate at 20KHZ or greater without flicker and have an average lamp current crest factor below 1.4 Advance Mark V, or equivalent GE or Universal.

B. Ballast for warehouse lighting fixtures shall be low temperature type rated for use at $0^{o}F$.

C. All ballasts in a given type lighting fixture shall be of same manufacture.

D. See fixture schedule on the drawings for additional information.

2.05 H.I.D. LAMP BALLAST

Constant wattage, high power factor type.

2.06 FIXTURE HANGERS AND SUPPORTS

A. Provide swivel canopy or ball aligner for stem-mounted fixtures.

B. Provide proper supports and mounting accessories, such as hangers, stems, yokes, plaster frames, etc., for each lighting fixture as required by the type of ceiling installed. See architectural drawings for ceiling construction and coordinate. Refer to plans.

C. Provide aircraft cable for suspended fixtures support 2 feet below ceiling for indirect lighting.

2.07 GROUNDING

Fluorescent and H.I.D. fixtures shall have factory installed grounding studs.

2.08 MOTION

3.00 EXECUTION

3.01 GENERAL

A. Provide and install all fixtures complete, including lamps, and ready for service.

B. Verify ceiling type and conditions and order fixtures for proper application required by the type of ceiling installed.

C. Architectural ceiling plans shall be used to determine exact locations of lighting fixtures and ceiling construction. Electrical drawings are diagrammatic only.

D. Determine exact location and height of fixtures by the structural and mechanical limitations of the building. Install fixtures in such a manner as to avoid such obstructions and to give proper illumination result. Verify layouts with Engineer.

E. All recessed lighting fixtures shall be wired from adjacent junction boxes utilizing flexible metal conduit (less than 6') to permit future fixture relocation. Outlet box for surface or stem mounted fixtures shall be provided with fixture stud as well as tapped and drilled canopy covers. All outlets shall finish flush with walls or ceilings except where in ceiling tiles, locate these in the center of a tile or at the intersection of four tiles.

F. All fluorescent fixtures shall be supported from the building structural members or from bridging attached to the structural members. Provide all necessary blocking and hardware so that fixtures hang true, square, plumb and in proper alignment. Fixtures installed suspended below grid type ceilings shall be supported independently of the grid system at a minimum of four points per four foot long fixture.

G. Contractor shall provide spare lamps equal to 10% of actual quantity required.

H. Four foot long fixture body: By a pair of 3/8" machine bolts separated by a maximum distance possible and located four inches in from each end of fixture - total of 4 bolts per fixture.

I. Ceiling grid system may be used to seat recessed lighting troffers but shall not provide sole support. A slack #12 gauge galvanized tie wire and a sway brace wire at 45° angle to the slack support wire shall be permanently attached to the structure shall be provided at four corners of each troffer installed in a grid type ceiling. Provide fixture and tee bar tie clips. H.I.D. and incandescent fixtures shall have support wires if required by city codes or as indicated on plans.

J. Provide operational test of low voltage lighting control in the presence of Owner and Engineer.

K. Contractor shall remove all dust and dirt on the fixtures and fixture lens after the construction clean up is complete and after the Owner is substantially moved in the facility.

L. Contractor shall be responsible for the final adjustment of all directional type light fixtures. The final adjustment shall be directed in the field by the Engineer after dark. Ladders shall be provided by the Contractor for final adjustment.

M. Indirect lighting fixtures shall be hung 2 feet below ceiling. Provide sway bracing if within 2 feet of walls or as required.

END OF SECTION