

CONSTRUCTION SPECIFICATION

FOR

MOORPARK COLLEGE

PARKING STRUCTURE

Moorpark, California

VCCCD Project No. 19125

PLAN CHECK CORRECTIONS

April 20, 2012

INTERNATIONAL PARKING DESIGN, INC.

Architects, Engineers, Parking

Consultants

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IPD Job No: 10-555



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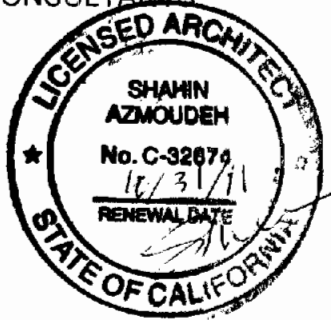
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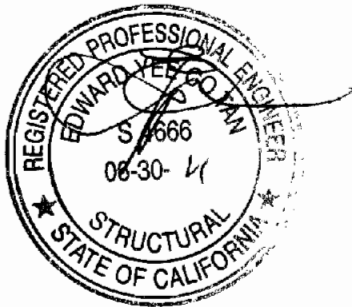
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IDENTIFICATION STAMP  
DIV OF THE STATE ARCHITECT

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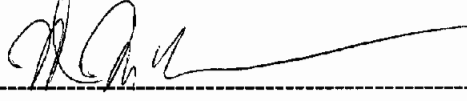
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ACS A. Katsaf  
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MECHANICAL ENGINEER



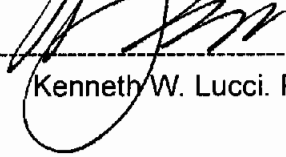
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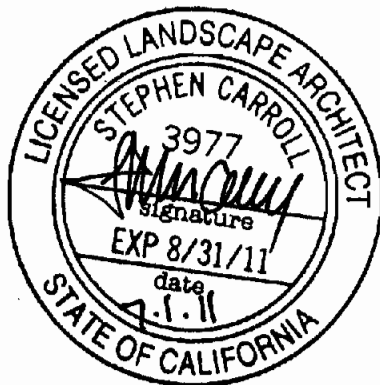
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END OF SECTION

IDENTIFICATION STAMP  
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**SECTION 00015  
NOTICE TO CONTRACTORS CALLING FOR BIDS**

**VENTURA COUNTY COMMUNITY COLLEGE DISTRICT  
NOTICE TO CONTRACTOR CALLING FOR BIDS**

**PROJECT #19125: MOORPARK COLLEGE PARKING STRUCTURE**

NOTICE IS HEREBY GIVEN that the above-named California Community College District, acting by and through its Board of Trustees, hereinafter referred to as "the District" will receive up to, but not later than 3:00 p.m., Tuesday, August 28, 2012, sealed bid proposals for the award of a contract for: **Project #19125, Moorpark College Parking Structure, Moorpark CA.**

**Scope of Work: Six hundred space parking structure with adjacent police stations and asphalt surface parking.** Bid proposals must conform with, and be responsive to, the bid and contract documents, copies of which may be obtained by PDF format at <http://www.vcccd.edu/mc-bid>

All bid proposals shall be submitted on forms furnished by the District and contained in the Specification Division 00. Bids shall be received at Ventura County Community College District, 255 W Stanley Ave., Suite 150, Ventura, CA 93001, Attn: Purchasing Department, Project #19125/Moorpark College Parking Structure BID. Each bid proposal shall be accompanied by: (a) the required Bid Security; (b) Subcontractors List; (c) Non-Collusion Affidavit; and (d) Statement of Bidder's Qualifications. Bids will be opened and publicly read at the stated time, date and place. Each bid proposal shall be accompanied by bid security in an amount not less than ten percent (10%) of the maximum amount of the bid proposal, inclusive of any additive alternate bid item(s). Failure of any bid proposal to be accompanied by the required bid security shall render such bid proposal to be non-responsive and rejected.

**A mandatory Job-Walk will begin at 10:00 a.m., Wednesday, August 8, 2012.** Bidders are to meet at the Moorpark College Maintenance & Operations Dept, 7075 Campus Road, Moorpark CA 93021. Bids without representation on the Heery job walk sign-in sheet will not be accepted.

Prevailing Wage Rates. Employment of Apprentices. This project is subject to the provisions of Labor Code Section 1720 et seq. and regulations set forth in Title 8, Section 16000 et seq. of the California Code of Regulations, which govern the payment of prevailing wages on public works projects. All bidders shall be governed by and required to comply with these statutes and regulations in connection with this project.

Pursuant to Labor Code Section 1771, the contractor receiving award of the contract and subcontractors of any tier shall pay not less than the prevailing wage rates to all workers employed in the execution of the contract. Bidders shall comply with applicable statutes and regulations, including but not limited to Labor Code Section 1771, 1775, 1777.5, 1813 and 1815.

In accordance with Section §1773 of the California Labor Code, the Contractor shall post a copy of the determination prevailing rates of wages at each job site. A copy of these determinations, entitled "PREVAILING WAGE SCALE" is available to any interested party through the internet at: [www.dir.ca.gov](http://www.dir.ca.gov). The District has initiated a Labor Compliance Program (LCP) pursuant to provisions of Labor Code Section 1771.5 and other applicable law. The Contractor and Subcontractor(s) of any tier shall comply with the LCP initiated and enforced by the District. For inquiries, questions or assistance with regard to the LCP, call Golden State Labor Compliance.

Bid proposals shall not be withdrawn by any bidder for a period of ninety (90) days after formal award of the contract by the District. During this time, all bidders shall guarantee prices quoted in their respective bid proposals. In accordance with the provisions of California Public Contract Code Section 22300, substitution of eligible and equivalent securities for any monies to be withheld by the District to ensure the Contractor's performance under the contract will be permitted at the request and expense of the contractor.

Pursuant to Public Contract Code §3300, Bidder must possess a current Class B California Contractors License at the time that the contract for the work is awarded.

Award of Contract to be on Base Bid. The Owner reserves the right to reject any or all bid proposals or to waive any irregularities or informalities in any bid proposal or in the bidding.

Project Estimated Cost: \$12 million

Estimated Start Date is: 10/1/2012

Dick Jones, Project Manager, Heery International, Inc. (805) 857-9184, E-Mail: djones@vcccd.edu

Publication Dates: Friday, August 3, 2012 and Monday, August 6, 2012

**SECTION 00200  
INSTRUCTIONS FOR BIDDERS**

**1.01 Preparation and Submittal of Bid Proposal**

- A. Bid Proposal Preparation.** All information required by the bid forms must be completely and accurately provided. Numbers shall be stated in both words and figures where so indicated in the bid forms; conflicts between a number stated in words and in figures are governed by the words, except where the figures represent an express, correctly calculated sum. Partially completed Bid Proposals may be deemed non-responsive. Bid Proposals submitted on other than the bid forms included herein shall be deemed non-responsive. Bid Proposals not conforming to these Instructions for Bidders and the Notice to Contractors Calling for Bids (“Call for Bids”) may be deemed non-responsive and rejected. Each Bidder is solely responsible for all costs and expenses incurred by the Bidder in preparing and submitting a Bid Proposal to the District.
- B. Bid Proposal Submittal.** Bid Proposals shall be submitted at the place designated in the Call for Bids in sealed envelopes bearing on the outside the Bidder’s name and address along with an identification of the Work for which the Bid Proposal is submitted. Bidders are solely responsible for timely submission of Bid Proposals to the District at the place designated in the Call for Bids.
- C. Date and Time of Bid Proposal Submittal.** A Bid Proposal is considered submitted only if the outer envelope containing the Bid Proposal is stamped by the District’s date/time stamp machine at the place designated for submittal of the Bid Proposal. The date/time stamp is controlling and determinative as to the date and time of the Bidder’s submittal of its Bid Proposal. Bid Proposals received after the date and time specified in the Call for Bids are non-responsive and will be returned to the Bidder unopened.
- D. Alternate Bid Item(s).** If the Bid Proposal forms do not specifically call for the submittal of alternate bid item(s) and a Bidder submits alternate bid item(s), the District may deem the Bid Proposal to be non-responsive and reject the same. In the event that alternate item(s) are specifically called for in the Bid Proposal forms, any Bid Proposal which does not include bid(s) for the alternate item(s) may result in the Bid Proposal being deemed by the District to be non-responsive and rejected. In the event that bids for alternate item(s) are specifically called for in the Bid Proposal forms, the Bidder is referenced to the provisions of the Contract Documents permitting the District, during performance of the Work of the Contract Documents, to add or delete such alternate item(s) with the cost or credit (inclusive of all direct and indirect costs, supervision, overhead and profit) for such alternate item(s) to be in the amount(s) set forth in the Bidder’s Bid Proposal for such alternate item(s).
- E. Break –out costs (accounting purposes only)** For the purposes of accounting, the

District will require that the cost for the construction of the Police Department and flat asphalt parking area be identified by the successful bidder within Seventy Two (72) hours following Notice of Intent to award. Items to be considered in this break-out cost will be identified in Specification Section 01030.

- 1.02 Bid Security.** Bid Security shall be in the form of: (a) cash, (b) a certified or cashier's check made payable to the District or (c) a Bid Bond, in the form and content attached hereto, in favor of the District executed by the Bidder as a principal and an Admitted Surety Insurer under Code of Civil Procedure §§995.120 and 995.311 as surety (the "Bid Security") in an amount not less than the stated percentage of the maximum amount of the Bid Proposal. Any Bid Proposal submitted without the required Bid Security is non-responsive and will be rejected.
- 1.03 Signatures.** All bid forms shall be executed by an individual duly authorized to execute the same on behalf of the Bidder.
- 1.04 Modifications.** Changes to the Bid Proposal which are not specifically called for or permitted may result in the District's rejection of the Bid Proposal as being non-responsive. No oral or telephonic modification of any submitted Bid Proposal will be considered. A written modification may be considered only if actually received by the District ten (10) days prior to the scheduled closing time for receipt of Bid Proposals.
- 1.05 Erasures; Inconsistent or Illegible Bid Proposals.** Bid Proposals must not contain any erasures, interlineations or other corrections unless the same are suitably authenticated by affixing in the margin immediately opposite such erasure, interlineation or correction the surname(s) of the person(s) signing the Bid Proposal. Any Bid Proposal not conforming to the foregoing may be deemed by the District to be non-responsive. If any Bid Proposal, or portions thereof, is determined by the District to be illegible, ambiguous or inconsistent, the District may reject such a Bid Proposal as being non-responsive.
- 1.06 Examination of Site and Contract Documents.** Each Bidder shall, at its sole cost and expense, inspect the Site to become fully acquainted with the Contract Documents and conditions affecting the Work. The failure of a Bidder to receive or examine any of the Contract Documents or to inspect the Site shall not relieve such Bidder from any obligation with respect to the Bid Proposal, the Contract or the Work required under the Contract Documents. The District assumes no responsibility or liability to any Bidder for, nor shall the District be bound by, any understandings, representations or agreements of the District's agents, employees or officers concerning the Contract Documents or the Work made prior to execution of the Contract. Bidder is charged with all information and knowledge that a reasonable bidder would ascertain from having performed this required work, investigation, research, and analysis. Bid prices must include entire cost of all work "incidental" to completion of the Work. The submission of a Bid Proposal shall be deemed prima facie evidence of the Bidder's full compliance with the requirements of this section.

**1.06.1 Conditions Shown on the Contract Documents:** Information as to underground conditions, as-built conditions, or other conditions or obstructions, indicated in the Contract Documents has been obtained with reasonable care, and has been recorded in good faith. However, District only warrants, and Contractor may only rely on, the accuracy of limited type of information as set forth herein.

(a) As to above-ground conditions or as-built conditions shown or indicated in the Contract Documents, there is no warranty, express or implied, or any representation express or implied, that such information is correctly shown or indicated. This information is verifiable by independent investigation and Contractor is required to make such verification as a condition to bidding. In submitting its Bid, Contractor shall rely on the results of its own independent investigation. In submitting its Bid, Contractor shall not rely on District-supplied information regarding above ground conditions or as-built conditions.

(b) As to any subsurface condition shown or indicated in the Contract Documents, Contractor may rely only upon the general accuracy of actual reported depths, actual reported character of materials, actual reported soil types, actual reported water conditions, or actual obstructions shown or indicated. District is not responsible for the completeness of such information for bidding or construction; nor is District responsible in any way for any conclusions or opinions of Contractor drawn from such information; nor is the District responsible for subsurface conditions that are not specifically shown (for example, District is not responsible for soil conditions in areas contiguous to areas where a subsurface condition is shown).

**1.06.2 Conditions Shown in Reports and Drawings Supplied for Information Purposes:** Any reports of explorations or tests of subsurface conditions at or contiguous to the Site that have been utilized by Architect in preparing the Contract Documents are not Contract Documents and, except for any “technical” data regarding subsurface conditions specifically identified in such reports and underground facilities data, Contractor may not in any manner rely on the information in these reports and drawings. Subject to the foregoing, Contractor must make its own independent investigation of all conditions affecting the Work and must not rely on information provided by District.

**1.06.3 Site Investigation.** Each Bidder shall complete the tasks listed below as a condition to bidding, and submission of a Bid shall constitute the Bidder’s express representation to District that Bidder has fully completed the following:

(a) Bidder has visited the Site and has examined thoroughly and understood the nature and extent of the Contract Documents, Work, Site, locality, actual conditions, as built conditions, and all local conditions and federal state and local laws, and regulations that in any manner may affect cost, progress, performance, or furnishing of Work or that relate to any aspect of the means, methods, techniques, sequences, or procedures of construction to be employed by Bidder and safety precautions and programs incident thereto;

(b) Bidder has conducted or obtained and has understood all examinations, investigations, explorations, tests, reports, and studies that pertain to the subsurface conditions, as built conditions, underground facilities, and all other physical conditions at or contiguous to the Site or otherwise that may affect the cost, progress, performance, or furnishing of Work, as Bidder considers necessary for the performance or furnishing of Work at the Contract Price, within the Contract Time, and in accordance with the other terms and conditions of the Contract Documents, including specifically the provisions of the General Conditions; and no additional examinations, investigations, explorations, tests, reports, studies, or similar information or data are or will be required by Bidder for such purposes;

(c) Bidder has correlated its knowledge and the results of all such observations, examinations, investigations, explorations, test, reports, and studies with the terms and conditions of the Contract Documents;

(d) Bidder has given the District prompt written notice of all conflicts, errors, ambiguities, or discrepancies that it has discovered in or among the Contract Documents and actual conditions (at least seven (7) calendar days prior to bid date and time), and the written resolution thereof by the District is acceptable to Bidder; and

(e) Bidder has made a complete disclosure in writing to the District of all facts bearing upon any possible interest, direct or indirect, that Bidder believes any representative of the District or other officer or employee of the District presently has or will have in this Contract or in the performance thereof or in any portion of the profits thereof.

**1.07 Withdrawal of Bid Proposal.** Any Bidder may withdraw its Bid Proposal without penalty by written request received by the District prior to the scheduled closing time for the receipt of Bid Proposals. Requests for withdrawal of bid proposals after scheduled closing time shall be in accordance with Public Contract Code §§5100 et seq.

**1.08 Documents Required Upon Award of Contract.** The Agreement which the successful Bidder, as Contractor, will be required to execute along with the other documents which will be required to be furnished are included in the Contract Documents and shall be carefully examined by the Bidder.

**1.09 Interpretation of Drawings, Specifications or Contract Documents.** Any Bidder in doubt as to the true meaning of any part of the Contract Documents or who finds discrepancies, errors or omissions therein; or who finds variances in any of the Contract Documents with applicable rules, regulations, ordinances and/or laws, may submit to the District a written request for an interpretation or correction thereof. It is the sole and exclusive responsibility of the Bidder to submit such request not less than **Seven (7) calendar days** prior to the scheduled closing for the receipt of Bid Proposals. Interpretations or corrections of the Contract Documents will be by written addendum



issued by the Architect/District, a copy of which will be sent to each Bidder who attends the mandatory pre-bid job walk. No person is authorized to render an oral interpretation or correction of any portion of the Contract Documents to any Bidder, and no Bidder is authorized to rely on any such oral interpretation or correction. Failure to request interpretation or clarification of any portion of the Contract Documents pursuant to the foregoing is a waiver of any discrepancy, defect or conflict therein.

- 1.10 Request for Substitutions Prior to Bid Opening.** Any Bidder may submit Request(s) for Substitution on the form provided herein, together with all substantiating data, no later than **Seven (7) Calendar days** prior to the scheduled closing time for receipt of the Bid Proposals, in accordance with Public Contract Code §3400. The District shall use its best efforts to consider and act upon such Request for Substitution in a timely fashion. Actions taken, if any, concerning the Request for Substitution will be by written addendum issued by the Architect/District, a copy of which will be sent to each Bidder who attends the mandatory pre-bid job walk. In the absence of written addendum, the Request for Substitution shall be deemed denied for purposes of the District's evaluation of the Bid Proposals and award of the Contract.
- 1.11 District's Right to Modify Contract Documents.** Before the scheduled closing time for receipt of Bid Proposals, the District may modify the Work, the Contract Documents, or any portion(s) thereof by the issuance of written addenda disseminated to all Bidders who have attended the mandatory pre-bid job walk. If the District issues any addenda, the failure of any Bidder to acknowledge such addenda in its Bid Proposal may render the Bid Proposal non-responsive.
- 1.12 Bidders Interested in More Than One Bid Proposal.** No person, firm, corporation or other entity shall submit or be interested in more than one Bid Proposal for the same Work; provided, however, that a person, firm or corporation that has submitted a sub-proposal to a Bidder or who has quoted prices for materials to a Bidder is not thereby disqualified from submitting a sub-proposal, quoting prices to other Bidders or submitting a Bid Proposal for the proposed Work to the District.
- 1.13 Bidder's Qualifications.** Each Bidder shall submit with its Bid Proposal a Statement of Bidder's Qualifications which is included within the Contract Documents. All information required by the Statement of Bidder's Qualifications shall be completely and fully provided. Any Bid Proposal not accompanied by the Statement of Bidder's Qualifications completed with all information required and bearing the signature of the Bidder's duly authorized representative under penalty of perjury will render the Bid Proposal non-responsive and rejected. If the District determines that any information provided by a Bidder in the Statement of Bidder's Qualifications is false or misleading, or is incomplete so as to be false or misleading, the District may reject the Bid Proposal submitted by such Bidder as being non-responsive.

**A qualified bidder must have successfully completed at least Two (2)**

**post-tensioned multi story parking structures within the past five (5) years. Failure to meet these minimum qualifications will be cause for a non-responsive proposal.**

#### **1.14 Award of Contract**

- A. Waiver of Irregularities or Informalities.** The District reserves the right to reject any and all Bid Proposals or to waive any irregularities or informalities in any Bid Proposal or in the bidding.
- B. Award to Lowest Responsive Responsible Bidder.** The award of the Contract, if any, will be to the responsible Bidder submitting the lowest responsive Bid Proposal on the basis of the Base Bid Proposal or the Base Bid Proposal and Alternate Bid Items, if any, selected in accordance with these Instructions for Bidders.
- C. Selection of Alternate Bid Items; Basis of Award of Contract.** The selection of Bid Alternates for determination of the lowest Bid Proposal will be based upon the Base Bid Proposal alone or a combination of the Base Bid Proposal and one or more Bid Alternates as selected by the District in accordance with the following “blind bidding” procedures. After opening timely submitted Bid Proposals and before the public reading of the Bid Proposals, District staff who will not be engaged in the selection of Bid Alternates (“Clerical Staff”) will assign each Bidder an alphabetical letter for identification purposes. The Clerical Staff will mask all portions of the Bid Proposal and other documents submitted with Bid Proposals so that the identity of each Bidder and each listed subcontractor is not revealed. The Clerical Staff will maintain a list (“Bidders List”) which identifies each Bidder’s name and a corresponding alphabetical letter assigned to each Bidder. After completing the Bidders List, the Clerical Staff will publicly read the Bid Proposal amounts of each Bidder for the Base Bid as well as each Bid Alternate. In this public reading, Bidders will not be identified by name, only by alphabetical letter assigned to each Bidder. After the public reading of Bid Proposals, the Clerical Staff will provide the Project Manager, Architect and District staff responsible for selection of Bid Alternates (“Review Team”) copies of the Bid Proposals with the identities of Bidders and listed subcontractors masked. Bid Proposals reviewed by the Review Team will identify Bidders only by alphabetical letters. At such time as the Review Team has completed its review of the Bid Proposals, has selected Bid Alternates and has determined which Bidder (by the alphabetical letter designation assigned by Clerical Staff) has submitted the lowest Bid Proposal based upon the Base Bid and any combination of the Bid Alternates as determined by the Review Team, the Clerical Staff will make available to the Review Team the Bidders List so that the identity of the Bidder to be awarded the Contract can be identified. Until such time as the Review Team has completed review of Bid Proposals and determination of which Bidder has submitted the lowest responsive Bid Proposal, there will be no communication between

members of the Clerical Staff and members of the Review Team regarding the identities of Bidders or listed subcontractors or any disclosure of any portion of the Bidders List.

- D. Alternate Bid Items Not Included in Award of Contract.** During performance of the Work, it is the District's option to add or delete from the scope of the Work Alternate Bid Items that were not included in the award of Contract. District may elect to have work done at price(s) set forth in the Alternate Bid Items Proposal.
- E. Responsive Bid Proposal.** A responsive Bid Proposal shall mean a Bid Proposal which conforms, in all material respects, to the Bid and Contract Documents.
- F. Responsible Bidder.** A responsible Bidder is a Bidder who has the capability in all respects to perform fully the requirements of the Contract Documents and the moral and business integrity and reliability that will assure good faith performance. In determining responsibility, the following criteria will be considered: (i) the ability, capacity and skill of the Bidder to perform the Work of the Contract Documents **with a history of successfully completion of at least two (2) post tensioned multistory parking structures within the most recent Five (5) years** ; (ii) whether the Bidder can perform the Work promptly and within the time specified, without delay or interference; (iii) the character, integrity, reputation, judgment, experience and efficiency of the Bidder; (iv) the quality of performance of the Bidder on previous **post tensioned parking structure** contracts, by way of example only, the following information will be considered: (a) the administrative, consultant or other cost overruns incurred by the District/owner on previous contracts with the Bidder; (b) the Bidder's compliance record with **safety**, contract general conditions **and labor compliance** on other projects; (c) the submittal by the Bidder of excessive and/or unsubstantiated extra cost proposals and claims on other projects; (d) the Bidder's record for completion of work within the contract time and the Bidder's compliance with the scheduling and coordination requirements on other projects; (e) the Bidder's demonstrated cooperation with the District/Owner and other contractors on previous contracts; (f) whether the work performed and materials furnished on previous contracts was in accordance with the Contract Documents; (v) the previous and existing compliance by the Bidder with laws and ordinances relating to contracts; (vi) the sufficiency of the financial resources and ability of the Bidder to perform the work of the Contract Documents; (vii) the quality, availability and adaptability of the goods or services to the particular use required; (viii) the ability of the Bidder to provide future maintenance and service for the warranty period of the Contract; (ix) whether the Bidder is in arrears on debt or contract or is a defaulter on any surety bond; (x) such other information as may be secured by the District having a bearing on the decision to award the Contract, to include without limitation the ability, experience and commitment of the Bidder to properly and reasonably plan, schedule, coordinate and execute the Work of the Contract Documents and whether the Bidder has ever been debarred

from bidding or found ineligible for bidding on any other projects. The ability of a Bidder to provide the required bonds will not of itself demonstrate responsibility of the Bidder. Upon request of the District, Bidder must promptly submit satisfactory evidence of any of the items listed above.

### **1.15 Subcontractors**

- A. Designation of Subcontractors; Subcontractors List.** Each Bidder shall submit a list of its proposed Subcontractors for the proposed Work as required by the Subletting and Subcontracting Fair Practices Act (California Public Contract Code §§4100 et seq.) on the form furnished (Section 00215). The District **will** request that one or more apparent low Bidders provide to the District within twenty four (24) hours of bid opening the license numbers and value of work for each listed subcontractor submitted by Bidder. Any Bidder's failure to comply with the District's request may deem such Bidder's bid non-responsive and subject to rejection by the District.
- B. Work of Subcontractors.** The organization or arrangements of the Specifications and Drawings shall not limit the extent of the Work of the Contract Documents. Accordingly, all Bidders are required to disseminate all of the Specifications, Drawings and other Contract Documents to all persons or entities submitting sub-bids to the Bidder. The omission of any portion or item of Work from the Bid Proposal or from the sub-bidders' sub-bids which is reasonably inferable from the Contract Documents is not a basis for adjustment of the Contract Price or the Contract Time.

**1.16 Workers' Compensation Insurance.** Pursuant to California Labor Code §3700, the successful Bidder shall secure Workers' Compensation Insurance for its employees engaged in the Work of the Contract. The successful bidder shall sign and deliver to the District the Workers Compensation Insurance certificate provided in Section 00415 prior to performing any of the Work under the Contract.

**1.17 Bid Security Return.** The Bid Security of three or more low Bidders, the number being solely at the discretion of the District, will be held by the District for ten (10) days after the period for which Bid Proposals must be held open (which is set forth in the Call for Bids) or until posting by the successful Bidder(s) of the bonds, certificates of insurance required and return of executed copies of the Agreement, whichever first occurs, at which time the Bid Security will be returned to them.

**1.18 Forfeiture of Bid Security.** If the Bidder awarded the Contract fails or refuses to execute the Agreement within seven (7) days from the date of receiving notification that it is the Bidder to whom the Contract has been awarded, the District may declare the Bidder's Bid Security forfeited as damages caused by the failure of the Bidder to enter into the Contract and may thereupon award the Contract for the Work to the responsible

Bidder submitting the next lowest responsive Bid Proposal or may call for new bids, in District's sole and exclusive discretion.

**1.19 Contractor's License.** No Bid Proposal will be considered from a Bidder who, at the time Bid Proposals are opened, is not licensed to perform the Work of the Contract Documents, in accordance with the Contractors License Law, California Business & Professions Code §§7000 et seq. This requirement is not a mere formality and cannot be waived by the District or its Board of Trustees. The required California Contractor's License classification(s) for the Work is set forth in the Call for Bids. The Contractor will be required to maintain the license(s) through the duration of the Contract. Any questions concerning a Contractor may be referred to the Registrar, Contractors' State License Board, P.O. Box 2600, Sacramento, CA 95826.

**1.20 Anti-Discrimination.** It is the policy of the District that there be no discrimination against any prospective or active employee engaged in the Work because of race, color, ancestry, national origin, religious creed, sex, age or marital status. All Bidders agree to comply with the District's anti-discrimination policy and all applicable Federal and California anti-discrimination laws including but not limited to the California Fair Employment & Housing Act beginning with California Government Code §§12940 et seq. and California Labor Code §1735. In addition, all Bidders agree to require like compliance by any Subcontractor employed by them on the Work of the Contract.

**1.21 Job-Walk**

**A. District Conduct of Job-Walk.** The District will conduct a Job Walk at the time and place designated in the Call for Bids. Regardless of whether the Job Walk is or is not designated as being mandatory, the District may, in its sole and exclusive discretion, elect to conduct one or more Job Walks in addition to that set forth in the Call for Bids, in which event the District shall notify all Bidders who have obtained the Contract Documents pursuant to the Call for Bids of any such additional Job Walk. If the District elects to conduct any Job Walk in addition to that set forth in the Call for Bids, the District shall, in its notice of any such additional Job Walks, indicate whether Bidders' attendance at such additional Job-Walks is/are mandatory; in the event that any such additional Job-Walks is/are designated as being mandatory, the provisions of this section 1.21 shall be deemed to apply to such additional Job-Walks.

**B. Mandatory Job Walk.** If the Job Walk is designated in the Call for Bids as being mandatory, the failure of any Bidder to have its authorized representative present **and registered** at the **beginning of** the Job Walk will be grounds for the District to reject such bid and the Bid Proposal will be returned to the Bidder unopened. Where the Job Walk is mandatory, a Bidder may have more than one authorized representative and/or representatives of its Subcontractors present at the Job Walk; provided, however that attendance by representatives of the Bidder's Subcontractors without attendance by a representative of the Bidder shall not be sufficient to meet the Bidder's obligations

hereunder and will be grounds for the District to declare the Bid Proposal of such Bidder to be non-responsive.

- 1.22 Drug Free Workplace Certificate.** In accordance with California Government Code §§8350 et seq., the Drug Free Workplace Act of 1990, the successful Bidder will be required to execute a Drug Free Workplace Certificate concurrently with execution of the Agreement. The successful Bidder will be required to implement and take the affirmative measures outlined in such provisions. Failure of the successful Bidder to comply with the measures outlined in such provisions may result in penalties, including without limitation, the termination of the Agreement, the suspension of any payment of the Contract Price otherwise due under the Contract Documents and/or debarment of the successful Bidder.
- 1.23 Compliance with Immigration Reform and Control Act of 1986.** The Bidder is solely and exclusively responsible for employment of individuals for the Work of the Contract in conformity with the Immigration Reform and Control Act of 1986, 8 USC §§1101 et seq. (“IRCA”); the successful Bidder shall also require that any person or entity employing labor in connection with any of the Work of the Contract shall so similarly comply with the IRCA.
- 1.24 Notice of Intent to Award Contract.** Following the public opening and reading of Bid Proposals, the District will issue a Notice of Intent to Award **or not Award** the Contract, If Intent to Award, the Bidder to whom the District intends to award the Contract will be identified, and the date/time/place of the District’s Board of Trustees meeting at which award of the Contract will be considered.
- 1.25 Bid Protest.** Any Bidder submitting a Bid Proposal to the District may file a protest of the District’s intent to award the Contract provided that each and all of the following are complied with:
- A.** The bid protest is in writing;
  - B.** The bid protest is filed and received by the District’s Director of Facilities not more than five (5) calendar days following the date of issuance of the District’s Notice of Intent to Award the Contract; and
  - C.** The written bid protest sets forth, in detail, all grounds for the bid protest, including without limitation all facts, supporting documentation, legal authorities and argument in support of the grounds for the bid protest; any matters not set forth in the written bid protest shall be deemed waived. All factual contentions must be supported by competent, admissible and creditable evidence.

Any bid protest not conforming to the foregoing shall be rejected by the District as invalid. Provided that a bid protest is filed in strict conformity with the foregoing, the District’s Director of Facilities or designee, shall review and

evaluate the basis of the bid protest. The District's Director of Facilities or designee shall provide the Bidder submitting the bid protest with a written statement concurring with or denying the bid protest. The District's Board of Trustees will render a final determination and disposition of a bid protest by taking action to adopt, modify or reject the disposition of a bid protest as reflected in the written statement of the District's Director of Facilities or designee. Action by the District's Board of Trustees relative to a bid protest shall be final and not subject to appeal or reconsideration by the District, any employee or officer of the District or the District's Board of Trustees. The issuance of a written statement by the Director of Facilities (or designee) and subsequent action by the District's Board of Trustees shall be express conditions precedent to the institution of any legal or equitable proceedings relative to the bidding process, the District's intent to award the Contract, the District's disposition of any bid protest or the District's decision to reject all Bid Proposals. In the event that any such legal or equitable proceedings are instituted and the District is named as a party thereto, the prevailing party(ies) shall recover from the other party(ies), as costs, all attorneys' fees and costs incurred in connection with any such proceeding, including any appeal arising therefrom.

**1.26.1 Public Records.** All documents included in Bid Proposals become the exclusive property of the District upon submittal to the District. All Bid Proposals and other documents submitted in response to the Call for Bids become a matter of public record, except for information contained in such Bid Proposals deemed to be Trade Secrets (as defined in California Civil Code §3426.1). ). Financial documents submitted in support of a Bidder's Statement of Qualifications will not be disclosed by the District nor become a matter of public record pursuant to California Government Code §6255. However, a Bidder that indiscriminately marks all or most of its Bid Proposal as exempt from disclosure as a public record, whether by the notations of "Trade Secret," "Confidential," "Proprietary," or otherwise, may render the Bid Proposal non-responsive and rejected. The District is not liable or responsible for the disclosure of such records, including those exempt from disclosure if disclosure is deemed required by law, by an order of Court, or which occurs through inadvertence, mistake or negligence on the part of the District or its officers, employees or agents. At such time as Bid Proposals are deemed a matter of public record, pursuant to the above, any Bidder or other party shall be afforded access for inspection and/or copying of such Bid Proposals, by request made to the District in conformity with the California Access to Public Records Act, California Government Code §§6250, et. seq.

### **1.30 Prevailing Wage Rates, Employment of Apprentices and Labor Compliance Program.**

**A. Payment of Prevailing Wage Rates.** The Bidder and all potential Subcontractors shall utilize the relevant prevailing wage rate determinations in the PREVAILING WAGE SCALE established by the Director of the Department of Industrial Relations in effect on the first advertisement date of the Notice to

Contractors Calling For Bids in preparing the Bid Proposal and all component price quotations. Pursuant to Labor Code §1773.2, copies of these determinations are maintained at the District's Capital Planning, Design and Construction office, 103 Durley Ave, Camarillo, CA 93010, and are available to any interested party upon request. Copies of rate schedules are also available on the Internet at [http://www.dir.ca.gov/DIR/S&R/statistics\\_research.html](http://www.dir.ca.gov/DIR/S&R/statistics_research.html).

- B. Apprenticeship Committee Contract Award Information.** Pursuant to Labor Code §1777.5 and Title 8 California Code of Regulations §230, the Contractor and Subcontractors of any tier who are not already approved to train by an apprenticeship program sponsor shall, within ten (10) calendar days of signing the Contract or Subcontract, as applicable, but in any event prior to the first day in which the Contractor or Subcontractor has workers employed on the Project, submit the Public Works Contract Award Information form (DAS form 140 included in Section 00900 of the Contract Specifications) to the appropriate local apprenticeship committees whose geographic area of operation include the area of the Project and who can supply apprentices to the Project. Contractors and Subcontractors must also submit a copy of the forms to the District.
- C. Statement of Employer Fringe Benefit Payments.** Within five (5) calendar days of signing the Contract or Subcontract, as applicable, the Statement of Employer Payments (DSLE Form PW 26 included in Section 00900 of the Specifications) must be completed and submitted to the District by each Contractor and Subcontractor of any tier who pays benefits to a third party trust, plan or fund for health and welfare benefits, vacation funds or makes pension contributions. The form must contain, for each worker classification, the fund or trust name, address, administrator, and amount per hour contributed and frequency of contributions. Training fund contributions must also be reported on this form. See Article 4.21.9 of the Contract General Conditions.
- C. Notice to Subcontractors.** Bidders shall notify all potential Subcontractors submitting price quotations for portions of the Work of the requirements concerning payment of prevailing wage rates, payroll records, hours of work, employment of apprentices and the District's LCP requirements and enforcement procedures set forth in Article 4.21 of Section 00700 (General Conditions) and Section 00900 of the Contract Specifications.

*[End of Section]*



**SECTION 00210  
BID PROPOSAL**

**TO:** **VENTURA COUNTY COMMUNITY COLLEGE DISTRICT**, a California Community College District, acting by and through its Board of Trustees ("District"), 255 W. Stanley Ave., Suite 150, Ventura CA, 93001, Phone: 805-652-5500 | Fax: 805-652-7700

**FROM:** \_\_\_\_\_

(Name of Bidder - as listed on license)

\_\_\_\_\_  
(Address)

\_\_\_\_\_  
(City, State, Zip Code)

\_\_\_\_\_  
(Telephone)

\_\_\_\_\_  
(Fax)

\_\_\_\_\_  
(Name(s) of Bidder's Authorized Representative(s) & Title)

**1.01 Bid Proposal**

**A. Bid Proposal Amount**

Pursuant to and in compliance with the Notice to Contractors Calling for Bids, the Instructions for Bidders and the other documents relating thereto, the undersigned Bidder, having reviewed the Instructions for Bidders and all other Contract Documents and upon compliance with all requirements therein with reference to the submittal of this Bid Proposal, hereby proposes and agrees to perform the Contract including, without limitation, all of its component parts; to perform everything required to be performed; to provide and furnish any and all of the labor, materials, tools, equipment, applicable taxes, and services necessary to perform the work of the Contract in strict compliance with the Contract Documents and complete in a workmanlike manner all of the Work required for the Project described as:

**Moorpark College PARKING STRUCTURE, VCCCD Project #19125** for the sum of:

**Base Bid Amount:**

\$ \_\_\_\_\_

(Bid amount in figures)

\_\_\_\_\_ Dollars

(Total bid amount in words)

**B. Acknowledgment of Bid Addenda**

In submitting this Bid Proposal, the undersigned Bidder acknowledges receipt of all Bid Addenda issued by or on behalf of the District, as set forth below. The Bidder confirms that this Bid Proposal incorporates and is inclusive of, all items or other matters contained in Bid Addenda.

\_\_\_\_\_ **No Addenda Issued**  
(initial)

\_\_\_\_\_ **Addenda Nos. \_\_\_\_\_ received, acknowledged and**  
(initial)  
**incorporated into this Bid Proposal.**

**C. Alternate Bid Items.** N/A ~~The Bidder's price proposal(s) for Alternate Bid Items is/are set forth in the form of Alternate Bid Item Proposal included herewith. The Bidder acknowledges that the award of the Contract, if at all, shall be in accordance with the Instructions for Bidders.~~

**D. Bid Proposal.** Contractor acknowledges that Contractor has reviewed Section 00010 Notice to Contractors Calling for Bids Section 1.07 Contract Time, and Contractor has included all costs associated with this Bid spread over said Contract Time.

\_\_\_\_\_ Yes

\_\_\_\_\_ No

*Note: If Contractor's answer is NO, or if both YES and NO answers are left blank, this bid is automatically rejected.*

**E. Onsite Personnel.** Contractor acknowledges that Contractor shall provide as a minimum the following personnel to manage and coordinate this project: Project Manager – Full Time, Superintendent – Full Time, Project Engineer These personnel shall be in addition to any other personnel the Contractor may consider necessary for the Contractor's on-site and/or office operations.

\_\_\_\_\_ Yes

\_\_\_\_\_ No

*Note: If Contractor's answer is NO, or if both YES and NO answers are left blank, this bid is automatically rejected.*

**F. Subcontractor Payment and Performance Bonds.** Contractor acknowledges that Contractor has complied with the requirements of Public Contract Code Section 4108 pertaining to payment and performance bonds for subbids of \$50,000 or more. (See Article 6.10 of the Contract General Conditions.)

\_\_\_\_\_ Yes

\_\_\_\_\_ No

*Note: If Contractor's answer is NO, or if both YES and NO answers are left blank,, this BID IS AUTOMATICALLY REJECTED.*

**G. Bidder's Qualifications.** Contractor acknowledges that Contractor has completed at least two (2) Post tensioned Multi-Story parking structure projects in the past five (5) years.

\_\_\_\_\_ Yes

\_\_\_\_\_ No

*Note: If Contractor's answer is NO, or if both YES and NO answers are left blank, this*

*BID IS AUTOMATICALLY REJECTED.*

**1.02 Rejection of Bid; Holding Open of Bid**

It is understood that the District reserves the right to reject this Bid Proposal and that this Bid Proposal shall remain open and not be withdrawn for the period of time specified in the Call for Bids, except as provided by law.

**1.03 Documents Comprising Bid Proposal**

The undersigned Bidder has submitted as its Bid Proposal the following:

1. Bid Proposal (00210);
2. List of Subcontractors (00215);
3. Non-Collusion Affidavit (00220);
4. Statement of Bidder's Qualifications (00240); and
5. Bid Security (Cash, Cashier's Check, Certified Check or Bid Bond – 00260).

The Bidder acknowledges that if this Bid Proposal and the foregoing documents are not fully in compliance with applicable requirements set forth in the Call for Bids, the Instructions for Bidders and in each of the foregoing documents, the Bid Proposal may be rejected as non-responsive.

**1.04 Award of Contract**

It is understood and agreed that if written notice of the acceptance of this Bid Proposal and award of the Contract thereon is mailed or delivered by the District to the undersigned after the opening of Bid Proposals and within the time this Bid Proposal is required to remain open or at any time thereafter before this Bid Proposal is withdrawn, the undersigned will execute and deliver to the District the Agreement in the form attached hereto in accordance with the Bid Proposal as accepted within seven (7) calendar days after notification of acceptance and award. Concurrently with delivery of the executed Agreement to the District, the Bidder awarded the Contract shall deliver to the District: (1) the Labor and Material Payment Bond; (2) the Performance Bond; (3) the Drug-Free Workplace Certificate; (4) Certificates of Insurance evidencing all insurance coverages required to be provided under the Contract Documents; and (5) the Certificate of Workers' Compensation Insurance. The Work under the Contract Documents shall be commenced by the undersigned Bidder, if awarded the Contract, on the date stated in the District's Notice to Proceed issued pursuant to the Contract Documents. Completion of the Work shall be achieved within the Contract Time specified in the Contract Documents.

**1.05 Notices**

All notices or other correspondence shall be addressed to the District and the Bidder at their respective addresses set forth herein. Notices shall be effective only if in writing and in conformity with the requirements for service of notices set forth in the Contract Documents.

**1.06 Contractor's License**

The undersigned Bidder is currently and duly licensed in accordance with the California

Contractors License Law, California Business & Professions Code §§7000 et seq., under the following:

License Number: \_\_\_\_\_  
Class \_\_\_\_\_ Expiration Date \_\_\_\_\_ Class \_\_\_\_\_ Expiration Date \_\_\_\_\_  
Class \_\_\_\_\_ Expiration Date \_\_\_\_\_ Class \_\_\_\_\_ Expiration Date \_\_\_\_\_

By executing this Bid Proposal, the Bidder hereby certifies that: (a) it is duly licensed, in the necessary class(es), for performing the Work of the Contract Documents; (b) that such license shall be in full force and effect throughout the duration of the performance of the Work under the Contract Documents; and (c) that all Subcontractors providing or performing any portion of the Work of the Contract Documents shall be so similarly and appropriately licensed to perform or provide such portion of the Work.

**1.07 Designation of Subcontractors**

In compliance with the Subletting and Subcontracting Fair Practices Act (California Public Contract Code §§4100, et seq.) and amendments thereof, each Bidder shall set forth in the Subcontractors List: (a) the name and location of the place of business of each Subcontractor who will perform work or labor or render services to the Bidder in or about the construction of the Work to be performed under the Contract Documents in an amount in excess of one-half of one percent (0.5%) of the Bidder's Bid Proposal; and (b) the trade and/or portion of the Work which will be performed by each listed Subcontractor. The Bidder shall list only one Subcontractor for each trade and/or portion of the Work as is defined by the Bidder in its Bid Proposal. If a Bidder fails to list a Subcontractor for a portion of the work in excess of one-half of one percent (0.5%) of the Bidder's Bid Proposal or if the Bidder specifies more than one Subcontractor for the same portion of Work to be performed under the Contract Documents valued in excess of one-half of one percent (0.5%) of the Bidder's Bid Proposal amount, the Bidder shall be deemed to have agreed that it is fully qualified to perform that portion of the Work itself and that it shall perform that portion of the Work.

**1.08 Confirmation of Figures**

By submitting this Bid Proposal, the Bidder confirms that it has checked all of the above figures and understands that neither the District nor any of its agents, employees or representatives shall be responsible for any errors or omissions on the part of the undersigned Bidder in preparing and submitting this Bid Proposal.

**1.09 Acknowledgment and Confirmation**

The undersigned Bidder acknowledges its receipt, review and understanding of the Drawings, the Specifications and other Contract Documents pertaining to the proposed Work. The undersigned Bidder certifies that the Contract Documents are, in its opinion, adequate, feasible and complete for providing, performing and constructing the Work in a sound and suitable manner for the use specified and intended by the Contract Documents. The undersigned Bidder certifies that it has, or has available, all necessary equipment, personnel, materials, facilities and technical and financial ability to complete the Work for the amount bid herein within the Contract Time and in accordance with the Contract Documents. The undersigned Bidder

certifies that its bid amount includes funds sufficient to allow the Bidder to comply with all applicable local, state and federal laws and regulations governing the labor and services to be provided for the performance of the Work of the Contract and shall indemnify, defend and hold District harmless from and against any and all claims, demands, losses, liabilities and damages arising out of or relating to Bidder's failure to comply with applicable law in this regard.

**THE UNDERSIGNED DECLARES UNDER PENALTY OF PERJURY UNDER THE LAWS OF THE STATE OF CALIFORNIA THAT THE REPRESENTATIONS MADE IN THIS BID PROPOSAL ARE TRUE AND CORRECT.**

*(Corporate Seal)*

By: \_\_\_\_\_  
*(Signature)*

\_\_\_\_\_  
*(Typed or Printed Name of Bidder's Authorized Representative)*

Title: \_\_\_\_\_



**SECTION 00215  
LIST OF SUBCONTRACTORS**

1. Licensed Name of Subcontractor	2. Address of Office, Mill or Shop	3. Trade or Portion of Work	4. License No. <small>Fill out ONLY if requested by District</small>	5. \$ Value of Work <small>Fill out ONLY if requested by District</small>
			<small>Fill out ONLY if requested by District</small>	<small>Fill out ONLY if requested by District</small>
			<small>Fill out ONLY if requested by District</small>	<small>Fill out ONLY if requested by District</small>
			<small>Fill out ONLY if requested by District</small>	<small>Fill out ONLY if requested by District</small>
			<small>Fill out ONLY if requested by District</small>	<small>Fill out ONLY if requested by District</small>
			<small>Fill out ONLY if requested by District</small>	<small>Fill out ONLY if requested by District</small>
			<small>Fill out ONLY if requested by District</small>	<small>Fill out ONLY if requested by District</small>
			<small>Fill out ONLY if requested by District</small>	<small>Fill out ONLY if requested by District</small>

**Name of Bidder:** \_\_\_\_\_ **Authorized Signature:** \_\_\_\_\_

[Duplicate and attach additional page(s) as required.]





**SECTION 00220  
NON-COLLUSION AFFIDAVIT**

STATE OF CALIFORNIA, COUNTY OF \_\_\_\_\_

I, \_\_\_\_\_ being first duly sworn, depose and say that I am  
*(Typed or Printed Name)*  
the \_\_\_\_\_ of \_\_\_\_\_,  
*(Title)* *(Bidder Name)*

the party submitting the foregoing Bid Proposal (the "Bidder"). In connection with the foregoing Bid Proposal, the undersigned declares, states and certifies that:

- 1.01 The Bid Proposal is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization or corporation.
- 1.02 The Bid Proposal is genuine and not collusive or sham.
- 1.03 The Bidder has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any other bidder or anyone else to put in sham bid, or to refrain from bidding.
- 1.04 The Bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price, or that of any other bidder, or to fix any overhead, profit or cost element of the bid price or that of any other bidder, or to secure any advantage against the public body awarding the contract or of anyone interested in the proposed contract.
- 1.05 All statements contained in the Bid Proposal and related documents are true.
- 1.06 The Bidder has not, directly or indirectly, submitted the bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any person, corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

Executed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_ at \_\_\_\_\_  
*(City, County and State)*

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct.

\_\_\_\_\_  
*Signature*

\_\_\_\_\_  
*Address*

\_\_\_\_\_  
*Name Printed or Typed*

\_\_\_\_\_  
*City, County and State*

( \_\_\_\_\_ )  
*Area Code and Telephone Number*



**SECTION 00240  
STATEMENT OF BIDDER'S QUALIFICATIONS**

**1.01 Bidder's Organization**

- A. Form of entity of Bidder, i.e, corporation, partnership, etc. \_\_\_\_\_
1. If a corporation, state the following: \_\_\_\_\_  
State of Incorporation: \_\_\_\_\_  
Date of Incorporation: \_\_\_\_\_  
President/Chief Executive Officer: \_\_\_\_\_  
Secretary: \_\_\_\_\_  
Treasurer/Chief Financial Officer: \_\_\_\_\_
2. If a partnership, state the following:  
Date of Organization: \_\_\_\_\_  
Type of Partnership (general, limited): \_\_\_\_\_  
Names of all general partners; if any of the general partners are not natural persons, provide the information for each such general partner requested by Paragraphs 1.01.A.1, 1.01.A.2 and 1.01.A.4 as appropriate: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
3. If a proprietorship, state the following:  
Names of all proprietors: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
4. If a joint venture, state the following: \_\_\_\_\_  
Date of organization: \_\_\_\_\_  
Names of all Joint Venture members. For each Joint Venture member, identify the form of entity and provide the information requested by Paragraphs 1.01.A.1, 1.01.A.2 and 1.01.1.C for each Joint Venture member as appropriate: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. Bidder's form of entity is other than listed above, describe the type of entity or organization and identify all principals or owners of equity in the entity or organization\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

B. Number of years your organization has been in business as a contractor: \_\_\_\_\_

C. Number of years your organization has conducted business under its present name: \_\_\_\_\_

1. If your organization has conducted business under a name or name style different than your organization's present name, identify all prior name(s) or name style(s):\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. For each name or name style identified in Paragraph 1.01.C.1, state the dates during which you conducted business under each name or style: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**1.02 Financial**

A. Attach a current (within the last 12 months) audited, reviewed or compiled Financial Statement for your organization prepared by a Certified Public Accountant licensed under the laws of the State of California utilizing generally accepted accounting practices applied in a consistent manner. The Financial Statement must include a current balance sheet and income statement showing: (i) current assets (i.e., cash, accounts receivable, accrued income, deposits, material inventory, etc.); (ii) net fixed assets; (iii) other assets; (iv) current liabilities (i.e., accounts payable, accrued salaries, accrued payroll taxes, etc.); and (v) other liabilities (i.e., capital, capital stock, earned surplus, retained earnings, etc.). Such financial documents will not be disclosed by the District nor become a matter of public record under the Trade Secret exception set forth in Civil Code §3426.1.

B. Is the attached Financial Statement for the identical organization as the Bidder? \_\_\_\_\_ Yes \_\_\_\_\_ No.

If not, explain the relationship and financial responsibility of the organization whose Financial Statement is provided (i.e., parent/subsidiary, etc.).

### 1.03 Licensing

A. California Contractors License:

License Number: \_\_\_\_\_

Expiration Date: \_\_\_\_\_

Responsible Managing Employee/Officer: \_\_\_\_\_

License Classification(s): \_\_\_\_\_

B. Has a claim or other demand ever been made against your organization's California Contractors License Bond? \_\_\_\_\_ Yes \_\_\_\_\_ No

If yes, on a separate attachment, state the following: (i) the name, address and telephone number of each person or entity making claim or demand; (ii) the date of each claim or demand; (iii) the circumstances giving rise to each such claim or demand; and (iv) the disposition of each such claim or demand.

C. Has a complaint ever been filed against your organization's California Contractors License with the California Contractors State License Board?  
\_\_\_\_\_ Yes \_\_\_\_\_ No

If yes, on a separate attachment, state the following for each complaint: (i) the name, address and telephone number of each person or entity making the complaint; (ii) the date of each complaint; (iii) the circumstances giving rise to each such complaint; and (iv) the disposition of each such complaint, including without limitation, any disciplinary or other action imposed or taken by the California Contractors State License Board as a result of any such complaint.

D. Attach to this Statement true and correct copies of the following:

1. Your organization's California Contractors License (the copy must clearly and legibly show: (i) the licensee name; (ii) the expiration date; (iii) the classification(s) of licensure).
2. The Contractors License Bond posted by your organization in connection with your California Contractors License pursuant to California Business & Professions Code §§7071.5 and 7071.6.
3. If your organization's California Contractors License is issued by virtue of the qualification of a responsible managing employee or responsible managing officer, the Qualifiers Bond if required pursuant to California Business & Professions Code §7071.9).

**1.04 Experience**

A. List the categories of work your organization typically performs with your own forces: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

B, List names & size (spaces) of Parking Structures completed within the past ten (10) years:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

C. List names and sizes of DSA projects completed within last Five (5) Years:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

D. Claims and lawsuits (if you answer yes to any of the following, you must attach details).

1. Have any lawsuits or other administrative, legal, arbitration or other proceedings, ever been brought or commenced against your organization or any of its principals, officers or equity owners in connection with any construction contract or construction project? \_\_\_\_\_ Yes \_\_\_\_\_ No

If so, describe the circumstances, the amount demanded or other relief demand and the disposition of each such lawsuit or other proceeding.

2. Has your organization ever filed a lawsuit or commenced other administrative, legal or other proceedings in connection with any construction contract or construction project? \_\_\_\_\_ Yes \_\_\_\_\_ No

If so, describe the circumstances, the amount demanded or other relief demand and the disposition of each such lawsuit or other proceeding.

3. Are there any judgments, orders, decrees or arbitration awards pending, outstanding against your organization or any of the officers, directors, employees or principals of your organization? \_\_\_\_\_ Yes \_\_\_\_\_ No

If so, describe each such judgment, order, decree or arbitration award and the present status of the satisfaction or discharge thereof.

**E.** On a separate attachment, list all construction projects your organization has in progress and for each project listed, state: (i) a general description of the work performed by your organization on the project; (ii) the dollar value of the work performed or to be performed by your organization; (iii) the owner's name, name of the owner's representative and the address and telephone number of the owner and the owner's representative; (iv) the project architect's name, address, telephone number and contact person; (v) percent presently complete; and (vi) the current scheduled completion date.

**F.** On a separate attachment, list all construction projects completed by your organization in the past five (5) years and for each project identified, state: (i) a general description of the work performed by your organization on the project; (ii) the dollar value of the work performed or to be performed by your organization; (iii) the owner's name, name of the owner's representative and the address and telephone number of the owner and the owner's representative; (iv) the project architect's name, address, telephone number and contact person; (v) percent presently complete; and (vi) the current scheduled completion date.

**G.** Has your organization ever refused to sign a contract awarded to it?  
\_\_\_\_\_ Yes \_\_\_\_\_ No

If so, on a separate attachment, state the following: (i) describe each such contract; (ii) the owner's name, address, telephone number and contact person; and (iii) the circumstances of your refusal to sign such contract.

**H.** Has your organization ever failed to complete a construction contract?  
\_\_\_\_\_ Yes \_\_\_\_\_ No

If so, on a separate attachment, state the following: (i) describe each such contract; (ii) the owner's name, address, telephone number and contact person; and (iii) the circumstances of your failure to complete such contract.

**I.** Has your organization ever been declared in default of a construction contract?  
\_\_\_\_\_ Yes \_\_\_\_\_ No

If so, on a separate attachment, state the following: (i) describe each such contract; (ii) the owner's name, address, telephone number and contact person; and (iii) the circumstances of each such declaration of default.

**J.** Has any construction contract to which your organization is a party been terminated for the convenience of the project owner? \_\_\_\_\_ Yes \_\_\_\_\_ No

If so, identify the project and project owner along with a description of the circumstances under which the convenience termination occurred.

**K.** Has a claim or other demand ever been asserted against any Bid Bond, Performance Bond, or Payment Bond posted by your organization in connection with any construction contract or your submittal of a bid proposal for a construction contract? \_\_\_\_\_ Yes \_\_\_\_\_ No

If so, on a separate attachment, state the following: (i) the name, address, telephone number and contact person for each claimant; (ii) the date upon which each such demand or claim was made; and (iii) the disposition of each such demand or claim.

**1.05 References** (include name, contact person, telephone/FAX and address for each reference provided)

**A.** Trade References (three (3) minimum) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**B.** Bank References \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**C.** Public Works Inspectors of Record \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**D.** Owner references (three (3) minimum, preferably California K-12 school districts and/or California community college districts) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**E.** Insurance Carriers (General Liability, Auto, and Workers' Compensation) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



F. Surety Firms (issuing your Bid, Performance and Payment Bonds) \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**1.06 Accuracy and Authority**

The undersigned is duly authorized to execute this Statement of Bidders Qualifications under penalty of perjury on behalf of the Bidder. The undersigned warrants and represents that he/she has personal knowledge of each of the responses to this Statement of Bidder's Qualifications and/or that he/she has conducted all necessary and appropriate inquiries to determine the truth, completeness and accuracy of responses to this Statement of Bidder's Qualifications.

The undersigned declares and certifies that the responses to this Statement of Bidder's Qualifications are complete and accurate; there are no omissions of material fact or information that render any response to be false or misleading and there are no misstatements of fact in any of the responses.

Executed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_ at \_\_\_\_\_.  
(City and State)

I declare under penalty of perjury under California law that the foregoing is true and correct.

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Typed or written name)

*[End of Section]*



**SECTION 00260  
BID BOND**

***KNOW ALL MEN BY THESE PRESENTS:***

That we, \_\_\_\_\_, as Principal, and \_\_\_\_\_, as Surety, are held and firmly bound, along with our respective heirs, executors, administrators, successors and assigns, jointly and severally, unto **VENTURA COUNTY COMMUNITY COLLEGE DISTRICT**, hereinafter "Obligee," for payment of the penal sum hereof in lawful money of the United States, as more particularly set forth herein.

**THE CONDITION OF THIS OBLIGATION IS SUCH THAT:**

WHEREAS, the Principal has submitted the accompanying Bid Proposal for the Work commonly described as Moorpark College Parking Structure and the Bid Proposal must be accompanied by Bid Security.

WHEREAS, subject to the terms of this Bond, the Surety is firmly bound unto the Obligee in the penal sum of **TEN PERCENT (10%)** of the maximum amount of the Bid Proposal submitted by the Principal to the Obligee, as set forth above, inclusive of additive alternate bid items, if any.

NOW, THEREFORE, if the Principal shall not withdraw said Bid Proposal within the period specified therein after the opening of the same, or, if no period be specified, for sixty (60) days after opening of said Bid Proposal; and if the Principal is awarded the Contract, and shall within the period specified therefore, or if no period be specified, within five (5) days after the prescribed forms are presented to him for signature, enter into a written contract with the Obligee, in accordance with the Bid Proposal as accepted, and give such bond(s) with good and sufficient surety or sureties, as may be required, for the faithful performance and proper fulfillment of such Contract and for the payment for labor and materials used for the performance of the Contract, or in the event of the withdrawal of said Bid Proposal within the period specified for the holding open of the Bid Proposal or the failure of the Principal to enter into such Contract and give such bonds within the time specified, if the Principal shall pay the Obligee the difference between the amount specified in said Bid Proposal and the amount for which the Obligee may procure the required Work and/or supplies, if the latter amount be in excess of the former, together with all costs incurred by the Obligee in again calling for Bids or otherwise procuring said Work or supplies, then the above obligation shall be void and of no effect, otherwise to remain in full force and effect.

Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or the Call for Bids, the Work to be performed thereunder, the Drawings or the Specifications accompanying the same, or any other portion of the Contract Documents shall in any way affect its obligations under this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of said Contract, the Call for Bids, the Work, the Drawings or the Specifications, or any other portion of the Contract Documents.

In the event that suit or other proceeding is brought upon this Bond by the Obligee, the Surety shall pay to the Obligee all costs, expenses and fees incurred by the Obligee in connection therewith, including without limitation, attorneys' fees.

IN WITNESS WHEREOF, the Principal and Surety have executed this instrument this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_ by their duly authorized agents or representatives.

**Bidder:**

*(corporate Seal)*

\_\_\_\_\_  
*(Principal's Name)*

By: \_\_\_\_\_

*(Signature)*

\_\_\_\_\_  
*(Typed or Printed Name & Title)*

\_\_\_\_\_  
*(Address)*

**Surety:**

*(Corporate Seal)*

\_\_\_\_\_  
*(Surety's Name)*

By: \_\_\_\_\_

*(Signature of Attorney-in-Fact for Surety)*

\_\_\_\_\_  
*(Typed or Printed Name)*

*(Attach Attorney-in-Fact Certificate)*

\_\_\_\_\_  
*(Address of Surety's Office where Bond is issued)*

\_\_\_\_\_  
*(Area Code and Telephone Number of Surety)*

**SECTION 00310  
AGREEMENT**

**Moorpark College Parking Structure  
VCCCD Project #19125**

**THIS AGREEMENT** is made this \_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, in the County of Ventura, State of California, by and between VENTURA COUNTY COMMUNITY COLLEGE DISTRICT, a California Community College District, hereinafter called the “District” and \_\_\_\_\_, hereinafter called the “Contractor”, with a principal place of business located at \_\_\_\_\_.

WITNESSETH, that the District and the Contractor in consideration of the mutual covenants contained herein agree as follows:

**1.01 The Work.** Within the Contract Time and for the Contract Price, subject to adjustments thereto pursuant to the Contract Documents, the Contractor shall perform and provide all necessary labor, materials, tools, equipment, utilities, services and transportation to complete in a workmanlike manner and in strict compliance with the terms and conditions of the Contract Documents all of the Work required in connection with the work of improvement commonly referred to as the Moorpark College Parking Structure, VCCCD Project #19125

Contractor shall complete all Work covered by the Contract Documents, including without limitation, the Drawings and Specifications prepared by the Architect and other Contract Documents enumerated in Article 5 below, along with all modifications and addenda thereto issued in accordance with the Contract Documents.

**1.02 Contract Time.** The Work shall be commenced on the date stated in the District’s Notice to Proceed. The Contractor shall achieve Substantial Completion of the Work within **Four Hundred Twenty (420)** calendar days after the date stated in the District’s Notice to Proceed (see Section 1.01 of the Contract Special Conditions and as otherwise provided in the Contract Documents).

**1.03 Contract Price.** The District shall pay the Contractor as full consideration for the Contractor’s full, complete and faithful performance of the Contractor’s obligations under the Contract Documents, subject to any additions or deduction as provided for in the Contract Documents, the Contract Price of \_\_\_\_\_ Dollars \$\_\_\_\_\_). The Contract Price is based upon the Contractor’s Base Bid Proposal and the following Alternate Bid Items, if any:

---

The District's payment of the Contract Price shall be in accordance with the Contract Documents.

**1.04 Liquidated Damages.** In the event of the failure or refusal of the Contractor to achieve Completion of the Work of the Contract Documents within the Contract Time, as adjusted, the Contractor shall be subject to assessment of Liquidated Damages in accordance with the Contract Documents.

**1.05 The Contract Documents.** The Contract Documents consist of the following:

- |                                        |                                     |
|----------------------------------------|-------------------------------------|
| Notice to Contractors Calling for Bids | Labor and Material Payment Bond     |
| Instructions for Bidders               | Performance Bond                    |
| Bid Proposal                           | Certificate of Workers Compensation |
| Subcontractors List                    | Drug Free Workplace Certification   |
| Non-Collusion Affidavit                | General Conditions                  |
| Statement of Bidder's Qualifications   | Special Conditions                  |
| Bid Security                           | Specifications                      |
| Agreement                              | Drawings                            |
| Labor Compliance Program               | Guarantee                           |

**1.06 Authority to Execute.** The individual(s) executing this Agreement on behalf of the Contractor is/are duly and fully authorized to execute this Agreement on behalf of Contractor and to bind the Contractor to each and every term, condition and covenant of the Contract Documents.

**IN WITNESS WHEREOF**, this Agreement has been duly executed by the District and the Contractor as of the date set forth above.

DISTRICT:  
VENTURA COUNTY COMMUNITY  
COLLEGE DISTRICT,  
a California Community College District

CONTRACTOR:  
\_\_\_\_\_  
(Contractor's License Number)

By: \_\_\_\_\_

By: \_\_\_\_\_

Name: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

*[Corporate Seal]*

*[End of Section]*

**SECTION 00400  
LABOR AND MATERIAL PAYMENT BOND  
CIVIL CODE §3247**

**KNOW ALL MEN BY THESE PRESENTS** that we, \_\_\_\_\_ as Principal, and \_\_\_\_\_ as Surety, are held and firmly bound unto **VENTURA COUNTY COMMUNITY COLLEGE DISTRICT** hereinafter "the Obligee", in the penal sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_) in lawful money of the United States, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally.

**THE CONDITION OF THIS OBLIGATION IS SUCH THAT:**

WHEREAS, the Obligee, by resolution of its Board of Trustees passed on \_\_\_\_\_, 20\_\_\_\_, has awarded to the Principal a Contract for the Work described as VCCCD Project #19125 Moorpark College Parking Structure.

WHEREAS, the Principal, on or about \_\_\_\_\_, 20\_\_\_\_, entered into a written agreement with the Obligee for performance of the Work, the Agreement and all other Contract Documents set forth therein are incorporated herein and made a part hereof by this reference.

WHEREAS, by the terms of the Contract Documents, the Principal is required to furnish a bond for the prompt, full and faithful payment to any Claimant, as hereinafter defined, for all labor materials or services used, or reasonably required for use, in the performance of the Work.

NOW THEREFORE, if the Principal shall promptly, fully and faithfully make payment to any Claimant for all labor, materials or services used or reasonably required for use in the performance of the Work then this obligation shall be void; otherwise, it shall be, and remain, in full force and effect.

The term "Claimant" shall refer to any person, corporation, partnership, proprietorship or other entity including without limitation, all persons and entities described in California Civil Code §3181, providing or furnishing labor, materials or services used or reasonably required for use in the performance of the Work under the Contract Documents, without regard for whether such labor, materials or services were sold, leased or rented. This Bond shall inure to the benefit of all Claimants so as to give them, or their assigns and successors, a right of action upon this Bond.

In the event that suit is brought on this Bond by any Claimant for amounts due such Claimant for labor, materials or services provided or furnished by such Claimant, the Surety shall pay for the same and reasonable attorneys fees pursuant to California Civil Code §3250.

The Surety, for value received, hereby stipulates and agrees that no change, extension of time, alteration, deletion, addition, or any other modification to the terms of the Contract Documents, the Work to be performed thereunder, the Specifications or the Drawings, or any other portion of the Contract Documents, shall in any way limit, restrict or otherwise affect its obligations under this Bond; the Surety

hereby waives notice from the Obligee of any such change, extension of time, alteration, deletion, addition or other modification to the Contract Documents, the Work to be performed under the Contract Documents, the Drawings or the Specifications of any other portion of the Contract Documents.

IN WITNESS WHEREOF, the Principal and Surety have executed this instrument this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_ by their duly authorized agent or representative.

*(Corporate Seal)*

\_\_\_\_\_  
(Principal Name)

By: \_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Typed or Printed Name)

Title: \_\_\_\_\_

*(Corporate Seal)*

\_\_\_\_\_  
(Surety Name)

By: \_\_\_\_\_  
(Signature of Attorney-in-Fact for Surety)

*(Attach Attorney-in-Fact Certificate)*

\_\_\_\_\_  
(Typed or Printed Name of Attorney-in-Fact)

( ) \_\_\_\_\_  
(Area Code and Telephone Number of Surety)

( ) \_\_\_\_\_  
(Area Code and Facsimile Number of Surety)



**SECTION 00410  
PERFORMANCE BOND**

***KNOW ALL MEN BY THESE PRESENTS:***

That we \_\_\_\_\_, as Principal, and \_\_\_\_\_, as Surety, are held and firmly bound, along with our respective heirs, executors, administrators, successors and assigns, jointly and severally, unto **VENTURA COUNTY COMMUNITY COLLEGE DISTRICT**, hereinafter "Obligee", for payment of the penal sum of \_\_\_\_\_ Dollars (\$) in lawful money of the United States, as more particularly set forth herein.

**THE CONDITION OF THIS OBLIGATION IS SUCH THAT:**

WHEREAS, the Obligee, by action of its Board of Trustees, has awarded to the Principal a Contract for the Work commonly described as: Moorpark College Parking Structure / VCCCD #19125.

WHEREAS, the Principal, on or about \_\_\_\_\_ 20\_\_\_\_, entered into a contract with the Obligee for performance of the Work; the Agreement and all other Contract Documents set forth therein are incorporated herein and made a part hereof by this reference.

WHEREAS, by the terms of the Contract Documents ("Contract"), the Principal is required to furnish a bond ensuring the Principal's prompt, full and faithful performance of the Work of the Contract.

WHEREAS, the Principal and the Surety, jointly and severally, bind themselves, their heirs, executors, administrative, successors and assigns, to the Obligee for the prompt, full and faithful performance of the Contract, which is incorporated herein by this reference.

NOW, THEREFORE, if the Principal shall promptly, fully and faithfully perform each and all of the obligations and things to be done and performed by the Principal in strict accordance with the terms of the Contract as said Contract may be modified or amended from time to time; and if the Principal shall indemnify and save harmless the Obligee and all of its officers, agents and employees from any and all losses, liability and damages, claims, judgments, stop notices, costs, and fees of every description, whether imposed by law or equity, which may be incurred by the Obligee by reason of the failure or default on the part of the Principal in the performance of any or all of the terms or the obligations of the Contract, including all modifications and amendments thereto, and any warranties or guarantees required thereunder; then this obligation shall be void; otherwise, it shall be, and remain, in full force and effect.

In the event the Principal is declared by the Obligee to be in breach or default in the performance of the Contract, then, after written notice from the Obligee to the Surety, as provided for herein, the Surety shall either remedy the default or breach of the Principal or shall take charge of the Work of the Contract and complete the Contract with a Contractor other than the Principal at its own expense; provided, however, that the procedure by which the Surety undertakes to discharge its obligations under this Bond shall be subject to the advance written approval of the Obligee.

If the Surety does not proceed to cure or remedy the Principal's default(s) of its performance of the Contract with reasonable promptness, the Surety shall be deemed to be in default on this Bond twenty-one (21) calendar days after receipt of a written notice from Obligee to the Surety demanding that the Surety perform its obligations under this Bond, and the Obligee shall be entitled to enforce any remedy available to Obligee.

Within twenty-one (21) calendar days of Obligee's written notice to the Surety of the failure of performance of the Contract by the Principal, it shall be the duty of the Surety to give to the Obligee an unequivocal notice in writing of the Surety's election to remedy the default(s) of the Principal promptly, or to promptly arrange for performance of the Contract, time being of essence to this Bond. In arranging for such performance of the Contract, Surety shall not elect to contract with the Principal for the completion of the Work of the Project without the prior written consent of Obligee, which consent will not be unreasonably withheld. In said Notice of Election, the Surety shall state the date of commencement of its cure or remedy of the Principal's default(s) or its performance of the Contract. The Surety's obligations for cure or remedy, include but are not limited to: correction of defective or incomplete work and completion of the Contract, additional legal, design professional and delay costs arising from Surety's actions or failure to act; and liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance by the Principal. The Surety shall give prompt written notice to the Obligee upon completion of the cure or remedy of the Principal's default(s) of its performance of the Contract.

In the event the Surety shall fail to issue its Notice of Election to Obligee within the time provided for herein above, the Obligee may thereafter cause the cure or remedy of the Principal's failure of performance or default or to complete the Work. The Principal and the Surety shall be each jointly and severally liable to the Obligee for all damages and costs sustained by the Obligee as a result of the Principal's failure of performance under the Contract Documents or default in its performance of obligations thereunder, including without limitation the costs of cure or completion exceeding the then remaining balance of the Contract Price.

The Surety, for value received, hereby consents, stipulates and agrees absolutely and unconditionally that no change, adjustment, alteration, deletion, addition or modification to the terms of the Contract or Contract Documents, including but not limited to Contract Time or Contract Price, or the Work to be performed thereunder, shall in any way release, limit, restrict, or otherwise affect the obligations of the Surety under this Bond. Surety waives notice of any change, adjustment, alteration, deletion, addition or modification to the terms of the Contract or the Contract Documents, including but not limited to the Contract Time or Contract Price, or the

Work to be performed thereunder and agrees to automatically adjust the penal sum of this Bond to reflect any adjustments of the Contract Time or Contract Price which increase the Contract Price. The Surety unconditionally and absolutely waives its entitlement, if any, to the benefits of California Civil Code §2845 concerning any security held by the District.

Principal and Surety agree that if Obligee is required to engage the services of an attorney in connection with enforcement of this Bond, each shall pay Obligee's costs and reasonable attorney's fees incurred, with or without suit, in addition to the above penal sum.

The guarantees contained in this Bond survive Final Completion of the Work called for in the Contract Documents with respect to the obligations and liabilities of the Principal, which survive Final Completion of the Work.

IN WITNESS WHEREOF, the Principal and Surety have executed this instrument this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_ by their duly authorized agents or representatives.

*(Corporate Seal)*

\_\_\_\_\_  
*(Principal Name)*

By: \_\_\_\_\_  
*(Signature)*

\_\_\_\_\_  
*(Typed or Printed Name)*  
Title: \_\_\_\_\_

*(Corporate Seal)*

\_\_\_\_\_  
*(Surety Name)*

By: \_\_\_\_\_  
*(Signature of Attorney-in-Fact for Surety)*

*(Attach Attorney-in-Fact Certificate)*

\_\_\_\_\_  
*(Typed or Printed Name of Attorney-in-Fact)*

\_\_\_\_\_  
*(Address)*

\_\_\_\_\_  
*(Area Code and Telephone Number of Surety)*



**SECTION 00415**  
**CERTIFICATE OF WORKERS' COMPENSATION INSURANCE**

I, \_\_\_\_\_ the \_\_\_\_\_,  
*(Name)* *(Title)*  
of \_\_\_\_\_, declare, state and certify that:  
*(Contractor Name)*

1.01 I am aware that California Labor Code §3700(a) and (b) provides:

"Every employer except the state shall secure the payment of compensation in one or more of the following ways:

- A. By being insured against liability to pay compensation in one or more insurers duly authorized to write compensation insurance in this state.
- B. By securing from the Director of Industrial Relations a certificate of consent to self-insure either as an individual employer, or one employer in a group of employers, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his or her employees."

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

By: \_\_\_\_\_  
*(Signature)*

\_\_\_\_\_  
*(Date)*





1.04 Contractor and I understand that if the District determines that Contractor has either: (a) made a false certification herein, or (b) violated this certification by failing to carry out and to implement the requirements of California Government Code §8355, the Contract awarded herein is subject to termination, suspension of payments, or both. Contractor and I further understand that, should Contractor violate the terms of the Drug-Free Workplace Act of 1990, Contractor may be subject to debarment in accordance with the provisions of California Government Code §§8350, et seq.

1.05 Contractor and I acknowledge that Contractor and I are aware of the provisions of California Government Code §§8350, et seq. and hereby certify that Contractor and I will adhere to, fulfill, satisfy and discharge all provisions of and obligations under the Drug-Free Workplace Act of 1990.

I declare under penalty of perjury under the laws of the State of California that all of the foregoing is true and correct.

Executed at \_\_\_\_\_ this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_  
(City and State)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Typed or Printed Name)



**SECTION 00420**  
**GUARANTEE**  
**Moorpark College Parking Structure - VCCCD Project #19125**

\_\_\_\_\_ (*Contractor's Name*) hereby unconditionally guarantees that the work performed under and pursuant to the Ventura County Community College District (District) project known as the Moorpark College parking Structure ("Project") has been done in strict accordance with the requirements of the Contract and therefore further guarantees the work of the contract to be and remain free of defects in workmanship and materials for a period of one (1) year continuous period from the date of acceptance of the Project by the Districts' Board of Trustees, unless a longer guarantee period is called for by the Contract Documents, in which case the terms of the longer guarantee shall govern. The Contractor hereby agrees to repair or replace any and all work, together with any other work which may have been damaged or displaced in so doing, that may prove to be not in accordance with the requirements of the Contract or that may be defective in its workmanship or materials within the guarantee period specified, without any expense whatsoever to the District, ordinary wear and tear and unusual abuse and neglect only excepted. The Contractor has provided contract bonds which will remain in full force and effect during the guarantee period.

The Contractor further agrees that within ten (10) calendar days after being notified in writing by the District of any work not in accordance with the requirements of the contract or any defects in the work, he will commence and prosecute with due diligence all work necessary to fulfill the terms of this guarantee, and to complete the work within a reasonable period of time. In the event he fails to so comply, he does hereby authorize the District to proceed to have such work done at the Contractor's expense and he will pay the cost thereof upon demand. The District shall be entitled to all costs, including reasonable attorneys' fees, necessarily incurred upon the Contractor's refusal to pay the above costs.

Notwithstanding the foregoing paragraph, in the event of an emergency constituting an immediate hazard to the health or safety of the employees of the District, or its property or licensees, the District may undertake at the Contractor's expense without prior notice, all work necessary to correct such hazardous condition when it was caused by the work of the Contractor not being in accordance with the requirements of this contract, or being defective, and to charge the same to the Contractor as specified in the preceding paragraph.

The guarantee set forth herein is not intended by the parties, nor shall it be construed, as in any way limiting or reducing the District's rights to enforce all terms of the contract referenced hereinabove or the time for enforcement thereof. This guarantee is provided in addition to, and not in lieu of, the District's rights on such contract.

\_\_\_\_\_  
Contractor's Signature

\_\_\_\_\_  
*Subcontractor's Signature*

Representative to be contacted for services:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone No.: \_\_\_\_\_

Fax No.: \_\_\_\_\_



**SECTION 00700  
GENERAL CONDITIONS  
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# GENERAL CONDITIONS

## ARTICLE 1: DEFINITIONS; GENERAL

- 1.1 Architect.** The Architect is the person or entity identified as such in the Agreement; references to the "Architect" includes the Architect's authorized representative and his, her or its successor(s).
- 1.2 Construction Equipment.** "Construction Equipment" is equipment utilized for the performance of any portion of the Work, but which is not incorporated into the Work.
- 1.3 Contract Documents.** The Contract Documents consist of the Agreement between the District and the Contractor, Conditions of the Contract (whether General, Special or otherwise), Drawings, Specifications, including addenda thereto issued prior to execution of the Agreement and any other documents listed in the Agreement. The Contract Documents shall include modifications issued after execution of the Agreement. The Contract Documents form the Contract for Construction.
- 1.4 Contract Document Terms.** The term "provide" means "provide complete in place" or to "furnish and install" such item. Unless otherwise provided in the Contract Documents, the terms "approved;" "directed;" "satisfactory;" "accepted;" "acceptable;" "proper;" "required;" "necessary" and "equal" shall mean as approved, directed, satisfactory, accepted, acceptable, proper, required, necessary and equal, in the opinion of the District, its agents or representatives. The term "typical" as used in the Drawings shall require the installation or furnishing of such item(s) of the Work designated as "typical" in all other similar areas; Work in such other areas shall conform to that shown as "typical" or as reasonably inferable therefrom.
- 1.5 Contractor.** The Contractor is the person or entity identified as such in the Agreement; references to "Contractor" include the Contractor's authorized representative.
- 1.6 Contractor's Superintendent.** The Contractor's Superintendent is the individual employed by the Contractor whose principal responsibility shall be the supervision and coordination of the Work; the Contractor's Superintendent shall not perform routine construction labor.
- 1.7 Days.** Unless otherwise expressly stated, references to "days" in the Contract Documents shall be deemed to be calendar days.
- 1.8 Deferred Approval Items.** Deferred approval items are those items that shall not be started until detailed plans, specifications, and engineering calculations have been accepted and signed by the Architect or Engineer.
- 1.9 District.** The "District" refers to **Ventura County Community College District** and its authorized representatives, the District's Board of Trustees and the District's officers, employees, agents and representatives.
- 1.10 District's Inspector.** The District's Inspector is the individual designated and employed by the District in accordance with the requirements of Title 24 of the California Code of Regulations. The District's Inspector shall be authorized to act on behalf of the District as provided for in the Contract Documents and in Title 24 of the California Code of Regulations, as the same may be amended from time to time.

**1.11 Division of State Architect ("DSA").** The DSA is the California Division of the State Architect including without limitation the DSA's Office of Construction Services, Office of Design Services and the Office of Regulation Services; references to the DSA in the Contract Documents shall mean the DSA, its offices and its authorized employees and agents. The authority of the DSA over the Work and the performance thereof shall be as set forth in the Contract Documents and Title 24 of the California Code of Regulations.

**1.12 Drawings and Specifications.** The Drawings are the graphic and pictorial portions of the Contract Documents, wherever located and whenever issued, showing generally, the design, location and dimensions of the Work and may include without limitation, plans, elevations, sections, details, schedules, notes or diagrams. The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, construction systems, standards, criteria and workmanship for the Work and related services. The Drawings and Specifications are intended to delineate and describe the Work and its component parts so as to permit skilled and competent contractors to bid upon the Work and prosecute the same to completion.

**1.13 Intent and Correlation of Contract Documents.**

**1.13.1 Work of the Contract Documents.** The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary and what is required by one shall be as binding as if required by all. Performance by the Contractor shall be required to the extent consistent with the Contract Documents and reasonably inferable therefrom as being necessary to produce the intended results. Organization of the Specifications into divisions, sections or articles, and the arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade. Where any portion of the Contract Documents is silent and information appears elsewhere in the Contract Documents, such other portions of the Contract Documents shall control. Work not particularly detailed, marked or specified shall be the same as similar parts that are detailed, marked or specified.

**1.13.2 Technical Terms.** Unless otherwise stated in the Contract Documents, words or terms, which have, well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

**1.13.3 Conflict in Contract Documents.** The Contract Documents are intended to be fully cooperative and to agree. If Contractor observes any conflict, inconsistency or ambiguity, Contractor shall promptly notify the District and the Architect in writing of such conflict, inconsistency or ambiguity prior to commencement of affected Work. If a conflict, inconsistency or ambiguity arises, the following order or precedence shall generally apply, provided, however, that the order of precedence shall not be so rigidly interpreted as to create an absurd or costly result: Special Conditions shall take precedence over General Conditions, Specifications shall take precedence over Drawings and shall govern as to materials, workmanship and installation procedures. Plans identify the scope and location of the Work. With regard to Drawings, figures govern over scaled dimensions, larger details govern over general drawings, addenda and change order drawings govern over contract drawings, contract drawings govern over standard drawings.

**1.14 Material Supplier.** A Material Supplier is any person or entity who only furnishes materials, equipment or supplies for the Work without fabricating, installing or consuming them in the Work.



- 1.15 Project.** The Project is the total construction of which the Work performed by the Contractor under the Contract Documents may be the whole or a part of the Project and which may include construction by the District or by separate contractors.
- 1.16 Project Manager.** The Project Manager, if any, is the individual or entity designated as such in the Special Conditions. The Project Manager is an independent contractor retained by the District and shall be authorized and empowered to act on behalf of the District. The removal or replacement of the designated Project Manager shall not result in adjustment of the Contract Price or the Contract Time or otherwise affect, limit or restrict Contractor's obligations hereunder.
- 1.17 Record Documents.** The Record Documents are a set of the Drawings and Specifications marked by the Contractor during the performance of the Work to indicate completely and accurately the actual as-built condition of the Work. The Record Documents shall be sufficient for a capable and qualified draftsman to modify the Drawings to reflect and indicate the Work actually in place at Final Completion of the Work.
- 1.18 Shop Drawings; Samples; Product Data ("Submittals").** Shop Drawings are diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor of any tier, manufacturer, Material Supplier, or distributor to illustrate some portion of the Work. Samples are physical examples of materials, equipment or workmanship forming a part of, or to be incorporated into the Work. Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work. Shop Drawings, Samples and Product Data prepared or furnished by the Contractor or any of its Subcontractors or Material Suppliers are collectively referred to as "Submittals".
- 1.19 Site.** The Site is the physical area designated in the Contract Documents for Contractor's performance, construction and installation of the Work.
- 1.20 Subcontractors; Sub-Subcontractors.** A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work. "Subcontractor" does not include a separate contractor to the District or subcontractors of any separate contractor. A Sub-Subcontractor is a person or entity of any tier, who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site.
- 1.21 Special Conditions.** If made a part of the Contract Documents, Special Conditions are special or supplemental provisions, not otherwise provided for in the Agreement or the General Conditions.
- 1.22 Surety.** The Surety is the person or entity that executes, as surety, the Contractor's Labor and Material Payment Bond and/or Performance Bond or other bonds provided by the Contractor.
- 1.23 Work.** The "Work" is the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment or services provided or to be provided by the Contractor to fulfill the Contractor's obligations under the Contract Documents. The Work may constitute the whole or a part of the Project.

1.24

## ARTICLE 2: DISTRICT

### 2.1 Information Required of District

**2.1.1 Surveys; Site Information.** District may provide information concerning physical characteristics of the Site. Information not provided by the District concerning physical characteristics of the Site, which is required, shall be obtained by Contractor without adjustment to the Contract Price or the Contract Time.

**2.1.2 Drawings and Specifications.** All of the Drawings and the Specifications shall remain the property of the District; the Contractor shall not use the Drawings or the Specifications in connection with any other work of improvement other than the Work of the Project.

**2.1.3 Furnishing of Information.** Information or services to be provided by the District under the Contract Documents shall be furnished by the District with reasonable promptness to avoid delay in the orderly progress of the Work. Information about existing conditions furnished by the District under the Contract Documents is obtained from sources believed to be reliable, but the District neither guarantees nor warrants that such information is complete and accurate. The Contractor shall verify all information provided by the District. To the extent that the Contract Documents depict existing conditions on or about the Site, or the Work involves the renovation, removal or remodeling of existing improvements, or the Work involves any tie-in or other connection with any existing improvements, the conditions and/or existing improvements depicted in the Contract Documents are as they are believed to exist.

**2.2 District's Right to Stop the Work.** In addition to the District's right to suspend the Work or terminate the Contract pursuant to the Contract Documents, the District may, by written order, direct the Contractor to stop the Work, or any portion thereof, until the cause for such stop work order has been eliminated, if the Contractor: (i) fails to correct Work which is not in conformity and in accordance with the requirements of the Contract Documents, or (ii) otherwise fails to carry out the Work in conformity and accordance with the Contract Documents. The right of the District to stop the Work hereunder shall not be deemed a duty on the part of the District to exercise such right for the benefit of the Contractor or any other person or entity, nor shall the District's exercise of such right waive or limit the exercise of any other right or remedy of the District under the Contract Documents or at law.

**2.3 Partial Occupancy or Use**

**2.3.1 District's Right to Partial Occupancy.** The District may occupy or use any completed or partially completed portion of the Work, provided that the District and the Contractor have accepted, in writing, the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, utilities, damage to the Work, insurance and the period for correction of the Work and commencement of warranties required by the Contract Documents for such portion of the Work partially used or occupied by the District. If the Contractor and the District are unable to agree upon the matters set forth above, the District may nevertheless use or occupy any portion of the Work, with the responsibility for such matters subject to resolution in accordance with the Contract Documents. Immediately prior to such partial occupancy or use of the Work, or portions thereof, the District, the District's Inspector, the Contractor and the Architect shall jointly inspect the portions of the Work to be occupied or to be used to determine and record the condition of the Work. The District's use or occupancy of the Work or portions thereof pursuant to the preceding shall not be deemed "completion" of the Work as that term is used in Public Contract Code §7107.

**2.3.2 No Acceptance of Defective or Nonconforming Work.** Unless otherwise expressly agreed

upon by the District and the Contractor, the District's partial occupancy or use of the Work or any portion thereof, shall not constitute the District's acceptance of the Work not complying with the requirements of the Contract Documents or which is otherwise defective.

- 2.4 The District's Inspector.** In addition to the authority and rights of the District's Inspector as provided for elsewhere in the Contract Documents, all of the Work shall be performed under the observation of the District's Inspector in accordance with the provisions of Title 24 of the California Code of Regulations. The District's Inspector shall have access to all parts of the Work at any time, wherever located, including shop inspections, and whether partially or completely fabricated, manufactured, furnished or installed. The performance of the duties of the District's Inspector under the Contract Documents shall not relieve or limit the Contractor's performance of its obligations under the Contract Documents.

## **ARTICLE 3: ARCHITECT**

### **3.1 Architect's Administration of the Contract**

**3.1.1 Administration of Contract.** The Architect will provide administration of the Contract as described in the Contract Documents, and will be one of the District's representatives during construction until the time that Final Payment is due the Contractor. The Architect will advise and consult with the District, the Project Manager and the District's Inspector with respect to the administration of the Contract and the Work. The Architect shall have the responsibilities and powers established by law, including Title 24 of the California Code of Regulations.

**3.1.2 Periodic Site Inspections.** The Architect will visit the Site at intervals appropriate to the stage of construction to become generally familiar with the progress and quality of the completed Work and to determine, in general, if the Work is being performed in a manner indicating that the Work, when completed, will be in accordance with the Contract Documents. The Architect will not be required to make exhaustive or continuous Site inspections to check quality or quantity of the Work. On the basis of Site observations as an architect, the Architect will keep the District informed of the progress of the Work, and will endeavor to guard the District against defects and deficiencies in the Work.

**3.1.3 Contractor Responsibility for Construction Means, Methods and Sequences.** The Architect will not have control over or charge of and will not be responsible for construction means, methods, techniques, sequences or procedures, or for safety precautions and programs in connection with the Work, these being solely the Contractor's responsibility. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or of any other persons performing portions of the Work.

**3.1.4 Verification of Applications for Payment.** In accordance with Article 8 hereof, the Architect will review the Contractor's Applications for Progress Payments and for Final Payment, verify the extent of Work performed and the amount properly due the Contractor on such Application for Payment.

**3.1.5 Rejection of Work.** The Architect is authorized to reject Work which is defective or does

not conform to the requirements of the Contract Documents. Whenever the Architect considers it necessary or advisable, additional inspections or testing of the Work may be conducted, whether or not such Work is fabricated, installed or completed. Neither this authority of the Architect nor a decision made in good faith by the Architect to exercise or not to exercise such authority shall give rise to a duty or responsibility to the Contractor, Subcontractors, Material Suppliers, their agents or employees, or other persons performing portions of the Work.

**3.1.6 Architect's Review of Submittals.** The Architect will review and approve or take other appropriate action upon the Contractor's Submittals, but only for the limited purpose of checking for conformance with the design concept expressed in the Contract Documents. Review of 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 the Contractor as required by the Contract Documents. The Architect's review of the Contractor's Submittals shall not relieve the Contractor of its obligations under the Contract Documents. The Architect's review of Submittals shall not constitute approval of safety measures, programs or precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item in a Submittal shall not indicate approval of an assembly of which the item is a component. The Architect's review and return of Submittals will normally require a minimum of twenty one (21) days from date of receipt of complete submittal. Deferred approval submittals indicated in the Contract Documents require additional time for processing and review of all submittals.

**3.1.7 Changes to the Work; Change Orders.** The Architect shall advise the Project Manager who in turn will prepare Change Orders and may authorize minor changes in the Work in accordance with Article 9.9 hereof.

**3.1.8 Completion.** The Architect will conduct observations to determine the date(s) of interim milestones, if any, and the dates of Substantial and Final Completion. The Architect will verify that the Contractor has complied with all requirements of the Contract Documents and is entitled to receipt of Final Payment.

**3.1.9 Interpretation of Contract Documents.** The Architect will interpret and decide matters concerning the requirements of the Contract Documents on written request of either the District or the Contractor, or as deemed necessary. The Architect's response to such requests will be made in writing with reasonable promptness and within the time limits specified in the Contract Documents. Interpretations and decisions of the Architect will be consistent with the intent of and reasonably inferable from the Contract Documents and will be in writing or in the form of drawings with transmittal letter. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both the District and the Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions so rendered in good faith. The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

## **ARTICLE 4: THE CONTRACTOR**

**4.1 Communications.** All communications regarding the Work, the performance thereof or the

Contract Documents shall be in writing; oral communications, unless reduced to writing, are not binding on the parties. Communications between the Contractor and the District shall be through the Project Manager. Communications between separate contractors, if any, shall be through the Project Manager. Contractor shall make all written communications concerning the Project available to the District upon request. Contractor shall receive direction only from the Project Manager and/or Architect and in accordance to the Contract Documents. No other College personnel is authorized to provide direction or approve any changes to the Construction Documents, unless prior written approval is given from the Project Manager.

## **4.2 Contractor Review of Contract Documents**

**4.2.1 Examination of Contract Documents.** The Contractor shall carefully study and compare the Contract Documents with each other and with information furnished by the District pursuant to the Contract Documents and shall at once report to the District any errors, inconsistencies or omissions discovered. If the Contractor performs any Work knowing, or with reasonable diligence should have known that, it involves an error, inconsistency or omission in the Contract Documents without prior written notice to the District of the same, the Contractor shall assume full responsibility for such performance and shall bear all attributable costs for correction of the same.

**4.2.2 Field Measurements.** Prior to commencement of the Work, or portions thereof, the Contractor shall take field measurements and verify field conditions at the Site and shall carefully compare such field measurements and conditions and other information known to the Contractor with information provided in the Contract Documents. Errors, inconsistencies or omissions discovered shall be reported to the District at once.

**4.2.3 Dimensions; Layouts and Field Engineering.** Dimensions indicated in the Drawings are intended for reference only. The Contractor shall be solely responsible for dimensioning and coordinating the Work of the Contract Documents. All field engineering required for laying out the Work and/or establishing grades for earthwork operations shall be by the Contractor at its expense. Any field engineering or other engineering to be provided or performed by the Contractor under the Contract Documents and required or necessary for the proper execution or installation of the Work shall be provided and performed by an engineer duly registered under the laws of the State of California in the engineering discipline for such portion of the Work.

**4.2.4 Request for Information.** If the Contractor encounters any condition which the Contractor believes, in good faith and with reasonable basis, is the result of an ambiguity, conflict, error or omission in the Contract Documents (collectively “the Conditions”), it shall be the affirmative obligation of the Contractor to timely notify the District, in writing, of the Conditions encountered and to request information from the District necessary to address and resolve any such Conditions before proceeding with any portion of the Work affected or which may be affected by such Conditions. If the Contractor fails to timely notify the District in writing of any Conditions encountered and the Contractor proceeds to perform

any portion of the Work containing or affected by such Conditions, the Contractor shall bear all costs associated with or required to correct, remove, or otherwise remedy any portion of the Work affected thereby without adjustment of the Contract Time or the Contract Price. In requesting information of the Architect to address and resolve any Conditions, the Contractor shall act with promptness in submitting any such written request so as to allow the Architect a reasonable period of time to review, evaluate and respond to any such request, taking into account the then current status of the progress and completion of the Work and the actual or potential impact of any such Conditions upon the completion of the Work within the Contract Time. The Contract Time shall not be subject to adjustment in the event that the Contractor fails to timely request information from the Architect. The foregoing provisions notwithstanding, in the event that the Architect reasonably determines that any of Contractor's request(s) for information: (i) does not reflect adequate or competent supervision or coordination by the Contractor or any Subcontractor; or (ii) does not reflect the Contractor's adequate or competent knowledge of the requirements of the Work or the Contract Documents; or (iii) is not justified for any other reason, Contractor shall be liable to the District for all costs incurred by the District associated with the processing, reviewing, evaluating and responding to any such request for information, including without limitation, fees of the Architect and any other design consultant to the Architect or the District. In the event that the Architect makes such a determination, the District may deduct such costs from any portion of the Contract Price then or thereafter due the Contractor.

**4.2.5 Work in Accordance With Contract Documents.** The Contractor shall perform all of the Work in strict conformity with the Contract Documents.

### **4.3 Site Investigation; Subsurface Conditions**

**4.3.1 Contractor Investigation.** The Contractor shall be responsible for, and by executing the Agreement acknowledges, that it has carefully examined the Site and has taken all steps it deems reasonably necessary to ascertain all conditions which may affect the Work, or the cost thereof, including, without limitation, conditions bearing upon transportation, disposal, handling or storage of materials; availability of labor or utilities; access to the Site; and the physical conditions and the character of equipment, materials, labor and services necessary to perform the Work. Any failure of the Contractor to do so will not relieve it from the responsibility for fully and completely performing all Work without adjustment to the Contract Price or the Contract Time. The District assumes no responsibility to the Contractor for any understandings or representations concerning conditions or characteristics of the Site, or the Work, made by any of its officers, employees or agents prior to the execution of the Agreement, unless such understandings or representations are expressly set forth in the Agreement.

**4.3.2 Subsurface Data.** By executing the Agreement, the Contractor acknowledges that it has examined the subsurface data available and satisfied itself as to the character, quality and quantity of surface and subsurface materials, including without limitation, obstacles which may be encountered in performance of the Work, insofar as this information is reasonably

ascertainable from an inspection of the Site, review of available subsurface data and analysis of information furnished by the District under the Contract Documents. Subsurface data or other soils investigation report provided by the District hereunder are not a part of the Contract Documents. Information contained in such data or report regarding subsurface conditions, elevations of existing grades, or below grade elevations are approximate only and is neither guaranteed nor warranted by the District to be complete and accurate. The Contractor shall examine all subsurface data to make its own independent interpretation of the subsurface conditions and acknowledges that its bid is based upon its own opinion of the conditions which may be encountered. The District assumes no responsibility for any conclusions or interpretations made by Contractor on the basis of available subsurface data or other information furnished by District under the Contract Documents.

### **4.3.3 Subsurface Conditions**

**4.3.3.1 Procedures.** If the Work under the Contract Documents involves digging trenches or other excavations that extend deeper than four feet below the surface, the Contractor shall promptly and before the following conditions are disturbed, notify the District's Inspector, in writing, of any: (i) material that the Contractor believes may be material that is hazardous waste, as defined in California Health and Safety Code §25117, that is required to be removed to a Class I or Class II or Class III disposal site in accordance with provisions of existing law; (ii) subsurface or latent physical conditions at the site differing from those indicated by information about the site made available to Contractor prior to award of the Contract; or (iii) unknown physical conditions at the site of any unusual nature, different materially from those ordinarily encountered and generally recognized as inherent in the Work or the character provided for in the Contract Documents. If upon notice to the District of the conditions described above and upon the District's investigation thereof, the District determines that the conditions so materially differ or involve such hazardous materials which require an adjustment to the Contract Price or the Contract Time, the District shall issue a Change Order in accordance with Article 9 hereof. In accordance with California Public Contract Code §7104, any dispute arising between the Contractor and the District as to any of the conditions listed in (i), (ii) or (iii) above, shall not excuse the Contractor from the completion of the Work within the Contract Time and the Contractor shall proceed with all Work to be performed under the Contract Documents. The District reserves the right to terminate the Contract pursuant to Article 15.2 hereof should the District determine not to proceed because of any condition described in (i), (ii) or (iii) above.

**4.3.3.2 Trenching.** For all excavations in excess of five (5) feet involving an estimated expenditure in excess of \$25,000, Contractor shall submit to the District for acceptance a detailed Drawing showing the design of shoring, bracing, sloping or other provisions to be made for the protection of workmen from the hazard of caving ground. If such design varies from the standards established by the Construction Safety Orders of the California Division of Industrial Safety, the Drawing shall be prepared by a registered civil or structural engineer. None of the

aforementioned trenching shall be started before Contractor receives notification of acceptance from the District. Contractor shall comply with all other applicable requirements of California Labor Code §6705, and as therein provided, no provisions of that Section or this Section shall be construed to impose tort liability upon the District. In any event, Contractor shall not commence any excavation work until it has secured all necessary permits including the required CAL OSHA excavation/shoring permit. Any permits shall be prominently displayed on the Project premises prior to commencement of any excavation.

#### **4.4 Supervision and Construction Procedures**

**4.4.1 Supervision of the Work.** The Contractor shall supervise and direct performance of the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract Documents, unless Contract Documents give other specific instructions concerning these matters. The Contractor shall be responsible for inspection of completed or partially completed portions of Work to determine that such portions are in proper condition to receive subsequent Work.

**4.4.2 Responsibility for the Work; Coordination of the Work.** The Contractor shall be responsible to the District for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and all other persons performing any portion of the Work under a contract with the Contractor. The Contractor shall not be relieved of the obligation to perform the Work in accordance with the Contract Documents either by activities or duties of the Project Manager, District's Inspector or the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor. The Contractor shall be responsible for all necessary or appropriate coordination of the Work and component parts thereof so that Substantial Completion of the Work will be achieved within the Contract Time and the Work will be completed for the Contract Price. The coordination of the Work is a material obligation of the Contractor hereunder and shall include without limitation, conducting regular coordination meetings with its Subcontractors and Material Suppliers, sequencing the operations of Subcontractors and Material Suppliers, and adapting its planned means, methods and sequences of construction operations as necessary to accommodate field or changed conditions at the Site. Contractor shall provide complete, functional and operating systems, and related equipment as intended per Contract Documents.

**4.4.3 Surveys.** The Contractor shall prepare or cause to be prepared all detailed surveys necessary for performance of the Work. The Contractor shall be responsible for the establishment, location, maintenance and preservation of benchmarks, reference points and stakes for the Work, the cost of which shall be included within the Contract Price. The Contractor shall be solely responsible for all loss or costs resulting from the loss, destruction, disturbance or damage of benchmarks, reference points or stakes.



**4.4.4 Construction Utilities.** The Contractor shall arrange for the furnishing of and shall pay the costs of all utility services, including, without limitation, electricity, water, gas and telephone necessary for performance of the Work and the Contractor's obligations under the Contract Documents. The Contractor shall furnish and install necessary or appropriate temporary distributions of utilities, including meters, to the Site. Any such temporary distributions shall be removed by the Contractor upon completion of the Work. The costs of all such utility services, including the installation and removal of temporary distributions thereof, shall be borne by the Contractor and included in the Contract Price.

**4.4.5 Existing Utilities; Removal, Relocation and Protection.** In accordance with California Government Code §4215, the District shall assume the responsibility for the timely removal, relocation, or protection of existing main or trunkline utility facilities located on the Site which are not identified in the Drawings, Specifications or other Contract Documents. Contractor shall be compensated for the costs of locating, repairing damage not due to the Contractor's failure to exercise reasonable care, and removing or relocating such utility facilities not indicated in the Drawings, Specifications and other Contract Documents with reasonable accuracy, and for equipment on the Site necessarily idled during such work. Contractor shall not be assessed Liquidated Damages for delay in completion of the Work when such delay is caused by the failure of the District or the utility district to provide for removal or relocation of such utility facilities. Nothing in this Article 4.4.5 shall be deemed to require the District to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the Site can be inferred from the presence of other visible facilities, such as buildings, meters and junction boxes, on or adjacent to the Site. If the Contractor encounters utility facilities not identified by the District in the Drawings, Specifications, or other Contract Documents, the Contractor shall immediately notify, in writing, the District and the utility owner. In the event that such utility facilities are owned by a public utility, the public utility shall have the sole discretion to perform repairs or relocation work or permit the Contractor to do such repairs or relocation work at a price determined in accordance with Article 9 of these General Conditions.

#### **4.5 Labor and Materials**

**4.5.1 Payment for Labor, Materials and Services.** Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, applicable taxes, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated in the Work.

**4.5.2 Employee Discipline and Skills.** The Contractor shall enforce strict discipline and good order among the Contractor's employees, the employees of any Subcontractor of any tier, and all other persons performing any part of the Work at the Site. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them. The Contractor shall dismiss from its project employees and direct any Subcontractor of any tier to dismiss from their employment on the project any person deemed by the District to be

unfit or incompetent to perform Work and thereafter, the Contractor shall not employ nor permit the employment of such person for performance of any part of the Work without the prior written consent of the District, which consent may be withheld in the reasonable discretion of the District.

**4.5.3 Contractor's Superintendent and Project Manager.** The Contractor shall employ a competent superintendent, project manager and all necessary assistants who shall be in attendance at the Site at all times during performance of the Work. The Contractor's communications relating to the Work or the Contract Documents shall be through the Contractor's superintendent and/or project manager. The superintendent shall represent the Contractor at the Site and communications given to the superintendent shall be binding as if given to the Contractor. The Contractor shall dismiss from the project the superintendent, project manager or any of his/her assistants if they are deemed, in the sole reasonable judgment of the District, to be unfit, incompetent or incapable of performing the functions assigned to them. In such event, the District shall have the right to approve of the replacement superintendent, project manager or assistant.

#### **4.5.4 Prohibition on Harassment**

**4.5.4.1 District's Policy Prohibiting Harassment.** The District is committed to providing a campus and workplace free of sexual harassment and harassment based on factors such as race, color religion, national origin, ancestry, age, medical condition, marital status, disability or veteran status. Harassment includes without limitation, verbal, physical or visual conduct which creates an intimidating, offensive or hostile environment such as racial slurs; ethnic jokes; posting of offensive statements, posters or cartoons or similar conduct. Sexual harassment includes without limitation the solicitation of sexual favors, unwelcome sexual advances, or other verbal, visual or physical conduct of a sexual nature.

**4.5.4.2 Contractor's Adoption of Anti-Harassment Policy.** Contractor shall adopt and implement all appropriate and necessary policies prohibiting any form of discrimination in the workplace, including without limitation harassment on the basis of any classification protected under local, state or federal law, regulation or policy. Contractor shall take all reasonable steps to prevent harassment from occurring, including without limitation affirmatively raising the subject of harassment among its employees, expressing strong disapproval of any form of harassment, developing appropriate sanctions, informing employees of their right to raise and how to raise the issue of harassment and informing complainants of the outcome of an investigation into a harassment claim. Contractor shall require that any Subcontractor or Sub-subcontractor performing any portion of the Work to adopt and implement policies in conformity with this Article 4.5.4.

**4.5.4.3 Prohibition on Harassment at the Site.** Contractor shall not permit any person, whether employed by Contractor, a Subcontractor, Sub-subcontractor, or any other

person or entity, performing any Work at or about the Site to engage in any prohibited form of harassment. Any such person engaging in a prohibited form of harassment directed to any individual performing or providing any portion of the Work at or about the Site shall be subject to appropriate sanctions in accordance with the anti-harassment policy adopted and implemented pursuant to Article 4.5.4.2 above. Any person performing or providing Work on or about the Site who engages in a prohibited form of harassment directed to any student, faculty member or staff of the District or directed to any other person on or about the Site shall be subject to immediate removal and shall be prohibited thereafter from providing or performing any portion of the Work. Upon the District's receipt of any notice or complaint that any person employed directly or indirectly by Contractor in performing or providing the Work has engaged in a prohibited form of harassment, the District will promptly undertake an investigation of such notice or complaint. In the event that the District, after such investigation, reasonably determines that a prohibited form of harassment has occurred, the District shall promptly notify the Contractor of the same and direct that the person engaging in such conduct be immediately removed from the Site. Unless the District's determination that a prohibited form of harassment has occurred is grossly negligent or without reasonable cause, the District shall have no liability for directing the removal of any person determined to have engaged in a prohibited form of harassment nor shall the Contract Price or the Contract Time be adjusted on account thereof. Contractor and the Surety shall defend, indemnify and hold harmless the District and its employees, officers, Board of Trustees, agents, and representatives from any and all claims, liabilities, judgments, awards, actions or causes of actions, including without limitation, attorneys' fees, which arise out of, or pertain in any manner to: (i) the assertion by any person dismissed from performing or providing work at the direction of the District pursuant to this Article 4.5.4.3; or (ii) the assertion by any person that any person directly or indirectly under the employment or direction of the Contractor has engaged in a prohibited form of harassment directed to or affecting such person. The obligations of the Contractor and the Surety under the preceding sentence are in addition to, and not in lieu of, any other obligation of defense, indemnity and hold harmless whether arising under the Contract Documents, at law or otherwise; these obligations survive completion of the Work or the termination of the Contract.

**4.6 Taxes.** The Contractor shall pay, without adjustment of the Contract Price, all sales, consumer, use and other taxes for the Work or portions thereof provided by the Contractor under the Contract Documents.

**4.7 Permits, Fees and Notices; Compliance with Laws**

**4.7.1 Payment of Permits, Fees.** Unless otherwise provided in the Contract Documents, the Contractor shall secure, pay for, and include in the Contract Price the building permits, other permits, governmental fees, licenses and inspections necessary or required for the proper execution and completion of the Work.

**4.7.2 Compliance with Laws.** The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations and other orders of public authorities bearing on performance of the Work.

**4.7.3 Notice of Variation from Laws.** If the Contractor knows, or has reason to believe, that any portion of the Contract Documents are at variance with applicable laws, statutes, ordinances, building codes, regulations or rules, the Contractor shall promptly notify the District, in writing, of the same. If the Contractor performs Work knowing, or with reasonable diligence should have known, it to be contrary to laws, statutes, ordinances, building codes, rules or regulations applicable to the Work without such notice to the District, the Contractor shall assume full responsibility for such Work and shall bear the attributable costs arising or associated therefrom, including without limitation, the removal, replacement or correction of the same.

## **4.8 Submittals**

**4.8.1 Purpose of Submittals.** Shop Drawings, Product Data, Samples and similar submittals (collectively “Submittals”) are not Contract Documents. The purpose for submission of Submittals is to demonstrate, for those portions of the Work for which Submittals are required, the manner in which the Contractor proposes to provide or incorporate such item of the Work in conformity with the information given and the design concept expressed in the Contract Documents.

### **4.8.2 Contractor's Submittals**

**4.8.2.1 Prompt Submittals.** The Contractor shall review, confirm and submit to the Architect with the number of copies of Submittals within the timeframes required by the Contract Documents. Contractor’s submission of Submittals in conformity with the Submittal Schedule is a material consideration of the Contract. In the event that the District reasonably determines that all or any portion of any Submittal fails to comply with the requirements of the Contract Documents and/or such Submittals are not otherwise complete and accurate so as to require re-submission more than one (1) time, Contractor shall bear all costs associated with the review and approval of such resubmitted Submittals; provided that such costs are in addition to, and not in lieu of, any liquidated damages imposed under the Contract Documents for Contractor's delayed submission of Submittals. Submittals not required by the Contract Documents may be returned without action. No adjustment to the Contract Time or the Contract Price shall be granted to the Contractor on account of its failure to make timely submission of any Submittals.

**4.8.2.2 Approval of Contractor’s Confirmation of Submittals.** All Submittals prepared by Subcontractors, of any tier, Material Suppliers, manufacturers or distributors shall bear the written approval of the Contractor thereto prior to submission to the

Architect for review. Any Submittal not bearing the Contractor's written approval shall be subject to return to the Contractor for re-submittal in conformity herewith, with the same being deemed to not have been submitted. Any delay, impact or cost associated therewith shall be the sole and exclusive responsibility of the Contractor without adjustment of the Contract Time or the Contract Price.

**4.8.2.3 Verification of Submittal Information.** By approving and submitting Submittals, the Contractor represents to the District and Architect that the Contractor has determined and verified materials, field measurements, field construction criteria, catalog numbers and similar data related thereto and has checked and coordinated the information contained within such Submittals with the requirements of the Work and of the Contract Documents.

**4.8.2.4 Information Included in Submittals.** All Submittals shall be accompanied by a written transmittal and each set of plans shall carry a “wet stamp” by the Contractor providing an identification of the portion of the Drawings and the CSI Specifications number pertaining to the Submittal with each Submittal numbered consecutively for ease of reference along with the following information included on each; (i) the written transmittal page and the wet stamp; (ii) date of submission; (iii) project name; (iv) name of submitting Subcontractor; and (v) if applicable, the revision number. The foregoing information is in addition to, and not in lieu of, any other information required for the Architect's review, evaluation and approval of the Contractor's Submittals. Each Submittal shall be complete with its required number of copies, no piece meal documentation is allowed. Any Submittal not bearing the required wet stamp as stated herein, shall be rejected until the appropriate wet stamp information is provided on each submittal.

**4.8.2.5 Contractor Responsibility for Deviations.** The Contractor shall not be relieved of responsibility for correcting deviations from the requirements of the Contract Documents by the Architect's approval of Submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submission of the Submittal and the District has given written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Submittals by the Architect’s approval thereof.

**4.8.2.6 No Performance of Work without Approval.** The Contractor shall perform no portion of the Work requiring the Architect’s review and approval of Submittals until the Architect has completed its review and granted its approval of such Submittal. The Contractor shall not perform any portion of the Work forming a part of a Submittal or which is affected by a related Submittal until the entirety of the Submittal or other related Submittal has been fully approved.

**4.8.3 Architect Review of Submittals.** The purpose of the Architect’s review of Submittals and the time for the Architect’s return of Submittals to the Contractor

shall be as set forth elsewhere in the Contract Documents, including without limitation, Article 3.1.6 of the General Conditions. If the Architect returns a Submittal as rejected or requiring correction(s) and re-submission, the Contractor, so as not to delay the progress of the Work, shall promptly thereafter resubmit a Submittal conforming to the requirements of the Contract Documents; the resubmitted Submittal shall indicate the portions thereof modified in order to obtain the Architect's approval. When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Architect shall be entitled to rely upon the accuracy and completeness of such calculations and certifications accompanying Submittals. The Architect's review of the Submittals is for the limited purposes described in the Contract Documents.

**4.8.4 Deferred Approval Items.** In the event that any portion of the Work is designated in the Contract Documents as a "Deferred Approval" item, Contractor shall be solely and exclusively responsible for the preparation of Submittals for such item(s) in a timely manner so as not to delay or hinder the completion of the Work within the Contract Time.

## **4.9 Materials and Equipment**

**4.9.1 Specified Materials, Equipment.** Except as otherwise provided, references in the Contract Documents to any specific article, device, equipment, product, material, fixture, patented process, form, method or type of construction, by name, make, trade name, or catalog number, with or without the words "or equal" shall be deemed to establish a minimum standard of quality or performance, and shall not be construed as limiting competition.

**4.9.2 Approval of or Equal, Substitutions or Alternatives.** The Contractor may propose to furnish alternatives or substitutes for a particular item specified in the Contract Documents, provided that the Contractor provides advance written notice to the District of such proposed or equal, substitution or alternative and certifies to the District that the quality, performance capability, functionality and appearance of the proposed alternative or substitute will meet or exceed the quality, performance capability, functionality, and appearance of the item or process specified, and must demonstrate to the District that the use of the substitution or alternative is appropriate and will not delay completion of the Work or result in an increase to the Contract Price. The Contractor shall submit all data to the District to permit the Architect's proper evaluation of the proposed substitution or alternative. The Contractor shall not provide, furnish or install any substitution or alternative without the District's prior approval of the same; any alternative or substitution installed or incorporated into the Work without first obtaining the District's approval of the same shall be subject to removal pursuant to Article 12 hereof. The District's decision shall be final regarding the approval or disapproval of the Contractor's proposed substitutions or alternatives. The District's approval of any Contractor-proposed substitution shall be in accordance with Change Order procedures set forth in Article 9 and as otherwise specified in the Contract Documents. Contractor shall bear all cost associated with and arising from the approval of any Requests for Substitution, including any other increase in cost(s) that

might impact other trade(s), due to the acceptance of any such Requests.

**4.9.3 Placement of Material and Equipment Orders.** Contractor shall, after award of the Contract, promptly and timely place all orders for materials and/or equipment necessary for completion of the Work so that delivery of the same shall be made without delay or interruption to the timely completion of the Work. Contractor shall require that any Subcontractor of any tier performing any portion of the Work similarly place orders for all materials and/or equipment to be furnished by any such Subcontractor. Upon request of the District, the Contractor shall furnish reasonably satisfactory written evidence of the placement of orders for materials and/or equipment necessary for completion of the Work, including without limitation, orders for materials and/or equipment to be provided, furnished or installed by any Subcontractor of any tier.

**4.9.4 District's Right to Place Orders for Materials and/or Equipment.** If the Contractor fails or refuses to provide reasonably satisfactory written evidence of the placement of orders for materials and/or equipment necessary for completion of the Work, or should the District determine, in its sole and reasonable discretion, that such orders have not been placed in a manner that assures timely delivery of such materials and/or equipment to the Site so the Work can be completed without delay or interruption, the District shall have the right, but not the obligation, to place such orders on behalf of the Contractor. If the District exercises such right, the District's conduct in that regard does not assume control of the work. Rather, Contractor remains responsible for the means, methods, techniques, sequences or procedures for completion of the Work and is not relieved from any of Contractor's obligations under the Contract Documents, including without limitation, completion of the Work within the Contract Time and for the Contract Price. If the District exercises the right hereunder to place orders for materials and/or equipment on behalf of Contractor pursuant to the foregoing, Contractor shall reimburse the District for all costs and fees incurred by the District in placing such orders; such costs and fees may be deducted by the District from the Contract Price then or thereafter due the Contractor.

#### **4.10 Safety**

**4.10.1 Safety Programs.** The Contractor shall be solely responsible for initiating, maintaining and supervising all safety programs required by applicable law, ordinance, regulation or governmental orders in connection with the performance of the Contract, or otherwise required by the type or nature of the Work. The Contractor shall require that its Subcontractors similarly initiate and maintain all appropriate or required safety programs.

**4.10.2 Safety Precautions.** The Contractor shall be solely responsible for initiating and maintaining reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to: (i) employees on the Work and other persons who may be affected thereby; (ii) the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors of any tier; and (iii) other property or items at the site of the

Work, or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities whether or not designated for removal, relocation or replacement in the course of construction. The Contractor shall erect and maintain, as required by existing conditions and conditions resulting from performance of the Contract, reasonable safeguards for safety and protection of property and persons, including, without limitation, posting danger signs and other warnings against hazards, promulgating safety regulations and notifying Districts and users of adjacent sites and utilities. The Contractor shall give or post all notices required by applicable law and comply with applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

**4.10.3 Safety Coordinator.** The Contractor shall designate a responsible member of the Contractor's organization at the Site whose duty shall be the prevention of accidents and the implementation and maintenance safety precautions and programs. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the District.

**4.10.4 Emergencies.** In an emergency affecting safety of persons or property, the Contractor shall act, to prevent threatened damage, injury or loss.

#### **4.11 Hazardous Materials**

**4.11.1 Use of Hazardous Materials.** In the event that the Contractor, any Subcontractor or anyone employed directly or indirectly by them shall use, at the Site, or incorporate into the Work, any material or substance deemed to be hazardous or toxic under any law, rule, ordinance, regulation or interpretation thereof (collectively "Hazardous Materials"), the Contractor shall comply with all laws, rules, ordinances or regulations applicable thereto and shall exercise all necessary safety precautions relating to the use, storage or disposal thereof. Unless otherwise provided, Contractor shall be solely responsible for the transportation and disposal of any Hazardous Materials on or about the Site.

**4.11.2 Prohibition on Use of Asbestos Containing Building Materials ("ACBMs").** Notwithstanding any provision of the Drawings or the Specifications to the contrary, it is the intent of the District that ACBMs not be used or incorporated into any portion of the Work. If any portion of the Work depicted in the Drawings or the Specifications shall require materials or products which the Contractor knows, or should have known with reasonably diligent investigation, to contain ACBMs, Contractor shall promptly notify the District of the same so that an appropriate alternative can be made in a timely manner so as not to delay the progress of the Work. Contractor warrants to the District that there are no materials or products used or incorporated into the Work which contain ACBMs. Whether before or after completion of the Work, if it is discovered that any product or material forming a part of the Work or incorporated into the Work contains ACBMs, the Contractor shall at its sole cost and expense remove such product or material in accordance with any laws, rules, procedures and regulations applicable to the handling, removal and disposal of ACBMs and to replace such product or material with non-ACBM products or materials and



to return the affected portion(s) of the Work to the finish condition depicted in the Drawings and Specifications relating to such portion(s) of the Work. Contractor's obligations under the preceding sentence shall survive the termination of the Contract, the warranty period provided under the Contract Documents, the Contractor's completion of the Work or the District's acceptance of the Work. In the event that the Contractor shall fail or refuse, for any reason, to commence the removal and replacement of any material or product containing ACBMs forming a part of, or incorporated into the Work, within ten (10) days of the date of the District's written notice to the Contractor of the existence of ACBM materials or products in the Work, the District may thereafter proceed to cause the removal and replacement of such materials or products in any manner which the District determines to be reasonably necessary and appropriate; all costs, expenses and fees, incurred by the District in connection with such removal and replacement shall be the responsibility of the Contractor and the Contractor's Performance Bond Surety.

**4.11.3 Encountering of Hazardous Materials.** If the Contractor encounters Hazardous Materials at the Site which have not been rendered harmless or for which there is no provision in the Contract Documents for their containment, removal, abatement or handling, the Contractor shall immediately stop the Work in the affected area and shall immediately notify the District, in writing, of such condition. The Contractor shall diligently proceed with the Work in all other unaffected areas. The Contractor shall proceed with the Work in the affected area only after the Hazardous Materials have been rendered harmless, contained, removed or abated. Adjustments, if any, to the Contract Time or Price shall be made in accordance with Articles 7 and 9.

**4.11.4 Material Safety Data Sheets.** Contractor is required to insure that Material Safety Data Sheets (MSDS) for any material requiring a MSDS pursuant to the federal "hazard communication" standard or employee's right-to-know law are available in a readily accessible place on the Work premises. The Contractor is also required to insure (i) the proper labeling of any substance brought onto the Work premises, and (ii) that the persons working with the material, or within the general area of the material, are informed about the hazards of the substance and follow proper handling and protection procedures.

**4.11.5 Compliance with Proposition 65.** Contractor is required to comply with the provisions of California Health and Safety Code § 25249.5, et seq., which requires the posting and giving of notice to persons who may be exposed to any chemical known to the State of California to cause cancer. The Contractor agrees to familiarize itself with such statutory provisions and to fully comply with the requirements set forth therein.

## **4.12 Maintenance of Documents**

**4.12.1 Documents at Site.** The Contractor shall maintain at the Site: (i) one record copy of the Drawings, Specifications and all addenda thereto, including updated logs for each of the items noted below); (ii) Change Orders approved by the District and all other modifications to the Contract Documents; (iii) Submittals reviewed by the Architect; (iv) Requests for

Information and responses thereto; (v) Record Drawings; (vi) Material Safety Data Sheets (“MSDS”) accompanying any materials, equipment or products delivered or stored at the Site or incorporated into the Work; and (vii) all building and other codes or regulations applicable to the Work, including without limitation, Title 24, Part 2 of the California Code of Regulations. During performance of the Work, all documents maintained by Contractor at the Site shall be available to the District, the Project Manager, the Architect, the District’s Inspector and DSA for review, inspection or reproduction. Upon completion of the Work, all documents maintained at the Site by the Contractor pursuant to the foregoing, except for (vii), shall be assembled and transmitted to the District.

**4.12.2 Maintenance of Record Documents.** During its performance of the Work, the Contractor shall continuously maintain Record Documents which are marked to indicate all field changes made to adapt the Work depicted in the Documents to field conditions, changes resulting from Change Orders and all concealed or buried installations, including without limitation, piping, conduit and utility services. The Record Documents shall be clean and all changes, corrections and dimensions shall be marked in a neat and legible manner in a contrasting color (i.e. red lined drawings). The District’s inspection or review shall not be deemed to be the District’s approval or verification of the completeness or accuracy of the Record Documents. The failure or refusal of the Contractor to continuously maintain complete and accurate Record Documents or to make available the Record Documents for inspection and review by the District may be deemed by the District to be Contractor’s default of a material obligation hereunder. Payments to the Contractor are conditioned upon continuous maintenance and completion of the Record Documents pursuant to Articles 8.3.2 and 8.3.3. If the Contractor fails or refuses to continuously maintain the Record Documents in a complete and accurate manner, the District may take appropriate action to cause such maintenance, and all costs incurred in connection therewith shall be charged to the Contractor; the District may deduct such costs from any portion of the Contract Price then or thereafter due the Contractor.

**4.13 Use of Site.** The Contractor shall confine operations at the Site to areas permitted by law, ordinances or permits, subject to any restrictions or limitations set forth in the Contract Documents. The Contractor shall not unreasonably encumber the Site or adjoining areas with materials or equipment. The Contractor shall be solely responsible for providing security at the Site with all such costs included in the Contract Price. The District shall at all times have access to the Site and the Contractor shall provide to the Project Manager, duplicate copies of any access keys, as needed.

**4.14 Noise and Dust Control.** The Contractor shall be responsible for complying with the requirements of the city and county having jurisdiction with regard to noise ordinances governing construction sites and activities. Construction equipment noise is subject to the control of the Environmental Protection Agency’s Noise Control Program (Code of Federal Regulations, Title 40, Part 204). The Contractor shall be solely responsible for maintaining all areas of the Work free from all materials and products that by becoming airborne may cause respiratory inconveniences to District students and personnel. Damages and/or any liability derived from the Contractor’s failure to comply with these requirements shall be the sole cost of the Contractor, including all penalties incurred for violations of local, state and/or federal regulations.

- 4.15 Cutting and Patching.** The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make the component parts thereof fit together properly in accordance with the Contract Documents. Only tradespersons skilled and experienced in cutting and patching shall perform such work. The Contractor shall not damage or endanger any portion of the Work, or the fully or partially completed construction of the District or separate contractors by cutting, patching, excavation or other alteration. The Contractor shall not cut, patch or otherwise alter the construction by the District or separate contractor without the prior written consent of the District or separate contractor thereto, which consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold consent to the request of the District or separate contractor to cut, patch or otherwise alter the Work.
- 4.16 Clean-Up.** The Contractor shall at all times keep the Site and all adjoining areas free from the accumulation of any waste material, rubbish or excess materials and equipment, placed, caused by performance of the Work. The Contractor shall maintain the Site in a "rake-clean" standard on a daily basis. Prior to completion of the Work, Contractor shall remove from the Site all rubbish, waste and excess material, tools, Construction Equipment, machinery, temporary facilities and barricades, and any other items which are not the property of the District under the Contract Documents. Upon completion of the Work, the Site and all adjoining areas shall be left in a neat and broom clean condition satisfactory to District. The Project Manager is authorized to direct the Contractor's clean-up obligations hereunder. If the Contractor fails to clean up as provided for in the Contract Documents within three (3) working days from the Project Manager's written notice, the District may do so, and all costs incurred in connection therewith shall be charged to the Contractor; the District may deduct such costs from any portion of the Contract Price then or thereafter due the Contractor.
- 4.17 Access to the Work.** The Contractor shall provide the DSA, the District, the Project Manager, the District's Inspector, Labor Compliance Officer and Labor Compliance administrator and consultant(s), the Architect and the Architect's consultant(s) with access to the Work, whether in place, preparation and progress and wherever located.
- 4.18 Information for the District's Inspector.** The Contractor shall furnish the District's Inspector access to the Work for obtaining such information as may be necessary to keep the District's Inspector fully informed respecting the progress, quality and character of the Work and materials, equipment or other items incorporated therein.
- 4.19 Inspector's Field Office.** The Contractor shall provide and include in the Contract Price a temporary furnished office at the Site, if specified in the Contract Documents, for use by the District, the Project Manager and the District's Inspector, until removal of the same is authorized by the District.
- 4.20 Patents and Royalties.** The Contractor and the Surety shall defend, indemnify and hold harmless the District and its agents, employees and officers from any claim, demand or legal proceeding arising out of or pertaining, in any manner, to any actual or claimed infringement of patent rights in

connection with performance of the Work under the Contract Documents.

#### **4.21 Prevailing Wage Rates; Employment of Labor.**

**4.21.1 Determination of Prevailing Rates.** Pursuant to the provisions of Division 2, Part 7, Chapter 1, Article 2 of the California Labor Code at §§1770 et seq., the District has obtained from the Director of the Department of Industrial Relations the general prevailing rate of per diem wages and the prevailing rate for holiday and overtime work in the locality in which the Work is to be performed. These rates are on file at the District's principal office. The Contractor shall post, at appropriate and conspicuous locations on the Site, a schedule showing all determined general prevailing wage rates.

**4.21.2 Payment of Prevailing Rates.** This Project is a public works project as defined in Labor Code §1720, and must be performed in accordance with the requirements of Labor Code §§1720 to 1815 and Title 8 California Code of Regulations §§16000 to 17270, which govern the payment of prevailing wage rates on public works projects. The Contractor, and any Subcontractor, of any tier, shall pay their workers engaged in the Work not less than the general prevailing wage rate, regardless of any contractual relationship which may be alleged to exist between the Contractor or any Subcontractor, of any tier, and such worker. Contractor, consistent with California Public Contract Code §6109, is prohibited from performing a portion of work with a Subcontractor who is debarred pursuant to Labor Code §§1777.1 or 1777.7.

**4.21.3 Prevailing Wage Penalty.** The Contractor shall, as a penalty, forfeit up to Fifty Dollars (\$50.00) to the District for each calendar day or portion thereof, for each worker paid less than the prevailing rates as determined by the Director of the Department of Industrial Relations for such work or craft in which such worker is employed for the Work by the Contractor or by any Subcontractor, of any tier. Pursuant to California Labor Code §1775, the difference between prevailing wage rates and the amount paid to each worker each calendar day, or portion thereof, for which each worker paid less than the prevailing wage rate, shall be paid to each worker by the Contractor.

**4.21.4 Sufficient Contract Price.** Contractor represents and warrants that the Contract Price includes sufficient funds to allow Contractor and all Subcontractors to comply with all applicable laws and contractual agreements. Contractor shall defend, indemnify and hold the District harmless from and against any and all claims, demands, losses, liabilities and damages arising out of or relating to the failure of Contractor or any Subcontractor to comply with any applicable law in this regard, including, but not limited to Labor Code §2810. Contractor agrees to pay any and all assessments, including wages, penalties, forfeitures and liquidated damages, made or asserted against the District in relation to any such failure.

#### **4.21.5 Payroll Records.**

**4.21.5.1 Submission of Certified Payroll Records to District.** Pursuant to California Labor Code §1776, the Contractor and each Subcontractor, of any tier, shall keep an accurate certified payroll record, showing the name, address, social security number, work classification, straight time and overtime hours worked each day and week, and the actual per diem wages paid to each person employed for the Work. If there is no work in a given week or on a given day, Contractor and each Subcontractor must keep a certified Non-Performance payroll record,

indicating “no work” for that week or day(s). Contractor shall submit all certified payroll records to the District’s Labor Compliance Administrator or designee in complete, unredacted form with an original signature on the Statement of Compliance along with, and as a condition to, its Application for Payment.

**4.21.5.2 Inspection of Certified Payroll Records.** Additionally, the certified payroll records shall be available for inspection at all reasonable hours at the principal office of the Contractor on the following basis: (i) a certified copy of an employee's payroll record shall be made available for inspection or furnished to such employee or his/her authorized representative on request; (ii) a certified copy of all payroll records shall be made available for inspection or furnished upon request to the District, the Division of Labor Standards Enforcement and the Division of Apprenticeship Standards of the Department of Industrial Relations; (iii) a certified copy of all payroll records shall be made available upon request to the public for inspection or copies thereof made; provided, however, that a request by the public shall be made through either the District, the Division of Apprenticeship Standards, or the Division of Labor Standards Enforcement. If the requested payroll records have not been provided, the requesting party shall, prior to being provided the records, reimburse the cost of preparation by the Contractor, Subcontractors and the entity through which the request was made. The public shall not be given access to such records at the principal office of the Contractor; (iv) the Contractor shall file a certified copy of the payroll records with the entity that requested such records within ten (10) days after receipt of a written request; (v) any copy of records made available for inspection as copies and furnished upon request to the public or any public agency by the District, the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement shall be marked or obliterated in such a manner as to prevent disclosure of an individual's name, address and social security number. The name and address of the Contractor or any Subcontractor, of any tier, performing a part of the Work shall not be marked or obliterated. The Contractor shall inform the District of the location of payroll records, including the street address, city and county and shall, within five (5) working days, provide a notice of a change or location and address.

**4.21.5.3 Submission of Payroll Records.** Contractor shall provide, and shall cause all Subcontractors to provide, payroll records as defined in Title 8 California Code of Regulations §16000 to the District, within ten (10) days of written request, at no cost to the District. The District will not return documents to Contractor.

**4.21.5.4 Penalty For Noncompliance.** In the event of noncompliance with the requirements of this Article 4.21.5, the Contractor shall have ten (10) days in which to comply, subsequent to receipt of written notice specifying in what respects the Contractor must comply herewith. Should noncompliance still be evident after such 10-day period, the Contractor shall, as a penalty to the District, forfeit Twenty-Five Dollars (\$25.00) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated. Upon the request of the Division of Apprenticeship Standards or the Division of Labor Standards Enforcement, such penalties shall be withheld from any portion of the Contract Price then or thereafter due the Contractor. The responsibility for compliance with the foregoing provisions shall rest upon the Contractor.

**4.21.5.5 Liquidated Damages.** Should Contractor neglect, fail or refuse to submit any

documents pursuant to this Article 4.21.5, Contractor agrees to pay to the District the sum of twenty-five (\$25) dollars per worker per day in liquidated damages, not as a penalty but as liquidated damages, for every day beyond ten (10) days after such documents are due. The liquidated damages amounts are agreed upon by and between the Contractor and the District because of the difficulty of fixing the District's actual damages in the event of failure to submit such documents. The Contractor and District specifically agree that said amounts are reasonable estimates of the District's damages in such event, and that such amounts do not constitute a penalty. The Contractor and District acknowledge and agree that the liquidated damages contained in this provision are reasonable under the circumstances existing at the time of the Contractor's execution of the Contract.

#### **4.21.6 Hours of Work.**

**4.21.6.1 Limits on Hours of Work.** Pursuant to California Labor Code §1810, eight (8) hours of labor shall constitute a legal day's work. Pursuant to California Labor Code §1811, the time of service of any worker employed at any time by the Contractor or by a Subcontractor, of any tier, upon the Work or upon any part of the Work, is limited and restricted to eight (8) hours during any one calendar day and forty (40) hours during any one calendar week, except as hereafter provided. Notwithstanding the foregoing provisions, Work performed by employees of Contractor or any Subcontractor, of any tier, in excess of eight (8) hours per day and forty (40) hours during any one week, shall be permitted upon compensation for all hours worked in excess of eight (8) hours per day at not less than one and one-half (1½) times the basic rate of pay.

**4.21.6.2 Penalty for Excess Hours.** The Contractor shall pay to the District a penalty of Twenty-five Dollars (\$25.00) for each worker employed on the Work by the Contractor or any Subcontractor, of any tier, for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any calendar day and forty (40) hours in any one calendar week, in violation of the provisions of Labor Code §1810 et seq.

**4.21.6.3 Contractor Responsibility.** Any Work performed by workers necessary to be performed after regular working hours or on Sundays or other holidays shall be performed without adjustment to the Contract Price or any other additional expense to the District.

#### **4.21.7 Apprentices.**

**4.21.7.1 Employment of Apprentices.** Labor Code §1777.5 and Title 8 California Code of Regulations §200 et seq. provide detailed requirements for employing apprentices on public works projects. Contractor is responsible for compliance with Labor Code §1777.5 and applicable regulations on the Project. This responsibility includes, but is not limited to, the obligation to employ properly registered apprentices and pay such apprentices at least the prevailing wage rate for their appropriate apprentice classification. Only apprentices, as defined in California Labor Code §3077 who are in training under apprenticeship standards and written apprenticeship agreements under California Labor Code §§3070 et seq. are eligible to be employed for the Work. The employment and training of each apprentice shall be in accordance with the provisions of the apprenticeship standards and apprentice agreements under which such apprentice is training. Any apprentices employed to perform any of the Work shall be paid the standard wage paid to apprentices under the regulations of the craft or trade for

which such apprentice is employed, and such individual shall be employed only for the work of the craft or trade to which such individual is registered. This Article 4.21.7 shall not apply to contracts of general contractors, or to contracts of specialty contractors not bidding for work through a general or prime contractor, when the contract involves less than Thirty Thousand Dollars (\$30,000.00). The term "Apprenticeable Craft or Trade," as used herein shall mean a craft or trade determined as an apprenticeable occupation in accordance with rules and regulations prescribed by the Apprenticeship Council.

**4.21.7.2 Apprenticeship Certificate.** When the Contractor or any Subcontractor, of any tier, in performing any of the Work employs workers in any Apprenticeable Craft or Trade, the Contractor and such Subcontractor shall apply to the Joint Apprenticeship Committee administering the apprenticeship standards of the craft or trade in the area of the site of the Work for and obtain a certificate approving the Contractor or such Subcontractor under the apprenticeship standards for the employment and training of apprentices in the area or industry affected, provided, however, that the approval as established by the Joint Apprenticeship Committee or Committees shall be subject to the approval of the Administrator of Apprenticeship. Contractors or Subcontractors shall not be required to submit individual applications for approval to local Joint Apprenticeship Committees provided they are already covered by the local apprenticeship standards for that craft or trade.

**4.21.7.3 Contract Award Information.** Contractor shall submit contract award information using the Division of Apprenticeship Standards (DAS 140) Form to the applicable apprenticeship committee within ten (10) days of the date of execution of contract and no later than the first day of work as per Title 8 California Code of Regulations §230. Contractor shall submit a copy of the completed DAS 140 Form to the District's Labor Compliance Program at the same time.

**4.21.7.4 Ratio of Apprentices to Journeymen.** The ratio of Work performed by apprentices to journeymen, who shall be employed in the Work, may be no higher than the ratio stipulated in the apprenticeship standards under which the Joint Apprenticeship Committee operates, but in no case shall the ratio be less than one hour of apprentice work for each five hours of labor performed by a journeyman, except as otherwise provided in California Labor Code §1777.5. Any ratio shall apply during any day or portion of a day when any journeyman is employed at the site of the Work and shall be computed on the basis of the hours worked during the day by journeymen so employed. The Contractor shall employ apprentices for the number of hours computed as above before the end of the Contract, and Subcontractors before the end of the subcontract. The Contractor shall, however, endeavor, to the greatest extent possible, to employ apprentices during the same time period that the journeymen in the same craft or trade are employed at the site of the Work. Any Work performed by a journeyman in excess of eight hours per day or 40 hours per week shall not be used to calculate the hourly ratio required by this Article. Where an hourly apprenticeship ratio is not feasible for a particular craft or trade, the Division of Apprenticeship Standards, upon application of an apprenticeship committee, may order a minimum ratio of not less than one apprentice for each five journeymen in a craft or trade classification. Upon proper showing by the Contractor or Subcontractor that it employs apprentices in such craft or trade in the State of California on all of its contracts on an annual average of not less than one apprentice to each five journeymen, the Division of Apprenticeship

Standards may grant a certificate exempting the Contractor from the 1-to-5 ratio as set forth in this Article and California Labor Code §1777.5.

**4.21.7.5 Exemption from Ratios.** The Joint Apprenticeship Committee shall have the discretion to grant a certificate, which shall be subject to the approval of the Administrator of Apprenticeship, exempting the Contractor from the 1-to-5 ratio set forth in this Article when it finds that any one of the following conditions are met: (i) unemployment for the previous three-month period in such area exceeds an average of fifteen percent (15%) or; (ii) the number of apprentices in training in such area exceeds a ratio of 1-to-5 in relation to journeymen, or; (iii) the Apprenticeable Craft or Trade is replacing at least one-thirtieth (1/30) of its journeymen annually through apprenticeship training, either on a statewide basis or on a local basis, or; (iv) if assignment of an apprentice to any Work performed under a public works contract would create a condition which would jeopardize such apprentice's life or the life, safety or property of fellow employees or the public at large, or if the specific task to which the apprentice is to be assigned is of such a nature that training cannot be provided by a journeyman. When such exemptions from the 1-to-5 ratio between apprentices and journeymen are granted to an organization which represents contractors in a specific trade on a local or statewide basis, the member contractors will not be required to submit individual applications for approval to local Joint Apprenticeship Committees, provided they are already covered by the local apprenticeship standards.

**4.21.7.6 Contractor's Compliance.** The responsibility of compliance with this Article for all Apprenticeable Trades or Crafts is that of the Contractor. In the event the Contractor knowingly fails to comply with the provisions of this Article and California Labor Code §1777.5, pursuant to California Labor Code §1777.7, the Contractor shall forfeit, as a civil penalty, not more than One Hundred Dollars (\$100.00) for each calendar day of noncompliance.

A contractor or subcontractor that knowingly commits a second or subsequent violation of this Article and California Labor Code §1777.5 shall forfeit as a civil penalty not more than Three Hundred Dollars (\$300.00) for each calendar day of noncompliance. Notwithstanding the provisions of California Labor Code §1727, upon receipt of a determination that a civil penalty has been assessed by the Chief of the Division of Apprenticeship Standards, the District shall withhold such amount from the Contract Price then due or to become due. In the event a Contractor or Subcontractor is determined by the Chief to have knowingly committed a serious violation of Labor Code §1777.5, the Chief may also deny the Contractor or Subcontractor and its responsible officers the right to be on or be awarded or perform work as a subcontractor on any public works contract for a period of up to one (1) year for a first violation and up to three (3) years for a second or subsequent violation.

**4.21.8 Employment of Independent Contractors.** Pursuant to California Labor Code §1021.5, Contractor shall not willingly and knowingly enter into any agreement with any person, as an independent contractor, to provide any services in connection with the Work where the services provided or to be provided requires that such person hold a valid contractors license issued pursuant to California Business and Professions Code §§7000 et seq. and such person does not meet the burden of proof of his/her independent contractor status pursuant to California Labor Code §2750.5.

In the event that Contractor shall employ any person in violation of the foregoing, Contractor shall be subject to the civil penalties under California Labor Code §1021.5 and any other penalty



provided by law. In addition to the penalties provided under California Labor Code §1021.5, Contractor's violation of this Article 4.21.8 or the provisions of California Labor Code §1021.5 shall be deemed an event of Contractor's default under Article 15.1 of these General Conditions. The Contractor shall require any Subcontractor of any tier performing or providing any portion of the Work to adhere to and comply with the foregoing provisions.

**4.22 Labor Compliance Program.** Pursuant to California Labor Code §1771.7, District has implemented a Labor Compliance Program. (See Section 00900). Contractor shall post "Notice of Initial Approval" of the District's Labor Compliance Program at the Site in accordance with 8 California Code of Regulations §16429. The Labor Compliance Program includes, without limitation, provisions requiring Contractor to comply with the prevailing rates of wages, maintenance and submission of weekly certified payroll records, employment of apprentices and, compliance with legal hours of work, and debarment. Contractor, and any Subcontractors, are required to comply with the requirements of the Labor Compliance Program, at no additional cost to District. Contractor shall include, and shall require the Subcontractors to include, contractual provisions in all contracts they enter into for the performance of the Work, requiring each Subcontractor, of every tier, who furnishes any labor for the performance of Work, to comply with these provisions at no additional cost. Contractor and all Subcontractors shall comply with California Labor Code §§1720-1781, applicable regulations and the Labor Compliance Program, and shall pay appropriate penalties for failure to comply pursuant to the California Labor Code, including, but not limited to, Sections 1775, 1776, 1777.7 and 1813, and the Labor Compliance Program. Contractor will be responsible for all failures by all Subcontractors, to comply with the District's LCP requirements. Contractor shall attend any pre-construction meetings held by the District and/or its Labor Compliance Program representatives to discuss labor requirements. Contractor and the Subcontractors shall allow the District, its Labor Compliance Program, the Department of Industrial Relations and designated representatives of each to conduct worker interviews at the Site during working hours. Compliance by Contractor with the requirements of this Article shall be a condition to Contractor's right to payment under its Applications for Payment. For questions or assistance concerning the Labor Compliance Program, please contact the District's Labor Compliance Program Administrator.

**4.23 Assignment of Antitrust Claims.** Pursuant to California Public Contract Code §7103.5, the Contractor and its Subcontractor(s), of any tier, hereby offers and agrees to assign to the District all rights, title and interest in and to all causes of action they may have under Section 4 of the Clayton Act, (15 U.S.C. §15) or under the Cartwright Act (California Business and Professions Code §§16700 et seq.), arising from purchases of goods, services or materials hereunder or any Subcontract. This assignment shall be made and become effective at the time the District tenders Final Payment to the Contractor, without further acknowledgment by the parties. If the District receives, either through judgment or settlement, a monetary recovery in connection with a cause of action assigned under California Public Contract Code §7103.5, the assignor thereof shall be entitled to receive reimbursement for actual legal costs incurred and may, upon demand, recover from the District any portion of the recovery, including treble damages, attributable to overcharges that were paid by the assignor but were not paid by the District as part of the Contract Price, less the expenses incurred by the District in obtaining that portion of the recovery. Upon demand in writing by the assignor, the District shall, within one year from such demand, reassign the cause of action assigned pursuant to this Article if the assignor has been or may have been injured by the violation of law for which the cause of action arose: and (i) the District has not been injured

thereby; or (ii) the District declines to file a court action for the cause of action.

## **ARTICLE 5: SUBCONTRACTORS**

**5.1 Subcontracts.** Any Work performed for the Contractor by a Subcontractor shall be pursuant to a written agreement between the Contractor and such Subcontractor which specifically incorporates by reference the Contract Documents and which specifically binds the Subcontractor to the applicable terms and conditions of the Contract Documents. The foregoing notwithstanding, no contractual relationship shall exist, or be deemed to exist, between any Subcontractor and the District, unless the Contract is terminated and District, in writing, elects to assume the Subcontract. Each Subcontract for a portion of the Work shall provide that such Subcontract may be assigned to the District if the Contract is terminated by the District pursuant to Article 15.1 hereof, subject to the prior rights of the Surety obligated under a bond relating to the Contract. Upon request, the Contractor shall provide to the District copies of executed Subcontracts and Purchase Orders, including amendment thereto, to which Contractor is a party within seven (7) days of District's request for same. The Contractor's failure or refusal, for any reason, to provide copies of such Subcontracts or Purchase Orders shall be deemed the Contractor's default of a material term of the Contract Documents.

### **5.2 Substitution of Listed Subcontractor**

**5.2.1 Substitution Process.** Any request of the Contractor to substitute a listed Subcontractor will be considered only if such request is in strict conformity with this Article 5.2 and California Public Contract Code §4107. All costs and fees incurred by the District in the review and evaluation of a request to substitute a listed Subcontractor shall be borne by the Contractor; such costs and fees may be deducted by the District from the Contract Price then or thereafter due the Contractor.

**5.2.2 Responsibilities of Contractor Upon Substitution of Subcontractor.** Neither the substitution nor the District's consent to Contractor's substitution of a listed Subcontractor shall relieve Contractor from its obligation to complete the Work within the Contract Time and for the Contract Price. In the event that the District determines that revised or additional Submittals are required of the newly substituted Subcontractor, the District shall promptly notify the Contractor, in writing, of such requirement and the time for submittal. In the event that the revised or additional Submittals are not submitted by Contractor within the time specified, Contractor shall be subject to the per diem assessments for late Submittals as set forth in Article 4.8 of these General Conditions.

Any revised or additional Submittals required pursuant to this Article 5.2.2 shall conform with the requirements of Article 4.8 of these General Conditions. Contractor shall reimburse the District for all fees and costs incurred or associated with the processing, review and evaluation of any revised or additional Submittals required pursuant to this Article 5.2.2; the District may deduct such fees and costs from any portion of the Contract Price then or thereafter due the Contractor. In the event that additional or revised Submittals are required pursuant to this Article 5.2.2, such requirement shall not result in an increase to the Contract Time or the Contract Price.

## **ARTICLE 6: INSURANCE; INDEMNITY; BONDS**

**6.1 Workers' Compensation Insurance; Employer's Liability Insurance.** The Contractor shall purchase and maintain Workers' Compensation Insurance as will protect the Contractor from claims under workers' or workmen's compensation, disability benefit and other similar employee benefit acts which are applicable to the Work to be performed, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. Contractor shall purchase and maintain Employer's Liability Insurance covering bodily injury (including death) by accident or disease to any employee which arises out of the employee's employment by Contractor. The Employer's Liability Insurance required of Contractor hereunder may be obtained by Contractor as a separate policy of insurance or as an additional coverage under the Workers' Compensation Insurance required to be obtained and maintained by Contractor hereunder. The limits of liability for the Employer's Liability Insurance required hereunder shall be as set forth in the Special Conditions.

**6.2 Commercial General Liability and Property Insurance.** The Contractor shall purchase and maintain Commercial General Liability and Property Insurance covering the types of claims set forth below which may arise out of or result from Contractor's operations under the Contract Documents and for which the Contractor may be legally responsible: (i) claims for damages because of bodily injury, occupational sickness or disease or death of the Contractor's employees; (ii) claims for damages because of bodily injury, sickness or disease or death of any person other than the Contractor's employees; (iii) claims for damages insured by usual personal injury liability coverage which are sustained (a) by a person as a result of an offense directly or indirectly related to employment of such person by the Contractor, or (b) by another person; (iv) claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom; (v) claims for damages because of bodily injury, death of a person or property damages arising out of ownership, maintenance or use of a motor vehicle; and (vi) contractual liability insurance applicable to the Contractor's obligations under the Contract Documents. Contractor shall also provide excess or umbrella liability limits for Products and Completed Operations Aggregate for this Project as a Designated Project as set forth in the Special Conditions.

**6.3 Builder's Risk "All-Risk" Insurance.** N/A

~~The Contractor, during the progress of the Work and until Final Acceptance of the Work by the District upon completion of the entire Contract, shall maintain Builder's Risk "All Risk" Completed Value Insurance Coverage on all insurable Work included under the Contract Documents which coverage is to provide extended coverage and insurance against vandalism and malicious mischief, perils of fire, sprinkler leakage, civil authority, sonic boom, collapse and flood upon the entire Work which is the subject of the Contract Documents, and including completed Work and Work in progress to the full insurable value thereof. Contractor's Builders Risk Insurance shall include coverage and insurance against the perils of earthquake if so indicated in the Special Conditions. Such insurance shall include the District as an additional named insured, and any other person with an insurable interest designated by the District as an additional named insured. The risk of damage to the Work due to the perils covered by the Builder's Risk "All Risk" Insurance, as well as any other hazard which might result in damage to the Work, is that of the Contractor and the Surety,~~

~~and no claims for such loss or damage shall be recognized by the District, nor will such loss or damage excuse the complete and satisfactory performance of the Contract by the Contractor.~~

**6.4 Coverage Amounts.** The insurance required of the Contractor hereunder shall be written for not less than any limits of liability specified in the Contract Documents, or required by law, whichever is greater. In the event of any loss or damage covered by a policy of insurance required to be obtained and maintained by the Contractor – or Owner - hereunder, the Contractor shall be solely and exclusively responsible for the payment of the deductible, if any, under such policy of insurance, without adjustment to the Contract Price on account thereof.

## **6.5 Evidence of Insurance; Subcontractor's Insurance**

**6.5.1 Certificates of Insurance.** With the execution of the Contract, Contractor shall deliver to the District Certificates of Insurance evidencing the insurance coverages required by the Contract Documents. Failure or refusal of the Contractor to so deliver Certificates of Insurance may be deemed by the District to be a default of a material obligation of the Contractor under the Contract Documents. The Certificates of Insurance and the insurance policies required by the Contract Documents shall contain a provision that coverages afforded under such policies will not be canceled or allowed to expire until at least thirty (30) days prior written notice has been given to the District. The insurance policies required of Contractor hereunder shall also name the District as an additional insured as its interests may appear. Should any policy of insurance be canceled before Final Acceptance of the Work by the District and the Contractor fails to immediately procure replacement insurance as required, the District reserves the right to procure such insurance and to deduct the premium cost thereof and other costs incurred by the District in connection therewith from any sum then or thereafter due the Contractor under the Contract Documents. The Contractor shall, from time to time, furnish the District, when requested, with satisfactory proof of coverage of each type of insurance required by the Contract Documents; failure of the Contractor to comply with the District's request may be deemed by the District to be a default of a material obligation of the Contractor under the Contract Documents.

**6.5.2 Subcontractors' Insurance.** Contractor shall require that every Subcontractor, of any tier, performing or providing any portion of the Work obtain and maintain the policies of insurance set forth in Articles 6.1 and 6.2 of these General Conditions; the coverages and limits of liability of such policies of insurance to be obtained and maintained by Subcontractors shall be as set forth in the Special Conditions. The policies of insurance to be obtained and maintained by Subcontractors hereunder are in addition to, and not in lieu of, Contractor obtaining and maintaining such policies of insurance. Each of the policies of insurance obtained and maintained by a Subcontractor hereunder shall conform with the requirements of this Article 6. Upon request of the District, Contractor shall promptly deliver to the District Certificates of Insurance evidencing that the Subcontractors have obtained and maintained policies of insurance in conformity with the requirements of this Article 6. Failure or refusal of the Contractor to provide the District with Subcontractors' Certificates of Insurance evidencing the insurance coverages required hereunder is a material default of Contractor hereunder.

- 6.6 Maintenance of Insurance.** Any insurance bearing on the adequacy of performance of Work shall be maintained after the District's Final Acceptance of all of the Work for the full one year correction of Work period and any longer specific guarantee or warranty periods set forth in the Contract Documents. Should such insurance be canceled before the end of any such periods and the Contractor fails to immediately procure replacement insurance as specified, the District reserves the right to procure such insurance and to charge the cost thereof to the Contractor. Nothing contained in these insurance requirements is to be construed as limiting the extent of the Contractor's responsibility for payment of damages resulting from its operations or performance of the Work under the Contract Documents, including without limitation the Contractor's obligation to pay Liquidated Damages. In no instance will the District's exercise of its option to occupy and use completed portions of the Work relieve the Contractor of its obligation to maintain insurance required under this Article until the date of Final Acceptance of the Work by the District, or such time thereafter as required by the Contract Documents. The insurer providing any insurance coverage required hereunder shall be to the reasonable satisfaction of the District.
- 6.7 Contractor's Insurance Primary.** All insurance and the coverages thereunder required to be obtained and maintained by Contractor hereunder, if overlapping with any policy of insurance maintained by the District, shall be deemed to be primary and non-contributing with any policy maintained by the District and any policy or coverage thereunder maintained by District shall be deemed excess insurance. To the extent that the District maintains a policy of insurance covering property damage arising out of the perils of fire or other casualty covered by the Contractor's Builder's Risk Insurance or the Commercial General Liability Insurance of the Contractor or any Subcontractor, the District, Contractor and all Subcontractors waive rights of subrogation against the others. The costs for obtaining and maintaining the insurance coverages required herein shall be included in the Contract Price. The District, its Project Manager and Bond Consultant shall be endorsed on all policies provided by Contractor, as appropriate, as additional insureds as respects liability arising out of Contractor's or Subcontractors' performance of the terms and conditions of these Contract Documents.
- 6.8 Indemnity.** Unless arising solely out of the active negligence, gross negligence or willful misconduct of the District, the Architect or the Project Manager, the Contractor shall indemnify, defend and hold harmless: (i) the District and its Board of Trustees, officers, employees, agents and representatives (including the District's Inspector); (ii) the Architect and its consultants for the Work and their respective agents and employees; and (iii) the Project Manager and its agents and employees from and against any and all damages, losses, claims, demands or liabilities whether for damages, losses or other relief, including, without limitation attorneys fees and costs which arise, in whole or in part, from the Work, the Contract Documents or the acts, omissions or other conduct of the Contractor or any Subcontractor or any person or entity engaged by them for the Work. The Contractor's obligations under the foregoing include without limitation: (i) injuries to or death of persons; (ii) damage to property; or (iii) theft or loss of property; and (iv) other losses, liabilities, damages or costs resulting from, in whole or part, any acts, omissions or other conduct of Contractor, any of Contractor's Subcontractors, of any tier, or any other person or entity employed directly or indirectly by Contractor in connection with the Work and their respective agents, officers or employees. If any action or proceeding, whether judicial, administrative, arbitration or

otherwise, shall be commenced on account of any claim, demand or liability subject to Contractor's obligations hereunder, and such action or proceeding names the District as a party thereto, the Contractor shall, at its sole cost and expense, defend the District in such action or proceeding with counsel reasonably satisfactory to District. In the event that there shall be any judgment, award, ruling, settlement, or other relief arising out of any such action or proceeding to which the District is bound by, Contractor shall pay, satisfy or otherwise discharge any such judgment, award, ruling, settlement or relief; Contractor shall indemnify and hold harmless the District from any and all liability or responsibility arising out of any such judgment, award, ruling, settlement or relief. The Contractor's obligations hereunder are binding upon Contractor's Performance Bond Surety and these obligations shall survive notwithstanding Contractor's completion of the Work or the termination of the Contract.

**6.9 Payment Bond; Performance Bond.** Prior to commencement of the Work, the Contractor shall furnish a Performance Bond as security for Contractor's faithful performance of the Contract and a Labor and Material Payment Bond as security for payment of persons or entities performing work, labor or furnishing materials in connection with Contractor's performance of the Work under the Contract Documents. The amounts of the Performance Bond and the Payment Bond required hereunder shall be one hundred percent (100%) of the Contract Price. Said Labor and Material Payment Bond and Performance Bond shall be in the form and content set forth in the Contract Documents. The failure or refusal of the Contractor to furnish either the Performance Bond or the Labor and Material Payment Bond in strict conformity with this Article 6.9 may be deemed by the District as a default by the Contractor of a material obligation hereunder. Upon request of the Contractor, the District may consider and accept, but is not obligated to do so, multiple sureties on such bonds. The Surety on any bond required under the Contract Documents shall be an Admitted Surety Insurer as that term is defined in California Code of Civil Procedure §995.120.

**6.10 Subcontractors' Payment Bond; Performance Bond.** All Subcontractors with subcontracts in the amount of \$50,000 or more shall furnish to the General Contractor a Performance Bond as security for Subcontractor's faithful performance of the Contract and a Labor and Material Payment Bond as security for payment of persons or entities performing work, labor or furnishing materials in connection with Subcontractor's performance of the Work under the Contract Documents. The provisions of Public Contract Code Section 4108 shall apply. The amounts of the Performance Bond and the Payment Bond required hereunder shall be one hundred percent (100%) of the Subcontract price. Said Labor and Material Payment Bonds and Performance Bonds shall be in the form and content set forth in the Contract Documents. Contractor shall provide copies of the Subcontractor Payment and Performance Bonds to the district no later than sixty (60) days from the District's Notice to Proceed with the Contract. The failure or refusal of any Subcontractor to furnish to the General Contractor, either the Performance Bond or the Labor and Material Payment Bond in strict conformity with this Article 6.10 may be deemed by the District as a default by the Contractor of a material obligation hereunder. Upon request of the Contractor, the District may consider and accept, but is not obligated to do so, multiple sureties on such bonds. The Surety on any bond required under the Contract Documents shall be an Admitted Surety Insurer as they term is defined in California Code of Civil Procedure Section 995.120.

## ARTICLE 7: CONTRACT TIME

**7.1 Substantial Completion of the Work Within Contract Time.** Unless otherwise expressly provided in the Contract Documents, the Contract Time is the period of time, including authorized adjustments thereto, allotted in the Contract Documents for achieving Substantial Completion of the Work. The date for commencement of the Work is the date established by the Notice to Proceed issued by the District, which shall not be postponed by the failure to act of the Contractor or of persons or entities for whom the Contractor is responsible. The date of Substantial Completion is the date certified by the Architect, the Project Manager and the District's Inspector as such in accordance with the Contract Documents. The Contract Time is as indicated in the Special Conditions.

### 7.2 Progress and Completion of the Work

**7.2.1 Time of Essence.** Time limits stated in the Contract Documents are of the essence. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing and achieving Substantial Completion of the Work. The Contractor shall employ and supply a sufficient force of workers, material and equipment, and prosecute the Work with diligence so as to maintain progress, to prevent Work stoppage and to achieve Substantial Completion of the Work within the Contract Time.

**7.2.2 Substantial Completion.** Substantial Completion is that stage in the progress of the Work when the Work is complete in accordance with the Contract Documents, including but not limited to start-up and testing, so the District can occupy or use the Work for its intended purpose; provided that, as a condition precedent to Substantial Completion, the Architect and District's Inspector shall have each agreed that the Work and Project have reached a stage of substantial completion and the District shall have received all permits, approvals, licenses, and other documents from any governmental authority having jurisdiction thereof necessary for the beneficial use of the Project. Substantial Completion shall be determined by the Architect and the District's Inspector upon request by the Contractor in accordance with the Contract Documents. The good faith and reasonable determination of Substantial Completion by the District's Inspector and the Architect shall be controlling and final.

**7.2.3 Correction or Completion of the Work After Substantial Completion.** Upon achieving Substantial Completion of the Work, the District, the District's Inspector, the Project Manager, the Architect and the Contractor ("Project Review Team") shall jointly inspect the Work and prepare a comprehensive list of items of the Work (punch list) to be corrected or completed by the Contractor. The exclusion of, or failure to include, any item on such list shall not alter or limit the obligation of the Contractor to complete or correct any portion of the Work in accordance with the Contract Documents. In addition to setting forth items for correction or completion, the Project Review Team shall, after the joint inspection of the Work, establish a reasonable time for Contractor's completion of all items requiring

correction or completion. If the Project Review Team is unable to mutually agree upon the time for the Contractor's completion of such items, the Architect shall determine such time, and in such event, the time determined by the Architect shall be final and binding upon the District and Contractor so long as the Architect's determination is made in good faith. The Contractor shall promptly and diligently proceed to complete or correct all items noted on such list within the time established. In the event that the Contractor shall fail or refuse, for any reason, to complete all punch list items within the time so established, Contractor shall be subject to Liquidated Damages in accordance with Article 7.5 hereof. If the Contractor fails or refuses to complete all items of the Work within the time established, the District may, in its sole and exclusive discretion and without further notice to Contractor, elect to cause the completion of such items of the Work, provided, however, that such election by the District is in addition to, and not in lieu of, any other right or remedy of the District under the Contract Documents or at law. If the District elects to complete items of the Work, Contractor shall be responsible for all costs incurred by the District in connection therewith and the District may deduct such costs from the Contract Price then or thereafter due the Contractor; if these costs exceed the remaining Contract Price due to the Contractor, the Contractor and the Performance Bond Surety are liable to District for any such excess costs.

- 7.2.4 Final Completion.** Final Completion is that stage of the Work when all Work has been completed in accordance with the Contract Documents, including without limitation, the performance of all punch list items noted upon Substantial Completion, and the Contract has been otherwise fully performed by the Contractor. Final Completion shall be determined by the Architect and the District's Inspector upon request of the Contractor. The good faith and reasonable determination of Final Completion by the District's Inspector and the Architect shall be controlling and final.
- 7.2.5 Contractor Responsibility for Multiple Inspections.** In the event the Contractor shall request determination of Substantial or Final Completion and it is determined by the District that the Work does not then justify certification of Substantial or Final Completion, as applicable, and re-inspection is required at a subsequent time to make such determination, the Contractor shall be responsible for all costs of such re-inspection, including without limitation, the fees of the Architect and the salary of the District's Inspector. The District may deduct such costs from the Contract Price then due or thereafter due to the Contractor.
- 7.2.6 Final Acceptance.** Final Acceptance of the Work shall occur upon approval of the Work by the District's Board of Trustees. Such approval shall be submitted for adoption at the next regularly scheduled meeting of the District's Board of Trustees after the determination of Final Completion. The commencement of any warranty or guarantee period under the Contract Documents shall be deemed to be the date upon the District's Board of Trustees approves of the Final Acceptance of the Work.

### **7.3 Progress Schedule**

- 7.3.1 Submittal of Preliminary Construction Schedule.** Within ten (10) days following execution of the Agreement, the Contractor shall prepare and submit to the District, the Project Manager and the Architect a Preliminary Construction Schedule, in both written and



electronic format, indicating, in graphic and tabular form, the estimated rate of progress and sequence of all Work required under the Contract Documents. The purpose of the Preliminary Construction Schedule is to assure adequate planning and execution of the Work so that it is completed within the Contract Time and to permit evaluation of the progress of the Work. The Preliminary Construction Schedule shall indicate the dates for commencement and completion of various portions of the Work, including, without limitation, the procurement and fabrication of major items, material and equipment forming a part of, or to be incorporated into, the Work as well as Site construction activities. The Preliminary Construction Schedule shall identify all major (critical) Submittals required, the portion(s) of the Work for which the identified Submittals relate to and the date upon which each Submittal required will be transmitted to the Architect for review (the "Submittal Schedule"). The Contractor shall prepare the Preliminary Construction Schedule using Primavera or comparable software in Critical Path Method format. If Contractor elects to use software other than Primavera, Contractor shall provide such software to the District at Contractor's expense. These requirements shall not be deemed control over or assumption of construction means, methods or sequences, all of which remain the Contractor's responsibility. Further, these requirements shall not give rise to an increase in the Contract Time or the Contract Price. The Contractor may submit a Preliminary Construction Schedule depicting completion of the Work in a duration shorter than the Contract Time; provided that such Preliminary Construction Schedule shall not be a basis for adjustment to the Contract Price in the event that completion of the Work shall occur after the time depicted therein, nor shall such Preliminary Construction Schedule be the basis for any extension of the Contract Time, the Contractor's entitlement to any extension of the Contract Time shall be based upon the Contract Time and not on any shorter duration which may be depicted in the Contractor's Preliminary Construction Schedule. In the event any of the Construction Schedules required under this Article 7.3 incorporate therein "float" time, it shall be understood that "float" time is not for exclusive use or benefit of either District or Contractor but is an expiring resource available to both parties on a non-discriminatory basis. Float shall be used by either party, as needed to meet Contract milestones and Contract completion dates. "As used herein, "float time" shall be deemed to refer to the time between the earliest start date and the latest start date, or between the earliest finish date and the latest finish date of each activity shown on the Construction Schedule.

**7.3.2 Review of Preliminary Construction Schedule.** The District, the Project Manager and the Architect shall review the Preliminary Construction Schedule submitted by the Contractor pursuant to Article 7.3.1 above for conformity with the requirements of the Contract Documents. Within fifteen (15) days of the date of receipt of the Preliminary Construction Schedule, such Schedule will be returned to the Contractor with comments to the form or content thereof. Review of the Preliminary Progress Schedule and any comments thereto by the District, the Project Manager and/or the Architect shall not be deemed to be the assumption of construction means, methods or sequences by the District, the Project Manager or the Architect, all of which remain the Contractor's obligations under the Contract Documents.

**7.3.3 Preparation and Submittal of Contract Construction Schedule.** Within ten (10) days of the District's return of the Preliminary Construction Schedule to the Contractor pursuant to

Article 7.3.2 above, the Contractor shall prepare and submit the Cost Loaded Construction Schedule which incorporates therein the comments to the Preliminary Construction Schedule. Upon the Contractor's submittal of such Construction Schedule, the District shall review the same for purposes of determining conformity with the requirements of the Contract Documents. Within fifteen (15) days of the receipt of the Construction Schedule, the District will approve such Construction Schedule or will return the same to the Contractor with comments to the form or content. In the event there are comments to the form or content thereof, the Contractor, shall within seven (7) days of receipt of such comments, revise and resubmit the Construction Schedule incorporating therein such comments. Upon the District's approval of the form and content of a Construction Schedule, the same shall be deemed the "Approved Construction Schedule." The District's approval of a Construction Schedule shall be for the sole and limited purpose of determining conformity with the requirements of the Contract Documents. By the Approved Construction Schedule, the District shall not be deemed to have exercised control over, or approval of, construction means, methods or sequences, all of which remain the responsibility and obligation of the Contractor in accordance with the terms of the Contract Documents. Further, the Approved Construction Schedule shall not operate to limit or restrict any of Contractor's obligations under the Contract Documents nor relieve the Contractor from the full, faithful and timely performance of such obligations in accordance with the terms of the Contract Documents. The activities, commencement and completion dates of activities, and the sequencing of activities depicted on the Approved Construction Schedule shall not be modified or revised by the Contractor without the prior consent, or direction, of the District. Updates to the Approved Construction Schedule pursuant to Article 7.3.5 below shall not be deemed revisions to the Approved Construction Schedule. In the event that the Approved Construction Schedule shall depict completion of the Work in a duration shorter than the Contract Time, the same shall not be a basis for an adjustment of the Contract Time or the Contract Price in the event that actual completion of the Work shall occur after such the time depicted in such Approved Construction Schedule. In such event, the Contract Price shall not be subject to adjustment on account of any additional costs incurred by the Contractor to complete the Work prior to the Contract Time, as adjusted in accordance with the terms of the Contract Documents. Any adjustment of the Contract Time or the Contract Price shall be based upon the Contract Time set forth in the Contract Documents and not any shorter duration which may depicted in the Approved Construction Schedule.

**7.3.4 Revisions to Approved Construction Schedule.** In the event that the progress of the Work or the sequencing of the activities of the Work shall materially differ from that indicated in the Approved Construction Schedule, as determined by the District in its reasonable discretion and judgment, the District may direct the Contractor to revise the Approved Construction Schedule; within fifteen (15) days of the District's direction, the Contractor shall prepare and submit a revised Approved Construction Schedule, for review and approval by the District. The Contractor may request consent of the District to revise the Approved Construction Schedule. Any such request shall be considered by the District only if in writing setting forth the Contractor's proposed revision(s) to the Approved Construction Schedule and the reason(s) therefor. The District may consent to, or deny, any

such request of the Contractor to revise the Approved Construction Schedule in its reasonable discretion.

**7.3.5 Updates to Approved Construction Schedule.** The Contractor shall monitor and update the Approved Construction Schedule on a monthly basis, or more frequently as required by the conditions or progress of the Work, or as may be requested by the District. Proper and complete updating of the Approved Construction Schedule shall be a condition precedent to the issuance of progress payments described in Article 8 of these General Conditions. The Contractor shall provide the District with updated Approved Construction Schedules indicating progress achieved and activities commenced or completed within the prior updated Approved Construction Schedule. Updates to the Approved Construction Schedule shall not include any revisions to the activities, commencement and completion dates of activities or the sequencing of activities depicted on the Approved Construction Schedule without the District's consent. Any revisions to the Approved Construction Schedule made without the District's consent shall result in the District's rejection of such update and Contractor shall, within seven (7) days of the District's rejection of such update, submit to the Architect and the Project Manager an Updated Approved Construction Schedule which does not incorporate any such revisions. The Contractor shall also submit, with its updates to the Approved Construction Schedule, a narrative statement including a description of current and anticipated problem areas of the Work, logic and resource changes, delaying factors and their impact, and an explanation of corrective action taken or proposed by the Contractor. If the progress of the Work is behind the Approved Construction Schedule, the Contractor shall indicate what measures will be taken to place the Work back on schedule. The District may, from time to time, and in the District's sole and exclusive discretion, transmit to the Contractor's Performance Bond Surety the Approved Construction Schedule, any updates thereof and the narrative statement described hereinabove. The District's election to transmit, or not to transmit such information, to the Contractor's Performance Bond Surety shall not limit the Contractor's obligations under the Contract Documents.

**7.3.6 Contractor Responsibility for Construction Schedule.** The Contractor shall be responsible for the preparation, submittal and maintenance of the Construction Schedules required by the Contract Documents, and any failure of the Contractor to do so may be deemed by the District as the Contractor's default in the performance of a material obligation under Contract Documents. Any and all costs or expenses required or incurred to prepare, submit, maintain, and update the Construction Schedules shall be solely that of the Contractor and no such cost or expense shall be charged to the District. The Contract Price shall not be subject to adjustment on account of costs, fees or expenses incurred or associated with the Contractor's preparation, submittal, maintenance or updating of the Construction Schedules. All schedule submittals shall include electronic diskettes for use by the District in its analysis and approval of the schedule submittal.

**7.4 Adjustment of Contract Time.** If Substantial Completion or completion of an Interim Milestone is delayed, adjustment, if any, to the Contract Time on account of such delay shall be in accordance with this Article 7.4 and will be made, if at all, by written Change Order made in accordance with Article 9.

**7.4.1 Excusable Delays.** If Substantial Completion of the Work is delayed by Excusable Delays, the Contract Time shall be subject to adjustment for such reasonable period of time as

determined by the District. Excusable Delays shall not result in any increase in the Contract Price. Excusable Delays refer to unforeseeable and unavoidable casualties or other unforeseen causes beyond the control, and without fault or neglect, of the Contractor, any Subcontractor, Material Supplier or other person directly or indirectly engaged by the Contractor in performance of any portion of the Work. Excusable Delays include unanticipated and unavoidable labor disputes, unusual and unanticipated delays in transportation of equipment, materials or Construction Equipment reasonably necessary for completion and proper execution of the Work, and unanticipated unusually severe weather conditions. Neither the financial resources of the Contractor or any person or entity directly or indirectly engaged by the Contractor in performance of any portion of the Work shall be deemed conditions beyond the control of the Contractor. If an event of Excusable Delay occurs, the Contract Time shall be subject to adjustment hereunder only if the Contractor establishes: (i) full compliance with all applicable provisions of the Contract Documents relative to the method, manner and time for Contractor's notice and request for adjustment of the Contract Time; (ii) that the event(s) forming the basis for Contractor's request to adjust the Contract Time are outside the reasonable control and without any fault or neglect of the Contractor or any person or entity directly or indirectly engaged by Contractor in performance of any portion of the Work; and (iii) that the event(s) forming the basis for Contractor's request to adjust the Contract Time directly and adversely impacted the progress of the Work as indicated in the most recent updated Approved Construction Schedule relative to the date(s) of the claimed event(s) of Excusable Delay. The foregoing provisions notwithstanding, if the Special Conditions set forth a number of "Rain Days" to be anticipated during performance of the Work, the Contract Time shall not be adjusted for rain related unusually severe weather conditions until and unless the actual number of Rain Days during performance of the Work shall exceed those noted in the Special Conditions and such additional Rain Days shall have directly and adversely impacted the progress of the Work as depicted in the Approved Construction Schedule or the most recent updated Approved Construction Schedule relative to the date(s) of such additional Rain Days.

- 7.4.2 Compensable Delays.** If Substantial Completion of the Work is delayed and such delay is caused by the acts or omissions of the District, the Architect, the Project Manager or separate contractor employed by the District (collectively "Compensable Delays"), upon Contractor's request and notice, in strict conformity with Articles 7 and 9 of these General Conditions, the Contract Time will be adjusted by Change Order for such reasonable period of time as determined by the Architect, Project Manager and the District. In accordance with California Public Contract Code §7102, if the Contractor's progress is delayed by any of the events described in the preceding sentence, Contractor shall not be precluded from the recovery of damages directly and proximately resulting therefrom, provided that the District is liable for the delay, the delay is unreasonable under the circumstances involved and the delay was not within the reasonable contemplation of the District and the Contractor at the time of execution of the Agreement. In such event, Contractor's damages, if any, shall be limited to direct, actual and unavoidable additional costs of labor, materials or Construction Equipment directly resulting from such delay, and shall exclude indirect or other consequential damages. In no event shall Contractor's damages exceed the mark-up amount(s) set forth in the Special Conditions and in accordance with Article 9.4.1.3.4.

Except as expressly provided for herein, Contractor shall not have any other claim, demand or right to adjustment of the Contract Price arising out of delay, interruption, hindrance or disruption to the progress of the Work. Adjustments to the Contract Price and the Contract Time, if any, on account of Changes to the Work or Suspension of the Work shall be governed by the applicable provisions of the Contract Documents, including without limitation, Articles 9 and 14 of these General Conditions.

**7.4.3 Unexcusable Delays.** Unexcusable Delays refer to any delay to the progress of the Work caused by events or factors other than those specifically identified in Articles 7.4.1 and 7.4.2 above. Neither the Contract Price nor the Contract Time shall be adjusted on account of Unexcusable Delays.

**7.4.4 Adjustment of Contract Time**

**7.4.4.1 Procedure for Adjustment of Contract Time.** The Contract Time shall be subject to adjustment only in strict conformity with applicable provisions of the Contract Documents. Failure of Contractor to request adjustment(s) of the Contract Time in strict conformity with applicable provisions of the Contract Documents shall be deemed Contractor's waiver of the same.

**7.4.4.2 Limitations Upon Adjustment of Contract Time on Account of Delays.** Any adjustment of the Contract Time on account of an Excusable Delay or a Compensable Delay shall be limited as set forth herein. No adjustment of the Contract Time shall be made on account of any Excusable Delays or Compensable Delays unless such delay(s) actually and directly impact Work or Work activities on the critical path of the then current and updated Approved Construction Schedule as of the date on which such delay first occurs. The District shall not be deemed in breach of, or otherwise in default of any obligation hereunder, if the District shall deny a request by the Contractor for an adjustment of the Contract Time for any delay which does not actually and directly impact Work on the then current and updated Approved Construction Schedule. In submitting a request for an adjustment of Contract Time, and as a condition precedent to the District's review of such request, Contractor shall insert into the then current and updated Approved Construction Schedule a "fragnet" analysis representing the event which Contractor claims to result in delay to the critical path as depicted in such updated Approved Construction Schedule. If an Excusable Delay and a Compensable Delay occur concurrently, the maximum extension of the Contract Time shall be the number of days from the commencement of the first delay to the cessation of the delay which ends last. If an Unexcusable Delay occurs concurrently with either an Excusable Delay or a Compensable Delay, the maximum extension of the Contract Time shall be the number of days, if any, which the Excusable Delay or the Compensable Delay exceeds the period of time of the Unexcusable Delay.

**7.5 Liquidated Damages; Contractor Delays.** Pursuant to Government Code §53069.85, should the Contractor not achieve Substantial Completion of the Work within the Contract Time, as adjusted, or to complete an Interim Milestone in accordance with the times specified or provided for in the Contract

Documents, the Contractor shall forfeit and pay to the District the amount of per diem Liquidated Damages set forth in the Special Conditions, for every day beyond the Contract Time, as adjusted, or Interim Milestone, the Work is achieved. Any such Liquidated Damages are automatically and without notice of any kind forfeited by Contractor upon the accrual of each day of delay. The District may at any time deduct Liquidated Damages from any payments due or to become due to the Contractor. Neither the District's failure or delay in deducting Liquidated Damages from payments otherwise due the Contractor, nor the District's failure or delay in notifying Contractor of the forfeiture of Liquidated Damages, shall be deemed a waiver of the District's right to Liquidated Damages. The Contractor and the Surety shall be liable for and pay to the District the entire amount of Liquidated Damages including any portion that exceeds the amount of the Contract Price then held, retained or controlled by the District. The Contractor and District acknowledge and agree that the Liquidated Damages and the provisions of this Article 7.5 are reasonable and necessary under the circumstances existing at the time this Contract is made because of the difficulty of fixing the District's actual damages in the event of delayed completion of the Work. The Contractor and the District agree that the Liquidated Damages do not constitute a penalty.

**7.6 District Right to Take-Over Work.** Unless caused by the District, Architect, Project Manager or the Inspector, if the Contractor fails or refuses, for any reason and at any time, to furnish adequate materials, labor, equipment or services to maintain progress of the Work in accordance with the then current Construction Schedule after twenty-four (24) hour advance written notice from the District to the Contractor of its failure or refusal, the District may thereafter furnish or cause to be furnish such materials, labor, equipment or services necessary to maintain progress of the Work in accordance with the then current Construction Schedule. All costs, expenses or other charges (whether direct, indirect or administrative) incurred by the District in furnishing such materials, labor, equipment or services shall be at the sole cost of the Contractor and the District may deduct the same from the Contract Price then or thereafter due the Contractor. The District's exercise of rights pursuant to the foregoing shall not be deemed a waiver or limitation of any other right or remedy of the District under the Contract Documents.

## **ARTICLE 8: CONTRACT PRICE**

**8.1 Contract Price.** The Contract Price is the amount stated in the Agreement as such, and subject to any authorized adjustments thereto in accordance with the Contract Documents, is the total amount payable by the District to the Contractor for performance of the Work under the Contract Documents. The District's payment of the Contract Price to the Contractor shall be in accordance with the Contract Documents.

**8.2 Cost Breakdown (Schedule of Values).** Within ten (10) days of the Cost Loaded Contract Construction Schedule (Article 7.3.3), the Contractor shall furnish a detailed tabular Cost Breakdown (Schedule of Values) of the Contract Price consistent with the cost-loaded work activities included in the Approved Construction Schedule. In preparing the Cost Breakdown, Contractor shall carefully list the true cost of each activity or item for which payment will be requested. The Contractor shall not "front-load" the Cost Breakdown with false dollar amounts for activities to be performed in the early stages of the Project. The District may, in its sole discretion, utilize the costs listed in the Cost Breakdown (Schedule of Values) as the true cost of items to be deducted from the Contract Price through credit or deductive Change Order. The values for each line item shall include the amount of overhead and profit applicable to each item of work and shall

include, at a minimum, a breakdown between rough and finish Work for the basic trades as well as individual dollars figures for large dollar equipment and materials to be installed or furnished for the Project. No individual line item or scope of work in the Cost Breakdown shall exceed \$50,000, except with the express, written consent of the District. Exceptions will be given by the District for a single item of Equipment for which the true cost exceeds \$50,000. The Cost Breakdown shall be subject to the District's review and approval of the form and content thereof. Upon request, Contractor shall provide District with data and documentation substantiating the accuracy of the proposed line items. In the event that the District shall reasonably object to any portion of the Cost Breakdown, within ten (10) days of the District's receipt of the Cost Breakdown, the District shall notify the Contractor, in writing of the District's objection(s) to the Cost Breakdown together with any request for substantiating data or documentation. Within five (5) days of the date of the District's written objection(s) and request for substantiating data and documentation, Contractor shall submit a revised Cost Breakdown to the District for review and approval together with the requested data and documentation. The foregoing procedure for the preparation, review and approval of the Cost Breakdown shall continue until the District has approved of the entirety of the Cost Breakdown. Once the Cost Breakdown is approved by the District, the Cost Breakdown shall not be thereafter modified or amended by the Contractor without the prior consent and approval of the District, which may be granted or withheld in the sole reasonable discretion of the District. Notwithstanding any provision of the Contract Documents to the contrary, payment of the Contractor's overhead, supervision and general conditions costs and profit, as such items are reflected in the Cost Breakdown, shall be made incrementally as included in the activities included in the Approved Construction Schedule.

### **8.3 Progress Payments**

**8.3.1 Applications for Progress Payments.** During the Contractor's performance of the Work, the Contractor shall submit monthly, on the first working day of each month, to the Project Manager, Applications for Progress Payments, on forms approved by the District, setting forth an itemized estimate of Work completed in the preceding month. Values utilized in the Applications for Progress Payments shall be based upon the proper updating of the Approved Construction Schedule. The Cost Breakdown and/or Approved Cost Loaded Construction Schedule, pursuant to Article 8.2 above, and such values shall be only for determining the basis of Progress payments to the Contractor, and shall not be considered as fixing a basis for adjustments, whether additive or deductive, to the Contract Price.

**8.3.2 District's Review of Applications for Progress Payments.** In accordance with Public Contract Code §20104.50, upon receipt of an Application for Progress Payment, the Project Manager, the District's Inspector, and the Architect shall review the Application. Such review shall be for the purpose of determining that the Application for Progress Payment is a proper Progress Payment request. For purposes of this Article 8.3.2, an Application for Progress Payment shall be deemed "proper" only if it is submitted on the properly completed form approved by the District, and accompanied by:

- (i) the Application submitted by the Contractor shall be consistent with and accompanied by the updated Approved Construction Schedule;
- (ii) weekly Certified Payroll Records ("CPRs") of the Contractor and all

Subcontractors, of any tier, for laborers performing any portion of the Work for which a Progress Payment is included. The District shall not make any payment to Contractor until (a) Contractor and/or its Subcontractor(s) provide CPRs acceptable to the District, and (b) the District is given sufficient time to review and/or audit the CPRs to determine their acceptability. Any delay in Contractor and/or its Subcontractor(s) providing CPRs to the District in a timely manner will delay the District's review and/or audit of the CPRs and Contractor's payment;

- (iii) duly completed and executed forms of Conditional Waiver and Release of Rights Upon Progress Payment in accordance with California Civil Code § 3262 of the Contractor, all Subcontractors of any tier, and Material Suppliers covering the Progress Payment requested;
- (iv) duly completed and executed forms of Unconditional Waiver and Release of Rights upon Progress Payment in accordance with California Civil Code §3262 of the Contractor, all Subcontractors of any tier, and Material Suppliers covering the Progress Payment received by the Contractor under the prior Application for Progress Payment;
- (v) all documents required pursuant to the District's Labor Compliance Program; and
- (vi) updated Record Documents reflecting the actual as-built conditions of the Work performed, as reviewed by the Architect.

In accordance with Public Contract Code § 20104.50, an Application for Progress Payment determined by the District not to be a proper Application for Progress Payment shall be returned by the District to the Contractor as soon as is practicable after receipt of the same from the Contractor, but in no event not more than seven (7) days after the District's receipt thereof. The District's return of any Application for Progress Payment pursuant to the preceding sentence shall be accompanied by a written document setting forth the reason(s) why the Application for Progress Payment is not proper. Pursuant to the District's Labor Compliance Program, Labor Code §1771.5 and other applicable law, the District shall withhold payments when payroll records are delinquent or inadequate.

### **8.3.3 Architect and District's Inspector Review of Applications for Progress Payments.**

Upon receipt of an Application for Progress Payment, the Architect and the District's Inspector shall meet with the Contractor to inspect the completed work and verify the portion of the work completed during the month using the approved Construction Schedule update and the Cost Breakdown. The Application for Progress Payment shall reflect the agreed percentages of work complete that is properly due to the Contractor under the terms of the Contract Documents. The Application submitted by the Contractor shall be consistent with and accompanied by the updated Approved Construction Schedule.

### **8.3.4 District's Disbursement of Progress Payments**

**8.3.4.1 Timely Disbursement of Progress Payments.** In accordance with Public Contract Code § 20104.50, within thirty (30) days after the District's receipt of a proper Application for Progress Payment, there shall be paid, by District, to Contractor a sum equal to ninety percent (90%) of the value of the Work indicated in the



Application for Progress Payment as verified and approved by the District's Inspector and the Architect. If an Application for Progress payment is determined not to be proper due to the failure or refusal of the contractor to submit the required documents with the Application for progress payment, or if it is reasonably determined that the Record Documents have not been continuously maintained to reflect the actual as-built conditions of the Work completed in the period for which the Progress Payment is requested, the thirty (30) day period hereunder for the District's timely disbursement of a Progress payment shall be deemed to commence on the date that the District is actually in receipt of a complete and proper Application for Progress payment or verifies the proper updating of the as-built conditions.

**8.3.4.2 Untimely Disbursement of Progress Payments.** In accordance with Public Contract Code §20104.50, in the event that the District shall fail to make any Progress Payment within thirty (30) days after receipt of an undisputed and properly submitted Application for Progress Payment, the District shall pay the Contractor interest on the undisputed amount of such Application for Progress Payment equal to the legal rate of interest set forth in California Code of Civil Procedure § 685.010(a). The foregoing notwithstanding, pursuant to the District's Labor Compliance Program, Labor Code §1771.5 and other applicable law, the District shall withhold payments when payroll records are delinquent or inadequate without penalty or payment of interest under Public Contract Code §20104.50.

**8.3.4.3 District's Right to Disburse Progress or Final Payments by Joint Checks.** The District may, in its sole discretion, issue joint checks to the Contractor and any Subcontractor or Material Supplier providing work, labor, materials, equipment or services for the Project in satisfaction of its obligation to make Progress Payments or the Final Payment due hereunder. District may require Contractor to provide copies of applicable Subcontracts, purchase orders, rental invoices or materials invoices.

**8.3.4.4 No Waiver of Defective or Non-Conforming Work.** The approval of any Application for Progress Payment or the disbursement of any Progress Payment to the Contractor shall not be deemed nor constitute acceptance of defective Work or Work not in conformity with the Contract Documents.

**8.3.5 Progress Payments for Changed Work.** The Contractor's Applications for Progress Payment may include requests for payment on account of Changes in the Work which have been properly authorized and approved by the District's Inspector, the Architect and the Board. Except as provided for herein, no other payment shall be made by the District for Changes in the Work.

**8.3.6 Materials or Equipment Not Incorporated Into the Work**

**8.3.6.1 Limitations Upon Payment.** Except as expressly provided for herein, no payments shall be made by the District on account of any item of the Work, including without limitation, materials or equipment which has/have not been incorporated into and made a part of the Work.

**8.3.6.2 Materials or Equipment Delivered and Stored at the Site.** The District may, in its sole and exclusive discretion, make payment for materials or equipment not yet incorporated into the Work if, a request for payment of such materials or equipment is made and if all of the following are complied with: (a) the materials or equipment have been delivered to the Site; (b) adequate arrangements, reasonably satisfactory to the District, have been made by the Contractor to store and protect such materials or equipment at the Site including without limitation, insurance reasonably satisfactory to the District, covering and protecting against the risk of loss, destruction, theft or other damage to such materials or equipment while in storage; and (c) the establishment of procedures reasonably satisfactory to the District by which title to such materials or equipment will be vested in the District upon the District's payment therefor. The Contractor acknowledges that the discretion to make, or not to make, payment for materials or equipment delivered or stored at the site of the Work pursuant to the preceding sentence shall be exercised exclusively by the District; the District's exercise of discretion not to make payment for materials or equipment delivered or stored at the Site, but not yet incorporated into the Work shall not be deemed the District's default hereunder. In the event that the District shall elect to make payment for materials or equipment delivered and stored at the Site, the costs and expenses incurred to comply with the requirements of (b) and (c) of this Article 8.3.6.2 shall be borne solely and exclusively by the Contractor and no payment shall be made by the District on account of such costs and expenses.

**8.3.7 Exclusions From Progress Payments.** No payments shall be made by the District for materials or equipment to be incorporated into the Work where such materials or equipment have not been delivered or stored at the Site. The District shall not make any payment on account of any materials or equipment which are in the process of being fabricated or which are in transit to the Site or other storage location. In addition to the District's right to withhold disbursement of any Progress Payment provided for in the Contract Documents, neither the Contractor's Application for Progress Payment shall include, nor shall the District be obligated to disburse any portion of the Contract Price for amounts which the Contractor does not intend to pay any Subcontractor, of any tier, or Material Supplier because of a dispute or any other reason.

**8.3.8 Title to Work.** The Contractor warrants that title to all Work covered by an Application for Progress Payment will pass to the District no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Progress Payment, all Work for which a Progress Payment has been previously issued and the Contractor has received payment from the District therefor shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, stop notices, security interests or encumbrances in favor of the Contractor, Subcontractors, Material Suppliers or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

**8.3.9 Preliminary Progress Pay Application Review Meeting.** Contractor shall submit to the Project Manager the preliminary pay application documentation for review, on a monthly

basis. The Project Manager may elect to call for a meeting with the Contractor and any Subcontractor(s) to review the plans that would depict the updated monthly progress work for each trade. Contractor and Subcontractor shall bring to the meeting the plans for the respective trade, showing color-coded progress work for a given month. Contractor shall update color-coded monthly progress work plans and keep them clean and legible at all times.

## **8.4 Final Payment**

**8.4.1 Application for Final Payment.** When the Contractor has achieved Final Completion of the Work and has otherwise fully performed its obligations under the Contract Documents, the Contractor shall submit an Application for Final Payment on such form as approved by the District. Thereupon, the Architect and the District's Inspector will promptly make a final inspection of the Work and when the Architect and the District's Inspector find the Work acceptable under the Contract Documents and that the Contract has been fully performed by the Contractor, the Architect and the District's Inspector will thereupon promptly approve the Application for Final Payment, stating that to the best their knowledge, information and belief, the Work has been completed in accordance with the terms of the Contract Documents. The Final Payment shall include the remaining balance of the Contract Price and any retention from Progress Payments previously withheld by the District.

**8.4.2 Conditions Precedent to Disbursement of Final Payment.** Neither Final Payment nor any remaining Contract Price shall become due until the Contractor submits to the District each and all of the following, the submittal of which are conditions precedent to the District's obligation to disburse the Final Payment: (i) an affidavit or certification by the Contractor that payrolls, bills for materials and other indebtedness incurred in connection with the Work for which the District or the District's property may or might be responsible or encumbered have been paid or otherwise satisfied; (ii) a certificate evidencing that insurance required by the Contract Documents to remain in force after the Contractor's receipt of Final Payment is currently in effect; (iii) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover any period following Final Payment as required by the Contract Documents; if required (iv) consent of the Surety on the Labor and Material Payment Bond and Performance Bond, to Final Payments if required; (v) duly completed and executed forms of Conditional or Unconditional Waivers and Releases of rights upon Final Payment of the Contractor, Subcontractors of any tier and Material Suppliers in accordance with California Civil Code §3262, with each of the same stating that there are, or will be, no claims for additional compensation after disbursement of the Final Payment; (vi) Operations and Maintenance manuals and separate warranties provided by any manufacturer or distributor of any materials or equipment incorporated into the Work; (vii) the Record Drawings; (viii) the form of Guarantee included in the Contract Documents duly executed by an authorized representative of the Contractor; (ix) any and all other items or documents required by the Contract Documents to be delivered to the District upon completion of the Work; and (x) if required by the District, such other data establishing payment or satisfaction of obligations such as receipts, releases and waivers of liens, stop notices, claims, security interest or

encumbrances arising out of the Contract to the extent and in such form as may be required by the District.

**8.4.3 Disbursement of Final Payment.** Provided that the District is then in receipt of all documents and other items in Article 8.4.2 above as conditions precedent to the District's obligation to disburse Final Payment, not later than sixty (60) days following Final Acceptance the District shall disburse the Final Payment to the Contractor. Pursuant to California Public Contract Code §7107, if there is any dispute between the District and the Contractor at the time that disbursement of the Final Payment is due, the District may withhold from disbursement of the Final Payment an amount not to exceed one hundred fifty percent (150%) of the amount in dispute.

**8.4.4 Waiver of Claims.** The Contractor's acceptance of the Final Payment is a waiver and release by the Contractor of any and all claims against the District for compensation or otherwise in connection with the Contractor's performance of the Contract.

**8.4.5 Claims Asserted After Final Payment.** Any lien, stop notice or other claim filed or asserted after the Contractor's acceptance of the Final Payment by any Subcontractor, of any tier, laborer, Material Supplier or others in connection with or for Work performed under the Contract Documents shall be the sole and exclusive responsibility of the Contractor who further agrees to indemnify, defend and hold harmless the District and its officers, agents, representatives and employees from and against any claims, demands or judgments arising or associated therewith, including without limitation attorneys fees incurred by the District in connection therewith. In the event any lien, stop notice or other claim of any Subcontractor, Laborer, Material Supplier or others performing Work under the Contract Documents remain unsatisfied after Final Payment is made, Contractor shall refund to District all monies that the District may pay or be compelled to pay in discharging any lien, stop notice or other claim, including, without limitation all costs and reasonable attorneys fees incurred by District in connection therewith.

**8.5 Withholding of Payments.** The District may decline to pay the Contractor, or reduce or withhold any portion of a payment otherwise due the Contractor for any Progress Payment or the Final Payment on account of:

(i) In the District's opinion, the Work cannot be completed for the unpaid balance of the Contract Price;

(ii) In the District's opinion, the Work will not be completed within the Contract Time and the unpaid balance of the Contract Price would not be adequate to cover liquidated damages resulting from the anticipated delay;

(iii) Any damage has occurred to the District or any Subcontractor, Material Supplier or another contractor, and the Contractor may be liable for such damage;

(iv) The Contractor fails to perform any portion of the Work in accordance with the Contract Documents or otherwise violates any provision of the Contract Documents or fails to discharge any Contractor obligation thereunder;

- (v) Any claims, liens, labor compliance withholds, or stop notices are filed in connection with the Work or asserted against the District, the Project or the Site;
- (vi) The Contractor fails to reimburse the District for any costs or expenses incurred by the District, or amounts advanced by the District, on behalf of the Contractor as may be provided or permitted in this Contract;
- (vii) Notification has been given that a penalty will be assessed by any State, local or municipal agency or by the District for violations of any applicable laws, including, without limitation, tax laws, labor laws and/or fair employment laws;
- (viii) Any current and non-resolved non-compliance notices issued by any public agency;
- (ix) Failure to satisfy any of the requirements of the Labor Compliance Program;
- (x) Defective Work or Work not in conformity with the Contract Documents which is not remedied as required in Article 12 herein;
- (xi) Stop Notices or other liens or third party claims served upon the District as a result of the Contract;
- (xii) Liquidated damages incurred by the District for delays to the Project;
- (xiii) Unsatisfactory prosecution of the Work by the Contractor;
- (xiv) Failure to store and properly secure materials;
- (xv) Failure of the Contractor to submit, on a timely basis, proper, sufficient, and acceptable documentation required by the Contract Documents, including, without limitation, a Construction Schedule, Schedule of Submittals, Schedule of Values, monthly progress schedules, Shop Drawings, Product Data and samples, proposed product lists, executed Change Orders, and/or verified reports;
- (xvi) Failure of the Contractor to maintain Record Drawings;
- (xvii) Erroneous estimates by the Contractor of the value of the Work performed, or other false statements in an Application for Payment;
- (xviii) Unauthorized deviations from the Contract Documents;
- (xix) Failure of the Contractor to prosecute the Work in a timely manner in compliance with the Construction Schedule, established progress schedules, and/or completion dates;
- (xx) If the District has an LCP in force on this Project, the failure to provide certified payroll records acceptable to the District for each journeyman, apprentice, worker, or other employee employed by

the Contractor and/or each Subcontractor in connection with the Work for the period of the Application for Payment;

(xxi) Failure to properly pay prevailing wages as defined in Labor Code §§1720 et seq., failure to comply with any other Labor Code requirements, and/or failure to comply with the District's LCP, if one is in force on this Project;

(xxii) Failure to properly maintain or clean up the Site;

(xxiii) Failure to indemnify, defend, or hold harmless the District;

(xxiv) Failure to make payments due to the District, including but not limited to payments for failed tests, utilities changes, or permits;

(xxv) Failure of the Contractor to make payments when due Subcontractors or Material Suppliers for materials or labor;

(xxvi) Contractor is otherwise in breach, default, or in substantial violation of any provision of this Contract.

In addition to the foregoing, the District shall not be obligated to process any Application for Progress Payment or Final Payment, nor shall Contractor be entitled to any Progress Payment or Final Payment so long as any lawful or proper direction concerning the Work or the performance thereof or any portion thereof, given by the District, the District's Inspector, the Architect or any public authority having jurisdiction over the Work, or any portion thereof, shall not be fully and completely complied with by the Contractor. When the District is reasonably satisfied that the Contractor has remedied any such deficiency, payment shall be made of the amount withheld. If the District elects to withhold payment from the Contractor pursuant to this Article 8.5, then the District will be permitted to withhold such amounts as the District may, in its reasonable discretion, deem necessary to (A) protect the District against any and all liabilities to Subcontractors, Material Suppliers or any other persons as a result of the Work or any of the Contractor's acts or omissions, (B) correct any defective Work or remedy any breach of the Contract Documents, (C) recover and collect liquidated damages in the event completion of the Project is delayed, (D) recover and collect any costs or expenses paid by, or amounts advanced by, the District on behalf of Contractor, (E) collect any penalty that may be assessed against the Contractor for violations of any applicable laws, including, without limitation, labor laws and/or fair employment laws, and/or (F) recover any testing/inspections costs incurred by the District in connection with failed tests or inspections. The District may apply any such withheld amount or amounts to the payment and satisfaction of such claims or obligations at its discretion. In so doing, the District shall be deemed the agent of Contractor and any payment so made by the District shall be considered as a payment made under the Contract by the District to the Contractor and shall be so deducted from the Contract Price otherwise due the Contractor. The District shall not be liable to Contractor for any such payments made in good faith. Such payments may be made without prior judicial determination of the claim or the obligation to make such payment. The District will render the Contractor a proper accounting of any such amounts retained or disbursed by the District on behalf of the Contractor.

**8.6 Payments to Subcontractors.** The Contractor shall pay all Subcontractors for and on account of Work of the Contract performed by such Subcontractors in accordance with the terms of their respective subcontracts and as provided for pursuant to California Public Contract Code §10262, the provisions of which are deemed incorporated herein by this reference. In the event of the Contractor's failure to make payment to Subcontractors in conformity with California Public Contract Code §10262, the provisions of California Public Contract Code §10253 shall apply; by this reference, the provisions of California Public Contract Code §10253 are incorporated herein in its entirety, except that the references in said Section 10253 to "the director" shall be deemed to refer to the District.

## **ARTICLE 9: CHANGES**

**9.1 Changes in the Work.** The District, at any time, by written order, may make Changes within the general scope of the Work under the Contract Documents or issue additional instructions, require additional Work or direct deletion of Work. The Contractor shall not proceed with any Change involving an increase or decrease in the Contract Price or the Contract Time without prior written authorization from the District. The foregoing notwithstanding, the Contractor shall promptly commence and diligently complete any Change to the Work subject to the District's written authorized issued pursuant to the preceding sentence; the Contractor shall not be relieved or excused from its prompt commencement and diligent completion of any Change subject to the District's written authorization by virtue of the absence or inability of the Contractor and the District to agree upon the extent of any adjustment to the Contract Time or the Contract Price on account of such Change. The issuance of a Change Order pursuant to this Article 9 in connection with any Change authorized by the District under this Article 9.1 shall not be deemed a condition precedent to Contractor's obligation to promptly commence and diligently complete any such Change authorized by the District hereunder. The District's right to make Changes shall not invalidate the Contract nor relieve the Contractor of any liability or other obligations under the Contract Documents. Any requirement of notice of Changes in the scope of Work to the Surety shall be the responsibility of the Contractor. Changes to the Work depicted or described in the Drawings or the Specifications shall be subject to approval by the DSA. The District may make Changes to bring the Work or the Project into compliance with environmental requirements or standards established by state or federal statutes and regulations enacted after award of the Contract.

**9.2 Oral Order of Change in the Work.** Any oral order, direction, instruction, interpretation, or determination from the District, the District's Inspector or the Architect which in the opinion of the Contractor causes any change to the scope of the Work, or otherwise requires an adjustment to the Contract Price or the Contract Time, shall be treated as a Change only if the Contractor gives the Architect and the District's Inspector written notice within ten (10) days of the order, directions, instructions, interpretation or determination and prior to acting in accordance therewith. Time is of the essence in Contractor's written notice pursuant to the preceding sentence so that the District can promptly investigate and consider alternative measures to address the order, direction, instruction, interpretation or determination giving rise to Contractor's notice. Accordingly, Contractor acknowledges that its failure, for any reason, to give written notice within ten (10) days of such order, direction, instruction, interpretation or determination shall be deemed Contractor's waiver of any right to assert or claim any entitlement to an adjustment of the Contract Time or the Contract

Price on account of such order, direction, instruction, interpretation or determination. The written notice shall state the date, circumstances, extent of adjustment to the Contract Price or the Contract Time, if any, requested, and the source of the order, directions, instructions, interpretation or determination that the Contractor regards as a Change. Unless the Contractor acts in strict accordance with this procedure, any such order, direction, instruction, interpretation or determination shall not be treated as a Change and the Contractor hereby waives any claim for any adjustment to the Contract Price or the Contract Time on account thereof.

**9.3 Contractor Submittal of Data.** Within fifteen (15) days after receipt of a written order directing a Change in the Work or furnishing the written notice regarding any oral order directing a Change in the Work, the Contractor shall submit to the District a detailed written “Change Order Request” setting forth the amount of any adjustment to the Contract Price on account thereof, properly itemized and supported by sufficient substantiating data to permit evaluation of the same, and the extent of adjustment of the Contract Time, if any, required by such Change. No claim or adjustment to the Contract Price or the Contract Time shall be allowed if not asserted by the Contractor in strict conformity herewith or if asserted after Final Payment is made under the Contract Documents.

**9.4 Adjustment to Contract Price and Contract Time on Account of Changes to the Work**

**9.4.1 Adjustment to Contract Price.** Adjustments to the Contract Price due to Changes in the Work shall be determined by application of one of the following methods, in the following order of priority:

**9.4.1.1 Mutual Agreement.** By negotiation and mutual agreement, on a lump sum basis, between the District and the Contractor on the basis of the estimate of the actual and direct increase or decrease in costs on account of the Change. Upon request of the District, the Contractor shall provide a Change Order Request with detailed estimate of increase or decrease in costs directly associated with performance of the Change along with cost breakdowns of the components of the Change and supporting data and documentation. The Contractor shall be solely responsible for any additional costs or additional time arising out of, or related in any manner to, its failure to provide the estimate of costs within fifteen (15) days after the receipt of the written request of the District for such estimate.

**9.4.1.2 Determination by the District.** By the District, whether or not negotiations are initiated pursuant to Article 9.4.1.1 above, based upon actual and necessary costs incurred by the Contractor as determined by the District on the basis of the Contractor's records. In the event that the procedure set forth in this Article 9.4.1.2 is utilized to determine the extent of adjustment to the Contract Price on account of Changes to the Work, promptly upon determining the extent of adjustment to the Contract Price, the District shall notify the Contractor in writing of the same; the Contractor shall be deemed to have accepted the District's determination of the amount of adjustment to the Contract Price on account of a Change to the Work unless Contractor shall notify the District in writing per Article 17, not more than seven (7) days from the date of the District's written notice, of any objection to the District's determination. Failure of the Contractor to timely notify the District, the



Architect and the District's Inspector of Contractor's objections to the District's determination of the extent of adjustment to the Contract Price shall be deemed Contractor's acceptance of the District's determination and a waiver of any right or basis of the Contractor to thereafter protest or otherwise object to the District's determination. Notwithstanding any objection of the Contractor to the District's determination of the extent of any adjustment to the Contract Price pursuant to this Article 9.4.1.2, Contractor shall, pursuant to Article 9.7 below, diligently proceed to perform and complete any such Change.

**9.4.1.3 Basis for Adjustment of Contract Price.** If Changes in the Work require an adjustment of the Contract Price pursuant to Articles 9.4.1.1 or 9.4.1.2 above, the basis for adjustment of the Contract Price shall be as follows:

**9.4.1.3.1 Labor.** Contractor shall be compensated for the costs of labor actually and directly utilized in the performance of the Change. Such labor costs shall be limited to field labor for which there is a prevailing wage rate classification. Wage rates for labor shall not exceed the prevailing wage rates in the locality of the Site and shall be in the labor classification(s) necessary for the performance of the Change. Use of a labor classification which would increase labor costs associated with any Change shall not be permitted. Labor costs shall exclude costs incurred by the Contractor in preparing estimate(s) of the costs of the Change, in the maintenance of records relating to the costs of the Change, coordination and assembly of materials and information relating to the Change or performance thereof, or the supervision and other overhead and general conditions costs associated with the Change or performance thereof.

**9.4.1.3.2 Materials and Equipment.** Contractor shall be compensated for the costs of materials and equipment necessarily and actually used or consumed in connection with the performance of Changes. Costs of materials and equipment may include reasonable costs of transportation from a source closest to the site of the Work and delivery to the Site. If discounts by Material Suppliers are available for materials necessarily used in the performance of Changes, they shall be credited to the District. If materials and/or equipment necessarily used in the performance of Changes are obtained from a supplier or source owned in whole or in part by the Contractor, compensation therefor shall not exceed the current wholesale price for such materials or equipment. If, in the reasonable opinion of the District, the costs asserted by the Contractor for materials and/or equipment in connection with any Change is excessive, or if the Contractor fails to provide satisfactory evidence of the actual costs of such materials and/or equipment from its supplier or vendor of the same, the costs of such materials and/or equipment and the District's obligation for payment of the same shall be limited to the then lowest wholesale price at which similar materials and/or equipment are available in the quantities required to perform the Change. The District may elect to furnish materials and/or

equipment for Changes to the Work, in which event the Contractor shall not be compensated for the costs of furnishing such materials and/or equipment or any mark-up thereon.

**9.4.1.3.3 Construction Equipment.** Contractor shall be compensated for the actual cost of the necessary and direct use of Construction Equipment in the performance of Changes to the Work. Use of such Construction Equipment in the performance of Changes to the Work shall be compensated in increments of hourly, weekly or monthly rates, whichever shall be the most economical to the District when applied to the scope of the specific change.

Rental time for Construction Equipment moved by its own power shall include time required to move such Construction Equipment to the site of the Work from the nearest available rental source of the same. If Construction Equipment is not moved to the Site by its own power, Contractor will be compensated for the loading and transportation costs in lieu of rental time. The foregoing notwithstanding, neither moving time or loading and transportation time shall be allowed if the Construction Equipment is used for performance of any portion of the Work other than Changes to the Work. Unless prior approval in writing is obtained by the Contractor from the Architect, the District's Inspector and the District, no costs or compensation shall be allowed for time while Construction Equipment is inoperative, idle or on standby, for any reason. The Contractor shall not be entitled to an allowance or any other compensation for Construction Equipment or tools used in the performance of Changes to the Work where such Construction Equipment or tools have a replacement value of \$1,000.00 or less. Construction Equipment costs claimed by the Contractor in connection with the performance of any Change to the Work shall not exceed rental rates (Blue Book) established by distributors or construction equipment rental agencies in the locality of the Site; any costs asserted which exceed such rental rates shall not be allowed or paid. Unless otherwise specifically approved in writing by the Architect, the District's Inspector and the District, the allowable rate for the use of Construction Equipment in connection with Changes to the Work shall constitute full compensation to the Contractor for the cost of rental, fuel, power, oil, lubrication, supplies, necessary attachments, repairs or maintenance of any kind, depreciation, storage, insurance, labor (exclusive of labor costs of the Construction Equipment operator), and any all other costs incurred by the Contractor incidental to the use of such Construction Equipment.

**9.4.1.3.4 Mark-up on Costs of Changes to the Work.** In the event a Change adding to the Work is authorized by the District, Contractor shall be paid a mark-up on the direct costs of the Change for general conditions and administration costs, all overhead (including home office and field overhead) and profit, which mark-up shall not exceed the percentage set forth in the Special Conditions, regardless of the number of Subcontractors, of any tier, performing any portion of any Change to the Work. If a Change

to the Work reduces the Contract Price, the maximum adjustment to the Contract Price shall be the actual cost reduction realized by the reduced or deleted Work multiplied by the percentage set forth in the Special Conditions.

**9.4.1.4 Contractor Maintenance of Records.** In the event that Contractor shall be directed to perform any Changes to the Work pursuant to Article 9.1 or 9.2, or should the Contractor encounter conditions which the Contractor, pursuant to Article 9.6, believes would obligate the District to adjust the Contract Price and/or the Contract Time, Contractor shall maintain detailed records on a daily basis. Such records shall include without limitation hourly records for labor and Construction Equipment and itemized records of materials and equipment used that day in connection with the performance of any Change to the Work. In the event that more than one Change to the Work is performed by the Contractor in a calendar day, Contractor shall maintain separate records of labor, Construction Equipment, materials and equipment for each such Change. In the event that any Subcontractor, of any tier, shall provide or perform any portion of any Change to the Work, Contractor shall require that each such Subcontractor maintain records in accordance with this Article. Each daily record maintained hereunder shall be signed by Contractor's Superintendent or Contractor's authorized representative; such signature shall be deemed Contractor's representation and warranty that all information contained therein is true, accurate, complete and relate only to the Change r referenced therein. All records maintained by a Subcontractor, of any tier, relating to the costs of a Change to the Work shall be signed by such Subcontractor's authorized representative or Superintendent. All records maintained hereunder shall be subject to inspection, review and/or reproduction by the District, the Architect or the District's Inspector upon request. In the event that Contractor shall fail or refuse, for any reason, to maintain or make available for inspection, review and/or reproduction such records and the adjustment to the Contract Price on account of any Change to the Work is determined pursuant to this Article, the District's reasonable good faith determination of the extent of adjustment to the Contract Price on account of such Change shall be final, conclusive, dispositive and binding upon Contractor. Contractor's obligation to maintain records hereunder is in addition to, and not in lieu of, any other Contractor obligation under the Contract Documents with respect to Changes to the Work.

**9.4.2 Adjustment to Contract Time.** In the event of any Change(s) to the Work pursuant to this Article 9, the Contract Time shall be extended or reduced by Change Order for a period of time commensurate with the time reasonably necessary to perform such Change. Such time shall be requested in writing by the Contractor with the Contract price Adjustment Proposal. The time extension request shall be justified by the Contractor by submittal of a CPM analysis accurately portraying the impact of the change on the critical path of the project schedule. Changes performed within available float as indicated in the updated Approved Construction Schedule shall not justify a time extension to the Contract. When agreement is reached between the District and Contractor that a Change shall require an extension of the contract time, the Contractor shall not be subject to Liquidated Damages for such period

of time. If completion of the Work is delayed by causes for which the District is responsible and the delay is unreasonable under the circumstances involved, and not within the contemplation of the Contractor and the District at the time of execution of the Agreement, the Contractor shall not be precluded from the recovery of damages arising therefrom.

**9.4.3 Addition or Deletion of Alternate Bid Item(s).** If the Bid for the Work includes proposal(s) for Alternate Bid Item(s), during Contractor's performance of the Work, the District may elect, pursuant to this Article to add any such Alternate Bid Item(s) if the same did not form a basis for award of the Contract or delete any such Alternate Bid Item(s) if the same formed a basis for award of the Contract. If the District elects to add or delete any such Alternate Bid Item(s) pursuant to the foregoing, the cost or credit for such Alternate Bid Item(s) shall be as set forth in the Contractor's Bid.

**9.5 Change Orders.** If the District approves of a Change, a written Change Order prepared on behalf of the District shall be forwarded to the Contractor describing the Change and setting forth the adjustment to the Contract Time and the Contract Price, if any, on account of such Change. All Change Orders shall be in full payment and final settlement of all claims for direct, indirect and consequential costs, including without limitation, costs of delays or impacts related to, or arising out of, items covered and affected by the Change Order, as well as any adjustments to the Contract Time. Any claim or item relating to any Change incorporated into a Change Order not presented by the Contractor for inclusion in the Change Order shall be deemed waived. The Contractor shall execute the Change Order prepared pursuant to the foregoing; once the Change Order has been prepared and forwarded to the Contractor for execution, without the prior approval of the District which may be granted or withheld in the sole and exclusive discretion of the District, the Contractor shall not modify or amend the form or content of such Change Order, or any portion thereof. The Contractor's attempted or purported modification or amendment of any such Change Order, without the prior approval of the District, shall not be binding upon the District; any such unapproved modification or amendment to such Change Order shall be null, void and unenforceable. Unless otherwise expressly provided for in the Contract Documents or in the Change Order, any Change Order issued hereunder shall be binding upon the District only upon action of the District's Board of Trustees approving and ratifying such Change Order. In the event of any amendment or modification made by the Contractor to a Change Order for which there is no prior approval by the District, in accordance with the provisions of this Article 9.5, unless otherwise expressly stated in its approval and ratification of such Change Order, any action of the Board of Trustees to approve and ratify such Change Order shall be deemed to be limited to the Change Order as prepared by the Project Manager and/or the Architect; such approval and ratification of such Change Order shall not be deemed the District's approval and ratification of any unapproved amendment or modification by the Contractor to such Change Order.

**9.6 Contractor Change Order Requests.**

**9.6.1** Contractor may request changes to the Contract Price and/or Contract Time for extra work or delays to completion of the Work caused by the acts, errors, or omissions of District, its agents or employees, or caused by unforeseen conditions if, and only if, Contractor follows the procedures specified in this Article 9. As used in this Article 9, such acts, errors, or omissions shall include, but not be limited to, the provision of clarifications, drawings,

instructions, or interpretations that involve extra work or delay completion of the Work.

- 9.6.2** If Contractor asserts that Contractor is entitled to an adjustment of the Contract Price and/or Contract Time as the result of an act, error or omission of District, its agents or employees, or as the result of unforeseen conditions, then Contractor may submit a Change Order Request on the Cost Proposal form provided by the District.
- 9.6.3** A Change Order Request must state that it is a Change Order Request, state and justify the reason for the request, and specify the amount of any requested adjustment to the Contract Price and/or Contract Time. Upon District's request, Contractor shall submit such additional information as may be requested by District for the purpose of evaluating the Change Order Request. Such additional information may include a cost proposal meeting the requirements of this Article 9 and written documentation demonstrating Contractor's entitlement to a time extension under Article 7.4. If the Change Order Request seeks an adjustment of the Contract Price for delay, upon District's request, Contractor shall submit written documentation demonstrating Contractor's entitlement to such an adjustment under Article 7.4.
- 9.6.4** A condition precedent to obtaining an adjustment of the Contract Price and/or Contract Time as the results of an act, error or omission of District, its agents or employees, or as the result of an unforeseen condition, is timely submission of a Change Order Request that meets the requirements set forth in Article 9.6.3. A Change Order Request based upon such acts, errors or omissions will be deemed timely submitted if, and only if, it is submitted within three (3) working days of the date Contractor discovers or reasonably should discover, that an act, error or omission of District, its agents or employees, has occurred that may entitle Contractor to an adjustment of the Contract Price and/or Contract Time (even if Contractor has not been damaged, delayed, or incurred extra cost when Contractor discovers, or reasonably should discover, the act, error or omission giving rise to the Change Order Request). A Change Order Request based upon an unforeseen condition will be deemed timely submitted if, and only if, it is submitted within three (3) working days of the date Contractor discovers, or reasonably should discover, the existence of an unforeseen condition that may entitle Contractor to an adjustment of the Contract Price and/or Contract Time (even if Contractor has not been damaged, delayed, or incurred extra cost when Contractor discovers, or reasonably should discover, the unforeseen condition giving rise to the Change Order Request).
- 9.6.5** If the District issues a final decision on all or part of a Change Order Request, Contractor may contest the decision by filing a timely claim under the procedures specified in Article 17. A final decision is any decision on a Change Order Request which states that it is final.
- 9.7 Disputed Changes.** In the event of any dispute or disagreement between the Contractor and the District or the Architect regarding the characterization of any item as a Change to the Work or as to the appropriate adjustment of the Contract Price or the Contract Time on account thereof, the Contractor shall promptly proceed with the performance of such item of the Work, subject to a subsequent resolution of such dispute or disagreement in accordance with the terms of the Contract

Documents. The Contractor's failure or refusal to so proceed with such Work may be deemed to be Contractor's default of a material obligation of the Contractor under the Contract Documents.

- 9.8 Emergencies.** In an emergency affecting the safety of life, or of the Work, or of property, the Contractor, without special instruction or prior authorization from the District or the Architect, is permitted to act at its discretion to prevent such threatened loss or injury. Any compensation claimed by the Contractor on account of such emergency work shall be submitted and determined in accordance with this Article 9.
- 9.9 Minor Changes in the Work.** The Architect may order minor Changes in the Work not involving an adjustment in the Contract Price or the Contract Time and not inconsistent with the intent of the Contract Documents. Such Changes shall be effected by written order and shall be binding on the District and the Contractor. The Project Manager or the District's Inspector may direct the Contractor to perform Changes provided that each such Change does not result in an increase of more than \$500.00 to the Contract Price and no adjustment of the Contract Time. The Contractor shall carry out such orders promptly.
- 9.10 Unauthorized Changes.** Any Work beyond the lines and grades shown on the Contract Documents, or any extra Work performed or provided by the Contractor without notice to the Architect and the District's Inspector in the manner and within the time set forth in Articles 9.2 or 9.6 shall be considered unauthorized and at the sole expense of the Contractor. Work so done will not be measured or paid for, no extension to the Contract Time will be granted on account thereof and any such Work may be ordered removed at the Contractor's sole cost and expense. The failure of the District to direct or order removal of such Work shall not constitute acceptance or approval of such Work nor relieve the Contractor from any liability on account thereof.

## **ARTICLE 10: SEPARATE CONTRACTORS**

- 10.1 District's Right to Award Separate Contracts.** The District reserves the right to perform construction or operations related to the Project with the District's own forces or to award separate contracts in connection with other portions of the Project or other construction or operations at or about the Site. If the Contractor claims that delay or additional cost is involved because of such action by the District, the Contractor shall seek an adjustment to the Contract Price or the Contract Time as provided for in the Contract Documents. Failure of the Contractor to request such an adjustment of the Contract Time or the Contract Price in strict conformity with the provisions of the Contract Documents applicable thereto shall be deemed a waiver of the same.
- 10.2 District's Coordination of Separate Contractors.** The District shall provide for coordination of the activities of the District's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the District in reviewing their respective Construction Schedules when directed to do so. The Contractor shall make any revisions to the Approved Construction Schedule for the Work hereunder deemed necessary after a joint review and mutual agreement. The Construction Schedules shall then constitute the Construction Schedules to be used by the Contractor, separate contractors and the District until subsequently revised.
- 10.3 Mutual Responsibility.** The Contractor shall afford the District and separate contractors

reasonable opportunity for storage of their materials and equipment and performance of their activities at the Site and shall connect and coordinate the Contractor's Work, construction and operations with theirs as required by the Contract Documents.

- 10.4 Discrepancies or Defects.** If part of the Contractor's Work depends for proper execution or results upon construction or operations by the District or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Project Manager any apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor to so report shall constitute an acknowledgment that the District's or separate contractors' completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then discoverable by the Contractor's reasonable diligence.

## **ARTICLE 11: TESTS AND INSPECTIONS**

### **11.1 Tests; Inspections; Observations**

**11.1.1 Contractor's Notice.** If the Contract Documents, laws, ordinances or any public authority with jurisdiction over the Work requires the Work, or any portion thereof, to be specially tested, inspected or approved, the Contractor shall give the Project Manger written notice of the readiness of such Work for observation, testing or inspection at least two (2) working days prior to the time for the conducting of such test, inspection or observation. If inspection, testing or observation is by authority other than the District, the Contractor shall inform the District's Inspector and the Project Manager not less than two (2) working days prior to the date fixed for such inspection, test or observation. The Contractor shall not cover up any portion of the Work subject to tests, inspections or observations prior to the completion and satisfaction of the requirements of such test, inspection or observation. In the event that any portion of the Work subject to tests, inspection or approval shall be covered up by Contractor prior to completion and satisfaction of the requirements of such tests, inspection or approval, Contractor shall be responsible for the uncovering of such portion of the Work as is necessary for performing such tests, inspection or approval without adjustment of the Contract Price or the Contract Time on account thereof.

**11.1.2 Cost of Tests and Inspections.** Costs for tests and inspection of materials shall be paid by the District as provided for herein. Within twenty (20) days after the establishment of the Approved Construction Schedule pursuant to Article 7.3 hereof, the District shall submit to the Contractor a written list of the portions of the Work subject to special tests or inspections to be paid for by the District along with the number of hours or costs of testing or inspection allocated for each such portion of the Work. Should any act, omission or other conduct of the Contractor, any of its Subcontractors, of any tier, or Material Suppliers cause the number of hours or the costs of such tests or inspections to exceed that set forth in the District's list submitted pursuant to the foregoing, the Contractor shall be solely responsible for all such excess costs and the District may deduct such amount from any portion of the Contract Price then or thereafter due the Contractor. The District will pay for all tests and inspections provided that, in addition to the cost to be paid by the Contractor previously set forth in this Article, the Contractor shall pay for all tests and inspections

under any of the following conditions: (i) when such costs are stipulated in the provisions of the Contract Documents to be borne by the Contractor; (ii) when a material is tested or inspected and fails to meet the requirements of the Specifications and/or Drawings; or (iii) when the source of the material is changed after the original test or inspection has been made or approved.

**11.1.3 Testing/Inspection Laboratory.** The District shall select duly qualified person(s) or testing laboratory(ies) to conduct the tests and inspections to be paid for by the District and required by the Contract Documents. All such tests and inspections shall be in conformity with the latest adopted Title 24 of the California Code of Regulations. Where inspection or testing is to be conducted by an independent laboratory or testing agency, materials or samples thereof shall be selected by the laboratory, testing agency, the District's Inspector, the Project Manager or the Architect and not by the Contractor.

**11.1.4 Additional Tests, Inspections and Approvals.** If the Architect, the Project Manager, the District's Inspector or public authorities having jurisdiction over the Work determine that portions of the Work require additional testing, inspection or approval, the Project Manager shall instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the District, and the Contractor shall give timely notice to the Project Manager of when and where tests and inspections are to be made so the District's Inspector and the Architect may observe such procedures. The District shall bear the costs of such additional tests, inspections or approvals, except to the extent that such additional tests, inspections or approvals reveal any failure of the Work to comply with the requirements of the Contract Documents, in which case the Contractor shall bear all costs made necessary by such failures, including without limitation, the costs of corrections, repeat tests, inspections or approvals and the costs of the Architect's services or its consultants in connection therewith. Where required DSA testing of the work identifies a failure rate of ten percent (10%) or greater for any system, scope of work, installation or subtrade that has been specifically targeted, District may, at its sole discretion, order that all such similar systems, installations, scopes of work or subtrade work used in connection with the Project be tested, and the cost to test all such work shall be paid by the Contractor.

**11.2 Delivery of Certificates.** Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect. If a material is not required to be tested, the Architect, Inspector or the District may require Contractor to furnish a certificate bearing the official and legal signature of the supplier with each delivery of such material, which certificate shall state that the material complies with the Specifications.

**11.3 Timeliness of Tests, Inspections and Approvals.** Tests or inspections required and conducted pursuant to the Contract Documents shall be made or arranged by Contractor to avoid delay in the progress of the Work.

## **ARTICLE 12: UNCOVERING AND CORRECTION OF WORK**



## **12.1 Inspection of the Work**

**12.1.1 Access to the Work.** All Work and all materials and equipment forming a part of the Work or incorporated into the Work are subject to inspection by the District, the Project Manager, the Architect and the District's Inspector for conformity with the Contract Documents. The Contractor shall, at its cost and without adjustment to the Contract Price or the Contract Time, furnish any facilities necessary for sufficient and safe access to the Work for purposes of inspection by the District, the Project Manager, the Architect, the District's Inspector, DSA or any other public or quasi-public authority with jurisdiction over the Work or any portion thereof.

**12.1.2 Limitations Upon Inspections.** Inspections, tests, measurements, or other acts of the Architect and the District's Inspector hereunder are for the sole purpose of assisting them in determining that the Work, materials, equipment, progress of the Work, and quantities generally comply and conform with the requirements of the Contract Documents. These acts or functions shall not relieve the Contractor from performing the Work in full compliance with the Contract Documents. No inspection by the Architect or the District's Inspector shall constitute or imply acceptance of Work inspected. Inspection of the Work hereunder is in addition to, and not in lieu of, any other testing, inspections or approvals of the Work required under the Contract Documents.

**12.2 Uncovering of Work.** If any portion of the Work is covered contrary to the request of the Architect, the District's Inspector, the Project Manager or the requirements of the Contract Documents, it must be uncovered by the Contractor for observation by such District representative and be replaced by the Contractor without adjustment of the Contract Time or the Contract Price.

**12.3 Rejection of Work.** Prior to the District's Final Acceptance of the Work, any Work or materials or equipment forming a part of the Work or incorporated into the Work which is defective or not in conformity with the Contract Documents may be rejected by the District, the Project Manager, the Architect or the District's Inspector and the Contractor shall correct such rejected Work without any adjustment to the Contract Price or the Contract Time, even if the Work, materials or equipment have been previously inspected by the Architect or the District's Inspector or even if they failed to observe the defective or non-conforming Work, materials or equipment.

**12.4 Correction of Work.** The Contractor shall promptly correct any portion of the Work rejected by the District, the Project Manager, the Architect or the District's Inspector for failing to conform to the requirements of the Contract Documents, or which is determined by them to be defective, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed. The Contractor shall bear all costs of correcting such rejected Work, including additional testing and inspections and compensation for the Architect's or Inspector's services and expenses made necessary thereby. The Contractor shall bear all costs of correcting destroyed or damaged construction, whether completed or partially completed, of the District or separate contractors, caused by the Contractor's correction or removal of Work which is not in accordance with the requirements of the Contract Documents, or which is defective.

**12.5 Removal of Non-Conforming or Defective Work.** The Contractor shall, at its sole cost and expense, remove from the Site all portions of the Work which are defective or are not in accordance with the requirements of the Contract Documents which are neither corrected by the Contractor nor

accepted by the District.

- 12.6 Failure of Contractor to Correct Work.** If the Contractor fails to commence to correct defective or non-conforming Work within three (3) days of notice of such condition and promptly thereafter complete the same within a reasonable time, the District may correct it in accordance with the Contract Documents. If the Contractor does not so proceed, the District may remove it and store the salvable materials or equipment at the Contractor's expense. If the Contractor does not pay costs of such removal and storage after written notice, the District may sell such materials or equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including without limitation compensation for the Architect's and Inspector's services, attorneys fees and other expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contract Price shall be reduced by the deficiency. If payments of the Contract Price then or thereafter due the Contractor are not sufficient to cover such amount, the Contractor and the Surety shall promptly pay the difference to the District.
- 12.7 Acceptance of Defective or Non-Conforming Work.** The District may, in its sole and exclusive discretion, elect to accept Work which is defective or which is not in accordance with the requirements of the Contract Documents, instead of requiring its removal and correction, in which case the Contract Price shall be reduced as appropriate and equitable.

## **ARTICLE 13: WARRANTIES**

- 13.1 Workmanship and Materials.** The Contractor warrants to the District that all materials and equipment furnished under the Contract Documents shall be new, of good quality and of the most suitable grade and quality for the purpose intended, unless otherwise specified in the Contract Documents. All Work shall be of good quality, free from faults and defects and in conformity with the requirements of the Contract Documents. If required by the District, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment incorporated into the Work. Any Work, or portion thereof not conforming to these requirements, including substitutions or alternatives not properly approved in accordance with the Contract Documents may be deemed defective. Where there is an approved substitution of, or alternative to, material or equipment specified in the Contract Documents, the Contractor warrants to the District that such installation, construction, material, or equipment will equally perform the function and have the quality of the originally specified material or equipment. The Contractor expressly warrants the merchantability, the fitness for use, and quality of all substitute or alternative items in addition to any warranty given by the manufacturer or supplier of such item.
- 13.2 Warranty Work.** If, within one year after the date of Final Acceptance, or such other time frame set forth elsewhere in the Contract Documents, any of the Work is found to be defective or not in accordance with the requirements of the Contract Documents, or otherwise contrary to the warranties contained in the Contract Documents, the Contractor shall commence all necessary corrective action not more than seven (7) days after receipt of a written notice from the District to do so, and to thereafter diligently complete the same. In the event that Contractor shall fail or refuse to commence correction of any such item within said seven (7) day period or to diligently prosecute such corrective actions to completion, the District may, without further notice to

Contractor, cause such corrective Work to be performed and completed. In such event, Contractor and Contractor's Performance Bond Surety shall be responsible for all costs in connection with such corrective Work, including without limitation, general administrative overhead costs of the District in securing and overseeing such corrective Work. Nothing contained herein shall be construed to establish a period of limitation with respect to any obligation of the Contractor under the Contract Documents. The obligations of the Contractor hereunder shall be in addition to, and not in lieu of, any other obligations imposed by any special guarantee or warranty required by the Contract Documents, guarantees or warranties provided by any manufacturer of any item or equipment forming a part of, or incorporated into the Work, or otherwise recognized, prescribed or imposed by law. Neither the District's Final Acceptance, the making of Final Payment, any provision in Contract Documents, nor the use or occupancy of the Work, in whole or in part, by District shall constitute acceptance of Work not in accordance with the Contract Documents nor relieve the Contractor or the Contractor's Performance Bond Surety from liability with respect to any warranties or responsibility for faulty or defective Work or materials, equipment and workmanship incorporated therein.

- 13.3 Guarantee.** Upon completion of the Work, Contractor shall execute and deliver to the District the form of Guarantee included within the Contract Documents. The Contractor's execution and delivery of the form of Guarantee is an express condition precedent to any obligation of the District to disburse the Final Payment to the Contractor.
- 13.4 Survival of Warranties.** The provisions of this Article 13 shall survive the Contractor's completion of Work under the Contract Documents, the District's Final Acceptance or the termination of the Contract.

#### **ARTICLE 14 : SUSPENSION OF WORK**

- 14.1 District's Right to Suspend Work.** The District may, without cause and without invalidating or terminating the Contract, order the Contractor, in writing, to suspend, delay or interrupt the Work in whole or in part for such period of time as the District may determine. The Contractor shall resume and complete the Work suspended by the District in accordance with the District's directive, whether issued at the time of the directive suspending the Work or subsequent thereto.
- 14.2 Adjustments to Contract Price and Contract Time.** If the District orders a suspension of the Work, an adjustment shall be made to the Contract Price for increases in the direct cost of performance of the Work of the Contract Documents actually caused by suspension, delay or interruption ordered by the District; provided however that no adjustment of the Contract Price shall be made to the extent: (i) that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible under the Contract Documents; or (ii) that an equitable adjustment is made or denied under another provision of the Contract Documents. Any such adjustment of the Contract Price shall not include any adjustment to increase the Contractor's overhead, general administrative costs or profit, all of which will remain as reflected in the Cost Breakdown submitted by the Contractor pursuant to the Contract Documents. In the event of the District's suspension of the Work, the Contract Time shall be equitably adjusted.

## ARTICLE 15: TERMINATION

### 15.1 Termination for Cause

**15.1.1 District's Right to Terminate.** The District may terminate the Contract upon the occurrence of any one or more of the following events of the Contractor's default: (i) if the Contractor refuses or fails to prosecute the Work with diligence as will ensure Substantial Completion of the Work within the Contract Time, or if the Contractor fails to substantially Complete the Work within the Contract Time; (ii) if the Contractor becomes bankrupt or insolvent, or makes a general assignment for the benefit of creditors, or if the Contractor or a third party files a petition to reorganize or for protection under any bankruptcy or similar laws, or if a trustee or receiver is appointed for the Contractor or for any of the Contractor's property on account of the Contractor's insolvency, and the Contractor or its successor in interest does not provide adequate assurance of future performance in accordance with the Contract Documents within 10 days of receipt of a request for such assurance from the District; (iii) if the Contractor repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment; (iv) if the Contractor repeatedly fails to make prompt payments to any Subcontractor, of any tier, or Material Suppliers or others for labor, materials or equipment; (v) if the Contractor disregards laws, ordinances, rules, codes, regulations, orders applicable to the Work or similar requirements of any public entity having jurisdiction over the Work; (vi) if the Contractor disregards proper directives of the Architect, the District's Inspector or District under the Contract Documents; (vii) if the Contractor performs Work which deviates from the Contract Documents and neglects or refuses to correct such Work; or (viii) if the Contractor otherwise violates in any material way any provisions or requirements of the Contract Documents. Once the District determines that sufficient cause exists to justify the action, the District may terminate the Contract without prejudice to any other right or remedy the District may have, after giving the Contractor and the Surety at least seven (7) days advance written notice of the effective date of termination. The District shall have the sole discretion to permit the Contractor to remedy the cause for the termination without waiving the District's right to terminate the Contract, or otherwise waiving, restricting or limiting any other right or remedy of the District under the Contract Documents or at law.

**15.1.2 District's Rights Upon Termination.** In the event that the Contract is terminated pursuant to this Article 15.1, the District may take over the Work and prosecute it to completion, by contract or otherwise, and may exclude the Contractor from the site. The District may take possession of the Work and of all of the Contractor's tools, appliances, construction equipment, machinery, materials, and plant which may be on the site of the Work, and use the same to the full extent they could be used by the Contractor without liability to the Contractor. In exercising the District's right to prosecute the completion of the Work, the District may also take possession of all materials and equipment stored at the site of the Work or for which the District has paid the Contractor but which are stored elsewhere, and

finish the Work as the District deems expedient. In exercising the District's right to prosecute the completion of the Work, the District shall have the right to exercise its sole discretion as to the manner, methods, and reasonableness of the costs of completing the Work and the District shall not be required to obtain the lowest figure for completion of the Work. In the event that the District takes bids for remedial Work or completion of the Work, the Contractor shall not be eligible for the award of such contract(s).

**15.1.3 Completion by the Surety.** In the event that the Contract is terminated pursuant to this Article 15.1, the District may demand that the Surety take over and complete the Work. The District may require that in so doing, the Surety not utilize the Contractor in performing and completing the Work. Upon the failure or refusal of the Surety to take over and begin completion of the Work within fifteen (15) days after demand therefor, the District may take over the Work and prosecute it to completion as provided for above. Such remedy is in addition to, and not lieu of, other remedies available to District as provided by law or in equity.

**15.1.4 Assignment and Assumption of Subcontracts.** The District shall, in its sole and exclusive discretion, have the option of requiring any Subcontractor or Material Supplier to perform in accordance with its Subcontract or Purchase Order with the Contractor and assign the Subcontract or Purchase Order to the District or such other person or entity selected by the District to complete the Work.

**15.1.5 Costs of Completion.** In the event of termination under this Article 15.1, the Contractor shall not be entitled to receive any further payment of the Contract Price until the Work is completed. If the unpaid balance of the Contract Price as of the date of termination exceeds the District's direct and indirect costs and expenses for completing the Work, including without limitation, attorneys' fees and compensation for additional professional and consultant services, such excess shall be used to pay the Contractor for the cost of the Work performed prior to the effective date of termination with a reasonable allowance for overhead and profit. If the District's costs and expenses to complete the Work exceed the unpaid Contract Price, the Contractor and/or the Surety shall pay the difference to the District.

**15.1.6 Contractor Responsibility for Damages.** The Contractor and the Surety shall be liable for all damage sustained by the District resulting from, in any manner, the termination of Contract under this Article 15.1, including without limitation, attorneys' fees, and for all costs necessary for repair and completion of the Work over and beyond the Contract Price.

**15.1.7 Conversion to Termination for Convenience.** In the event the Contract is terminated under this Article 15.1, and it is determined, for any reason, that the Contractor was not in default under the provisions hereof, the termination shall be deemed a Termination for Convenience of the District and thereupon, the rights and obligations of the District and the Contractor shall be determined in accordance with Article 15.2 hereof.

**15.1.8 District's Rights Cumulative.** In the event the Contract is terminated pursuant to this Article 15.1, the termination shall not affect or limit any rights or remedies of the District against the Contractor or the Surety. The rights and remedies of the District under this Article 15.1 are in addition to, and not in lieu of, any other rights and remedies provided by

law or otherwise under the Contract Documents. Any retention or payment of monies to the Contractor by the District shall not be deemed to release the Contractor or the Surety from any liability hereunder.

**15.2 Termination for Convenience of the District.** The District may at any time, in its sole and exclusive discretion, by written notice to the Contractor, terminate the Contract in whole or in part when it is in the interest of, or for the convenience of, the District. In such case, the Contractor shall be entitled to payment for: (i) Work actually performed and in place as of the effective date of such termination for convenience of the District, with a reasonable allowance for profit and overhead on such Work, and (ii) reasonable termination expenses for reasonable protection of Work in place and suitable storage and protection of materials and equipment delivered to the site of the Work but not yet incorporated into the Work, provided that such payments exclusive of termination expenses shall not exceed the total Contract Price as reduced by payments previously made to the Contractor and as further reduced by the value of the Work as not yet completed. The Contractor shall not be entitled to profit and overhead on Work which was not performed as of the effective date of the termination for convenience of the District. The District may, in its sole discretion, elect to have subcontracts assigned pursuant to Article 15.1.4 above after exercising the right hereunder to terminate for the District's convenience.

## **ARTICLE 16: MISCELLANEOUS**

**16.1 Governing Law.** This Contract shall be governed by and interpreted in accordance with the laws of the State of California.

**16.2 Successors and Assigns.** Except as otherwise expressly provided in the Contract Documents, all terms, conditions and covenants of the Contract Documents shall be binding upon, and shall inure to the benefit of the District and the Contractor and their respective heirs, representatives, successors-in-interest and assigns.

**16.3 Cumulative Rights and Remedies; No Waiver.** Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not in lieu of or otherwise a limitation or restriction of duties, obligations, rights and remedies otherwise imposed or available by law. No action or failure to act by the District shall constitute a waiver of a right or remedy afforded it under the Contract Documents or at law nor shall such an action or failure to act constitute approval of or acquiescence in a breach hereunder, except as may be specifically agreed in writing.

**16.4 Severability.** In the event any provision of the Contract Documents shall be deemed illegal, invalid, unenforceable and/or void, by a court or any other governmental agency of competent jurisdiction, such provision shall be deemed to be severed and deleted from the Contract Documents, but all remaining provisions hereof, shall in all other respects, continue in full force and effect.

**16.5 No Assignment by Contractor.** The Contractor shall not sublet or assign the Contract, or any portion thereof, or any monies due thereunder, without the express prior written consent and approval of the District, which approval may be withheld in the sole and exclusive discretion of the District. The District's approval to such assignment shall be upon such terms and conditions as

determined by the District in its sole and exclusive discretion.

- 16.6 Independent Contractor Status.** In performing its obligations under the Contract Documents, the Contractor is an independent contractor to the District and not an agent or employee of the District.
- 16.7 Notices.** Except as otherwise expressly provided for in the Contract Documents, all notices which the District or the Contractor may be required, or may desire, to serve on the other, shall be effective only if delivered by personal delivery or by postage prepaid, First Class Certified Return Receipt Requested United States Mail, addressed to the District or the Contractor at their respective address set forth in the Contract Documents, or such other address(es) as either the District or the Contractor may designate from time to time by written notice to the other in conformity with the provisions hereof. In the event of personal delivery, such notices shall be deemed effective upon delivery, provided that such personal delivery requires a signed receipt by the recipient acknowledging delivery of the same. In the event of mailed notices, such notice shall be deemed effective on the third working day after deposit in the mail.
- 16.8 Disputes; Continuation of Work.** Notwithstanding any claim, dispute or other disagreement between the District and the Contractor regarding performance under the Contract Documents, the scope of Work thereunder, or any other matter arising out of or related to, in any manner, the Contract Documents, the Contractor shall proceed diligently with performance of the Work in accordance with the District's written direction, pending any final determination or decision regarding any such claim, dispute or disagreement.
- 16.9 Dispute Resolution; Claims Under \$375,000.00.** Claims between the District and the Contractor of \$375,000.00 or less shall be resolved in accordance with the procedures established in Part 3, Chapter 1, Article 1.5 of the California Public Contract Code, §§20104 et seq.; provided however that California Public Contract Code §20104.2(a) shall not supersede the requirements of the Contract Documents with respect to the Contractor's notification to the District of such claim or extend the time for the giving of such notice as provided in the Contract Documents. The Dispute Resolution provisions of Article 17 herein shall govern and control to the extent not inconsistent with the requirements of Public Contract Code §§20104, et seq.
- 16.10 Attorneys Fees.** Except as expressly provided for in the Contract Documents, or authorized by law, neither the District nor the Contractor shall recover from the other any attorneys fees or other costs associated with or arising out of any legal, administrative or other proceedings filed or instituted in connection with or arising out of the Contract Documents or the performance of either the District or the Contractor thereunder.
- 16.11 Marginal Headings; Interpretation.** The titles of the various Articles of these General Conditions and elsewhere in the Contract Documents are used for convenience of reference only and are not intended to, and shall in no way, enlarge or diminish the rights or obligations of the District or the Contractor and shall have no effect upon the construction or interpretation of the Contract Documents. The Contract Documents shall be construed as a whole in accordance with their fair meaning and not strictly for or against the District or the Contractor.
- 16.12 Provisions Required by Law Deemed Inserted.** Each and every provision of law and clause required by law to be inserted in the Contract Documents is deemed to be inserted herein and the

Contract Documents shall be read and enforced as though such provision or clause are included herein, and if through mistake, or otherwise, any such provision or clause is not inserted or if not correctly inserted, then upon application of either party, the Contract Documents shall forthwith be physically amended to make such insertion or correction.

**16.13 Entire Agreement.** The Contract Documents contain the entire agreement and understanding between the District and the Contractor concerning the subject matter hereof, and supersedes and replaces all prior negotiations, proposed agreements or amendments, whether written or oral. No amendment or modification to any provision of the Contract Documents shall be effective or enforceable except by an agreement in writing executed by the District and the Contractor.

## **ARTICLE 17: DISPUTE RESOLUTION**

### **17.1 CLAIMS**

**17.1.1** The term “claim” as used herein means a written demand or assertion by Contractor seeking an adjustment or interpretation of the Contract Documents, payment of money, extension of time, or other relief with respect to the Contract Documents, including a determination of disputes or matters in question between District and Contractor arising out of or related to the Contract Documents or the performance of the work, and claims alleging an unforeseen condition or an act, error or omission by District, Architect, Inspector or District’s Project Manager, their agents or employees. However, the term “claim” shall not include, and the claims procedures provided under this Article 17, shall not apply to the following:

**17.1.1.1** Claims respecting penalties or forfeitures prescribed by statute or regulation which a government agency is specifically authorized to administer, settle, or determine.

**17.1.1.2** Claims respecting personal injury, death, reimbursement, or other compensation arising out of or resulting from liability for personal injury or death.

**17.1.1.3** Claims respecting a latent defect, breach of warranty, or guarantee to repair.

**17.1.1.4** Claims respecting stop notices.

**17.1.2** If a claim is subject to the procedures specified in Article 9.6, the claim arises upon the issuance of a written final decision denying in whole or in part Contractor’s Change Order Request. If a claim is not subject to the procedures specified in Article 9.6, the claim arises when Contractor discovers or reasonably should discover, the condition or event giving rise to the claim (even if Contractor has not been damaged, delayed, or incurred extra cost when Contractor discovers, or reasonably should discover, the condition or event giving rise to the claim).

**17.1.3** A claim not subject to the procedures specified in Article 9.6 may be asserted if, and only if,



Contractor gives a valid written notice of intent to file the claim within three (3) working days of the date the claim arises under subparagraph 17.1.2. A written notice of intent to file a claim will be deemed valid if, and only if, it identifies the event or condition giving rise to the claim and states its probable effect, if any, with respect to Contractor's entitlement to an adjustment of the Contract Price and/or the Contract Time.

**17.1.4** A claim must include the following:

**17.1.4.1** A statement that it is a claim and a request for a decision pursuant to paragraph 17.3.

**17.1.4.2** A detailed description of the act, error, omission, unforeseen condition, event or other condition giving rise to the claim.

**17.1.4.3** If the claim is subject to the procedures specified in Article 9.6, a statement demonstrating that a Change Order Request was timely submitted as required by Article 9.6. If the claim is not subject to the procedures specified in Article 9.6, a statement demonstrating that a valid notice of intent to file the claim was timely submitted as required by subparagraph 17.1.3.

**17.1.4.4** A detailed justification for any remedy or relief sought by the claim, including to the extent applicable, the following:

**17.1.4.4.1** If the claim involves extra work, a detailed cost breakdown of the amounts claimed, including the items specified in Article 9. The breakdown must be provided even if the costs claimed have not been incurred when the claim is submitted. To the extent costs have been incurred when the claim is submitted, the claim must include actual cost records (including without limitation, payroll records, material and rental invoices and the like) demonstrating that costs claimed have actually been incurred. To the extent costs have not yet been incurred at the time the claim is submitted, actual cost records must be submitted on a current basis not less than once a week during any periods costs are incurred. A cost record will be considered current if submitted within seven (7) days of the date the cost reflected in the record is incurred. At the request of District, claimed extra costs may be subject to further verification procedures (such as having an inspector verify the performance of alleged extra work on a daily basis).

**17.1.4.4.2** If the claim involves an error or omission in the Contract Documents: (i) an affirmative representation under penalty of perjury by Contractor and any affected subcontractors and suppliers that the error or omission was not discovered prior to submitting a bid for the Contract, and (ii) a detailed statement demonstrating that the error or omission reasonably should not have been discovered, by Contractor, its subcontractors and suppliers, prior to submitting a bid for the Contract.

**17.1.4.4.3** If the claim involves an extension of the Contract Time, written documentation demonstrating Contractor's entitlement to a time extension under Article 7.4.

**17.1.4.4.4** If the claim involves an adjustment of the Contract Price for delay, written documentation demonstrating Contractor's entitlement to such an adjustment under subparagraph 7.4 and Article 9, as it may apply.

## **17.2 ASSERTION OF CLAIMS**

**17.2.1** Claims by Contractor shall be first submitted to District for decision.

**17.2.2** Notwithstanding the making of any claim or the existence of any dispute regarding any claim, unless otherwise directed by District, Contractor shall not cause any delay, cessation, or termination in or of Contractor's performance of the Work, but shall diligently proceed with performance of the Work in accordance with the Contract Documents. District will continue to make payments in accordance with the Contract Documents.

**17.2.3** Contractor shall submit a claim in writing, together with the supporting data specified in Article 17.1.4, to District as soon as possible but no later than thirty (30) days after the date the claim arises under Article 17.1.2.

**17.2.4.** Contractor agrees that strict compliance with the requirements of Articles 9.6 and 17.2.3 is an express condition precedent to Contractor's right to arbitrate or litigate a claim. Contractor specifically agrees to assert no claims in arbitration or litigation unless there has been strict compliance with Articles 9.6 and 17.2.3.

## **17.3 DISTRICT DECISION ON CLAIMS**

**17.3.1** District will timely review claims submitted by Contractor. If District determines that additional supporting data are necessary to fully evaluate a claim, District will request such additional supporting data in writing. Such data shall be furnished no later than ten (10) days after the date of such request. District will render a decision promptly and in any case within thirty (30) days after the later of the receipt of the claim or the deadline for furnishing such additional supporting data; provided that, if the amount of the claim is in excess of \$50,000, the aforesaid thirty day period shall be sixty (60) days. Failure of District to render a decision by the applicable deadline will be deemed a decision denying the claim on the date of the deadline. District's decision on a claim or dispute will include a statement substantially as follows:

“This is a decision under paragraph 17.3 of the General Conditions of your Contract. If you are dissatisfied with the decision, and if you complied with the procedural requirements for asserting claims specified in Article 17 of the General Conditions of your Contract, you may have the right to arbitrate or litigate this decision. If you fail to take appropriate action

within thirty (30) days of the date of this decision, the decision shall become final and binding and not subject to further appeal.”

**17.3.2** If Contractor disputes District’s decision on a claim and the amount of the claim in question, when combined with all other claims which have been previously appealed and not yet finally decided, is less than \$100,000, Contractor shall have the right, within thirty (30) days after the District’s decision, to make a demand for arbitration in accordance with paragraph 17.5.

**17.3.4** If a demand for arbitration or, if applicable, notice of election to litigate is not given by Contractor within thirty (30) days after the District’s decision, District’s decision on the claim will be final and binding and not subject to appeal or challenge.

**17.3.5** Any litigation shall be filed in the Superior Court of the State of California for the county in which the Contract was to be performed.

**17.3.6** The parties will attempt in good faith to resolve any controversy or claim arising out of or relating to this Contract by negotiation.

## **17.4 MEDIATION**

**17.4.1** Within sixty (60) days, but no earlier than thirty (30) days, following the earlier of (1) receipt of notice by the other party from AAA of the disputing party’s demand for arbitration or (2) receipt by the other party of the disputing party’s notice of election to litigate, the parties shall submit the matter to non-binding mediation administered by the AAA under its construction industry mediation rules, unless waived by mutual stipulation of both parties.

**17.4.2** If District issues a final decision on all or part of a Change Order Request, Contractor may contest the decision by filing a timely claim under the procedures specified in Paragraph 17.3. A final decision is any decision on a Change Order Request which states that it is final. If the claim in question is less than \$25,000, the parties shall not be represented by counsel in the mediation. If the claim is in excess of \$25,000, then the parties may, but shall not be required to, be represented by counsel in mediation. This requirement of mediation shall not in any way alter or modify the time limitations otherwise provided for claims as described in this Article 4 and no conduct or settlement negotiation during mediation shall be considered a waiver of District’s right to assert that claim procedures were not followed.

## **17.5 ARBITRATION**

**17.5.1** A demand for arbitration shall be in writing and shall state the claim, attach a copy of the District’s decision, state the amount in controversy, if any, and state the remedy sought. Two copies of the demand and attachments and the appropriate filing fee shall be filed with the regional office of the AAA servicing the area of the Project site. Copies of the demand and attachments shall be given to all other parties to the dispute.

**17.5.2** Except as modified by this Article 17.5, arbitration shall be conducted in accordance with the construction industry arbitration rules of the AAA then in effect. The following additional modifications shall be made to the aforesaid AAA rules:

**17.5.2.1** Civil discovery shall be permitted for the production of documents and taking of depositions. Other discovery may be permitted in the discretion of the arbitrator. All disputes regarding discovery shall be decided by the arbitrator.

**17.5.2.2** District and/or District's consultants shall if required by agreement with the District, upon demand by District join in and be bound by the arbitration. District's Representative and District's consultants will have the same rights in any arbitration proceeding as are afforded by the AAA rules to contractor and District.

**17.5.2.3** Contractor's sureties shall be bound by any arbitration award and may join in any arbitration proceeding.

**17.5.2.4** Except as provided in subparagraphs 17.5.2.2 and 17.5.2.3 above, no subcontractor or other person shall have a right or obligation to join in or be a party to any arbitration proceeding provided for in this Article 17 either directly, by joinder, by consolidation or actions, by counter claim, or otherwise without the express written consent of District, contractor, and the joining party.

**17.5.2.5** If more than one demand for arbitration is made by a party with respect to claims referred to District, all such claims shall be consolidated into a single arbitration unless the parties otherwise agree in writing.

**17.5.2.6** No hearing shall be held prior to final completion unless District and Contractor otherwise agree.

**17.5.2.7** The exclusive forum for determining arbitrability shall be the Superior Court of the State of California.

**17.5.3** Unless District and contractor otherwise agree in writing, the arbitration decision shall be made under and in accordance with the laws of the State of California, supported by substantial evidence, and in writing. If the total of all claims or cross claims submitted to arbitration is in excess of \$50,000, the award shall contain the basis for the decision, findings of fact, and conclusions of law. Any arbitration award shall be subject to confirmation, vacation or correction under the procedures and on the grounds specified in the California Code of Civil Procedure including without limitation Section 1296. The expenses and fees of the arbitrators and the administrative fees of the AAA shall be divided among the parties equally. Each party shall pay its own counsel fees, witness fees, and other expenses incurred for its own benefit.

## **17.6 WAIVER**

**17.6.1** A waiver of or failure by District to enforce any requirement in Articles 9 or 17 in connection with any claim shall not constitute a waiver of, and shall not preclude District from enforcing, such requirements in connection with any other claims.

**17.6.2** Contractor agrees and understands that no oral approval, either express or implied, of any claim shall be binding upon District unless and until such approval is ratified by execution of a written Change Order.

*[End of Section]*



## **SECTION 00800 SPECIAL CONDITIONS**

### **1.01 Contract Time**

#### **1.01.1 Substantial Completion of the Work**

The Work shall be commenced on the date stated in the Notice to Proceed issued by the District to the Contractor and shall be completed (Substantial Completion) within Four Hundred Twenty (420) consecutive calendar days from and after the date stated in the Notice to Proceed (Reference Article 7 of the General Conditions).

### **1.02 Liquidated Damages**

#### **1.02.1 Delayed Completion of the Work**

Pursuant to Article 7 of the General Conditions, the Contractor shall be subject to the assessment and withholding of Liquidated Damages for failure to achieve Substantial Completion of the Work within the Contract Time as indicated in item 1.01.1, above. Liquidated Damages shall be at the rate of Three Thousand Dollars (\$3,000) per calendar day until Substantial Completion of the Work is achieved.

#### **1.02.2 Delayed Final Completion of the Work**

Pursuant to Article 7 of the General Conditions, the Contractor shall be subject to the assessment and withholding of Liquidated Damages for failure to achieve Final Completion of the Work after Substantial Completion in accordance with the Contract Documents. Liquidated Damages shall be at the rate of Two Thousand Dollars (\$2,000) per calendar day until Final Completion of the Work is achieved.

#### **1.02.3 Delayed Submittals**

The per day assessment of Liquidated Damages for Contractor's delayed submission of Submittals pursuant to Article 4.8.2.1 of the General Conditions is Three Hundred Dollars (\$300) per calendar day per Submittal until the required Submittal is submitted.

#### **1.02.4 Cumulative Accrual of Liquidated Damages**

If the Contractor fails to timely deliver the Submittals, fails to achieve Substantial Completion, or fails to achieve Final Completion of the Work, the Contractor shall be liable to the District for Liquidated Damages in the amounts set forth above for each such portion of the Work which is not timely delivered or completed within the time allocated for each portion of the Work, such amounts to accrue cumulatively until each such event is achieved in accordance with the Contract Documents.

**1.02.5 Deferred Approval Submittals**

All deferred approvals must be provided to the architect for submission to DSA no later than ninety (90) day after notice to proceed. Submission to architect must be complete with all required details, calculations and engineers’ stamps during the first initial submission to Architect. Liquidated damages at the rate of One Thousand Dollars (\$1,000.00) per calendar day will be assessed against the Contractor for failure to submit all deferred submittals within the stated period. If first submittal is rejected by DSA, the Contractor will be allowed Fifteen (15) days for complete resubmission. Failure to resubmit within Fifteen (15) calendar days will result in assessment of Liquidated damages of One Thousand Five Hundred Dollars (1,500.00) per Calendar day. If second submittal is rejected by DSA, Contractor will be assessed Liquidated Damages at a rate of Two Thousand Dollars (\$2,000.00) per calendar day until third submittal is provided complete to the Design Architect with all DSA comments addressed. All costs for resubmission due to lack of information noted by DSA will be assessed against the contractor. Should Architect/Engineer find that the submission are incomplete and return the document to the Contractor prior to submission to DSA, the Liquidated Damages will continue to be assessed until correction have been made and resubmitted. A firm schedule of submission to the Architect for all Deferred Approvals must be provided by the Contractor no later than thirty (30) calendar days after Notice to Proceed.

**1.03 Insurance**

**1.03.1 Insurance Provided By Contractor**

Pursuant to Article 6 of the General Conditions, the Contractor shall provide and maintain the following insurance coverage amounts as set forth below:

- 1. **Workers Compensation Insurance**  
In accordance with limits established by law.
- 2. **Employers Liability Insurance:** \$1,000,000
- 3. **Commercial General Liability Insurance**
  - Per Occurrence \$2,000,000
  - Aggregate \$5,000,000
- 4. **Automobile Liability Insurance** \$1,000,000
- 5. **Builders Risk Insurance – *Provided by District***  
Contractor will be obligated to pay the required deductible of Ten thousand \$10,000.00 Dollars for each occurrence.
- 6. **Excess Products and Completed Operations** \$2,000,000



**1.03.2 Insurance Provided by Subcontractors**

Pursuant to Article 6 of the General Conditions, all Subcontractors and Sub-Subcontractors shall provide and maintain the following insurance coverage, with minimum coverage amounts as set forth below:

- 1. Workers Compensation Insurance**  
In accordance with limits established by law.
  
- 2. Employers Liability Insurance** \$1,000,000
  
- 3. Commercial General Liability Insurance**  
Per Occurrence \$1,000,000  
Aggregate \$2,000,000
  
- 4. Automobile Liability**  
Bodily Injury/Property Damage Per Occurrence \$1,000,000

**1.04 Drawings and Specifications**

The number of sets of the Drawings and Specifications, which the District will provide to the Contractor, pursuant to Article 2.1.2 of the General Conditions, is Zero (0) sets of reproducible specifications with plans.

**1.05 Number of Contract Documents**

The number of executed copies of the Agreement is six (6); the number of Performance Bonds and Payment Bonds required is four (4).

**1.06 Security**

In addition to the security requirements set forth elsewhere in the Contract Documents, the Contractor must adhere to the following:

**1.06.1 Locked Door Policy**

No building, room or site gate shall be left unsecured for any period of time when not occupied by the Contractor and/or after the Contractor’s daily work hours.

**1.07 Working Hours**

The working hours for this Contract shall be 7:00 a.m. to 7:00 p.m. Monday through Friday. Saturday/Sunday work requires written notification to and written approval from the Director of Facilities, Maintenance & Operations.

Work hours are subject to standard construction hours per the Ordinance set by the City of Moorpark, California. Contractor is expected to work weekends and holidays, as necessary, to complete the work within the specified time of completion without any additional cost to the District. At the District’s request, Contractor shall modify the working hours for the Contract without adjustment of the Contract Time or Contract Price. (Reference General Conditions Article

7.2.1)

If any work performed during school hours is found to be disruptive to the educational process (as determined by the District), the contractor will be required to re-schedule subject work to occur during non-school hours without any additional cost to the District.

**1.08 Temporary Electric Power**

Provide temporary electric power as necessary for execution of work. The Contractor will arrange distribution service point for electric power with the Director of Facilities, Maintenance & Operations. Contractor shall provide secondary meters, necessary wiring, switches, receptacles, etc., and make connections to distribution points. Cost for power based on rates paid by the District will be deducted from the Contractor via a change Order, based upon the power use as indicated on the secondary meter. Meter will be read once every three months by Contractor and verified by representative of the District.

**1.09 Temporary Lighting**

Provide lighting and outlets in temporary structures and building and wherever necessary for proper performance and inspection of work. If operations are performed during hours of darkness and whenever District's Construction Manager deems natural lighting insufficient, provide adequate floodlights, clusters, and spot illumination, as required to facilitate reading of drawings and specifications. Make arrangements with subcontractors for electric services and lighting as necessary in performance of their work. Contractor to pay for all temporary lighting.

**1.10 Temporary Heat and Ventilation**

**1.10.1** Provide heat, fuel and services to protect the work against injury from dampness and cold until final acceptance of all work of the contract.

**1.10.2** When the new HVAC system is used for temporary heat and ventilation, comply with air quality requirements of ASHRAE 62, and the following:

**1.10.2.1** Temporary Filters for Air Systems: Provide temporary filters in air conditioning and ventilating systems to prevent dust and fumes from contaminating the new ductwork and equipment. Use commercial viscous-coated throw away filters, or equal, having efficiency of not less than 60 percent.

**1.10.2.2** At completion, inspect the entire system for dirt and debris. Clean equipment, ducts and plenums that are soiled, at no cost to the District.

**1.10.3** Before casework is delivered to the building, for not less than 5 days prior to installing wood finishes, and throughout placing of this finish and other finish operations such as Drywall, painting and floor covering, the facility must be acclimatized to meet all specification product manufacturer's requirements for temperature and humidity.

**1.10.4** Operate HVAC system over a weekend as directed, for not less than 48 hours to purge VOC and other contaminants from the building.

### **1.11 Temporary Telephone, Fax and email service**

**1.11.1** Provide, maintain and pay for duration of work, for temporary telephone, fax and email service including installation, maintenance and removal for construction needs. Provide one direct line telephone instrument at the first aid station.

### **1.12 Temporary Water Services**

**1.12.1** The Contractor shall provide hydrant meter, obtained from Water District, and service lines to site. Temporary service lines shall be installed and removed by the Contractor, who shall pay all charges for making the connections, running temporary lines, installing meter, removing same at the completion of the work, and disconnecting the services.

**1.12.2** An approved double check valve shall be furnished and installed by the Contractor at the connection if connected to Campus water service.

**1.12.3** All relocations required to clear work of others shall be performed when requested by the Architect. The District reserves the right to make connections to the temporary lines by themselves or by other contractors.

**1.12.4** Drinking water shall be available to meet CAL OSHA requirements at the cost by the Contractor.

### **1.13 Temporary Gas (Not Applicable)**

### **1.14 Temporary Sanitary Facilities**

Provide and maintain temporary toilet facilities for duration of operations. Properly proportion number of fixtures for the number of workers employed all in accordance with CAL OSHA requirements. Provide water tight and floored structures. Maintain in a clean and sanitary condition acceptable to District and Architect.

### **1.15 Utility Costs for Subcontractors**

Distribution of temporary utility services to subcontractors shall be Contractor's responsibility.

## **1.16 Temporary Fire Protection and Safety Requirements**

**1.16.1** The Contractor shall take necessary precautions to guard against and eliminate fire hazards and to prevent damage to construction work, building materials, equipment, temporary field offices, storage sheds, and public and private property. The Contractor shall be responsible for providing, maintaining, and enforcing the following conditions and requirements during the entire construction period.

**1.16.1** Fire Inspection: The Contractor's Superintendent shall inspect the entire project at least once each week to make certain that the conditions and requirements are being adhered to.

**1.16.2** Hose: The number of outlets, supply of hose, and proper hose size to protect the construction area shall be determined by the local Fire Department and provided by the Contractor. Contractor responsible for communication with local Fire Department.

**1.16.3** Fires: Employees shall not be allowed to start fires with gasoline or kerosene or other highly flammable materials. No open fires shall be allowed.

**1.16.4** Flammable Building Materials: Only a reasonable working supply of flammable building material shall be located inside of, or on the roof of, any storage facility.

**1.16.5** Combustible Waste Materials: Oil-soaked rags, papers, and other highly combustible materials must be stored in closed metal containers at all times, and shall be removed from the site at the close of each day's work and more often where necessary, and placed in metal containers with tight hinged lids.

**1.16.6** Gasoline and other flammable or polluting liquids/materials shall not be poured into sewers, manholes, or traps, but shall be disposed of, together with flammable or waste material subject to spontaneous combustion, in a safe manner meeting all applicable laws and ordinances. Make appropriate arrangements for storing these materials outside of the building.

**1.16.7** Provide and maintain fire extinguishers during construction, conveniently located for proper protection, one fire extinguisher for each 5,000 square feet of floor area or less, but not less than four extinguishers. Fire extinguishers shall be ten-pound ABC type. Extinguishers shall meet

approval of Underwriter's Laboratory, and shall be inspected at regular intervals and recharged as necessary.

**1.17** All self-propelled construction equipment, except light service trucks, panels, pickups, station wagons, crawler type cranes, power shovels and draglines, whether moving alone or in combination, shall be equipped with a reverse signal alarm (hub-cap type).

**1.18. Temporary Offices (Inspector, Construction Manager, Architect/Engineer)**

**1.18.1** Prior to starting work, provide and maintain, at Contractors cost, for duration of operations, separate temporary office facilities as required for Project Inspectors, Construction manager, and Architect's administration. Recommend size of office trailer to be no less than 12' x 60'.

**1.18.2** The office shall be conveniently located in area as directed by the District, and in close proximity of the project. Substantially and neatly constructed, weather-tight, well lighted, and neatly painted inside and out. The office shall be heated and cooled with provision for power and internet connection. It shall have doors, which are separately keyed, and two or more windows on opposite sides.

**1.18.3** The facilities for the Project Inspectors, Construction Manager, and Architect's use shall be not less than described herein. The field office facilities shall be of suitable size to accommodate the Project Inspectors office. Construction Manager, and Architect office and an open planning area. The location of the field office trailer will be determined at the time of mobilization and shall be furnished and maintained with the following:

- 1) The Project Inspector, Construction Manager and Architect's field trailer offices shall be furnished each with an office desk (36"x72") total 3, One (1) adjustable padded, rolling desk chairs with arms chairs for each desk, one 3-shelf standard bookshelf each, one 4-drawer legal size metal file cabinet each, one wastebasket. Each desk shall be provided with one phone line and one data line.
- 2) The open area (in the middle of the trailer) shall be equipped with a 42" wall mounted Monitor with HDMI computer connection capability, a plain paper colored (BizHub-Multipurpose) Copier, printer, fax and scanner, networked to a minimum of three (3) computer stations. Communication line to the (BizHub-Multipurpose) must be a dedicated service. One (1) 8' wide drawing layout table of a depth sufficient to allow full size drawings to be laid out flat and opened.

Upon completion of the project, Monitor, (BizHub-Multipurpose) Copier, printer, Fax and Scanner to become the property of the Ventura County Community College District.

- 3) Costs of the field offices, supplies (paper, Toner, etc), and utilities, including cleaning service not less than 3 times per week, shall be by the Contractor.
- 4) Provide and install software for computer systems including but not limited to, all software listed under article 1.19.1.3 or latest version as determined by the District, in original packaging and licensed to the Ventura County Community College District for use by the District, Architect Construction Manager and Project Inspector. Provide instruction and support as to use of same, including all licensing and support costs as required. Upon completion of the project, all software to become the property of the Ventura County Community College District.
- 5) Provide the following: (For use in open area)
  - a) One (1) refrigerated bottled water dispenser, cups and water (not to exceed 10 gallons per week).
  - b) All code books listed on the title sheet of the drawings, **in electronic format.**
  - c) Steel plan rack with plan holders (quantity for 10 );
  - d) Bookshelves (48" x 60");
  - e) One (1) conference table (48" x 96");
  - g) Twelve (12) conference table chairs;
  - h) Two (2) waste baskets.
  - i) One (1) 3' x 4' (Minimum) white Board with colored dry markers and eraser.

## **1.19 Temporary Electronic Communications Equipment and Licensed Software**

**1.19.1** Contractor shall provide at the site, in the office, the following for the use by the Project Inspectors, and Construction Manager:

- 1) **Two (2) Dell M6600 (or latest version) 17" Laps top containing:**
  - a. Intel® Core™ i5-2520M (Dual Core 2.50GHz, 3M cache) with Turbo BoostTechnology 2.0 Processor (or faster)
  - b. Genuine Windows® 7 Professional, No Media, 64-bit, English Operating System (or latest version)
  - c. 17.3" UltraSharp™ FHD(1920x1080) Wide View LED Multi-Touch w/Stylus, Premium Panel Guarantee Display (minimum)
  - d. 4GB DDR3 SDRAM at 1333MHz Memory (minimum)

- e. 500GB hard drive (7200RPM) Hard Drive (minimum)
- f. 8X DVD+/-RW Slot Load w/Roxio and Cyberlink PowerDVD™, no media Optical Drive (minimum)
- g. AMD® FirePro® M8900 Mobility Pro Graphics with 2GB GDDR5 Video Card (minimum)
- h. HDMI connection to wall mounted monitor.

Upon completion of the project, Computers to become the property of the Ventura County Community College District.

- 2) Provide one (1) Large Format Network Scanner, (Colortrac Model Ci40 c with Scan works software) and one (1) imagePROGRAF iPF700 (or equal) wide format printer along with supplies (paper, ink etc) capable of scanning and copying full size construction documents. Scanner and wide format copier to be networked to a minimum of three (3) computers. Scanner and wide format copier to be the property of the District upon completion of the project.
- 3) Software to be included for each computer provided unless otherwise noted:
  - a. Latest version of Windows operating system. Minimum Windows 7.
  - b. Adobe Acrobat latest edition Professional, boxed CD.
  - c. Latest Microsoft office professional. Boxed CD.
  - d. One copy only – Full version of most recent Revit 2013 format software with two (2) user licenses, in original packaging.

All software to licensed to and become the property of Ventura County Community College District.

- 4) Contractor shall supply toner and paper, as needed. One replacement toner cartridge shall be kept on hand in the District's Construction Manager's possession at all times for the duration of the project.

Contractor shall provide similar electronic communication equipment for the Contractor's personnel such as Project Manager, Superintendent, and all of Contractor's project engineers.

## **1.20 Temporary Office (Contractor's Trailer)**

- 1.20.1** Prior to starting work, provide and maintain for duration of operations, temporary office facilities as required for Contractor's administration; likewise, all necessary sheds and facilities for proper storage of tools, materials, and equipment employed in performance of work.

**1.20.2** The office shall be a separate structure. The location of the office trailer will be determined at the time of mobilization to be acceptable to the District. The office structure shall be substantially and neatly constructed, weather-tight, well lighted, and neatly painted inside and out. The office shall be heated and cooled. It shall have doors that are separately keyed and two or more windows on opposite sides.

**1.20.3** The facilities for Contractor's use shall be of suitable size to accommodate the office, and shall be furnished with whatever facilities the Contractor needs.

**1.20.4** Costs of the field offices and utilities, including cleaning service, shall be by the Contractor.

**1.21 Temporary Scaffolding, Stairs, and Hoists**

Provide and maintain for duration of work, in accordance with CAL-OSHA and applicable laws and ordinances, all required temporary standing scaffolding, and temporary stairs, ladders, ramps, runways and hoists for use of all trades, unless otherwise specified in Contract Documents.

**1.22 Temporary Guards, Barricades, and Lights**

**1.22.1** Provide construction canopies, barricades, fences, guards, railings, lights, and warning signs necessary and required by law, and take necessary precautions required to avoid injury or damage to any and all persons and property.

**1.22.2** Provide and maintain protective fences and barricades as shown on drawings and as Contractor may deem necessary to protect construction yard, storage areas and work in place, subject to approval as to type and appearance. Hog wire fencing is not acceptable Remove all temporary fences and barricades upon project completion.

**1.23 Protection of Work and Facilities**

**1.23.1** Protect all adjacent property, roads, streets, curbs, shrubbery, lawns, erosion control materials and planting during construction operations. All damaged material shall be replaced and/or repaired at the expense of the Contractor. Maintain a chain link fence around the perimeter of the project's site for the duration of construction and if necessary patch damage due to fence installation.

**1.23.2** Upon completion deliver the entire work to the District in proper, whole and unblemished condition. Work outside of the immediate construction site shall be restored to a whole and unblemished condition immediately upon completion of that portion of the work.



**1.23.2.1** Parts of work in place that are subject to injury, because of operations being carried on adjacent thereto, shall be covered, boarded up, or substantially enclosed with adequate protection.

**1.23.2.2** The Contractor shall be responsible for preventing the overloading of any part of the facilities beyond their safe calculated carrying capacity by the placing of materials and/or equipment, tools, machinery, or any other items thereon.

**1.23.2.3** The District may provide such watchman services deemed necessary to protect the District's interest, but any protection so provided by the District shall not relieve the Contractor of the responsibility for the safety and condition of the work and material until the completion and acceptance thereof. The Contractor shall employ such watchman services as he may deem necessary to properly protect and safeguard the work and material.

## **1.24 Special Controls**

### **1.24.1 Use of Powder-Driven Fasteners**

The use of powder set (cartridge type) anchors or lugs for attaching of any work is strictly prohibited on this project unless approved in writing by the Architect.

### **1.24.2 Use of Explosives**

Blasting will not be permitted unless approved in writing by the Architect.

**1.24.3 Dust Control** Through-out the entire Contract period, effectively dust-palliate the working area, roads, and storage areas constructed under this Contract and involved portions of the site, except during such periods that other contractors may be performing work of separate contracts in these areas. Such application shall consist of intermittent watering and sprinkling of such frequency as will satisfactorily allay the dust during all hours that work is being performed. At no time shall water be allowed to pond or puddle. Ponds and puddles shall be removed immediately and steps taken to remove or dry the mud resulting from the ponds or puddles.

## **1.25 Water Control**

Surface or subsurface water or other fluid shall not be permitted to accumulate in excavations or under the structures. Should such conditions develop or be encountered, the water or other fluid shall be controlled and suitably disposed of by means of temporary pumps, piping, drainage lines and ditches, dams or other methods approved by the Architect.

## **1.26 Project Identification**

Provide and maintain one sign only on the property at location as directed by Architect. Signboard shall contain information and be of size as detailed on the

drawings. Small direction signs may be installed if specifically approved by Architect. Signs by subcontractors and material suppliers will not be permitted.

**1.27 Contractor Vehicles on Campus**

Contractor's vehicles shall be restricted to access routes established by the Director of Facilities, Maintenance & Operation. Parking of Contractor's employees' vehicles will be limited to areas as established by the Director of Facilities, Maintenance & Operation, not necessarily adjacent to the site.

**1.28 Removal of Temporary Construction**

Remove temporary office facilities, toilets, storage sheds, fences, and other construction of temporary nature from site as soon as progress of work permits. Recondition and restore portions of site occupied by same to a condition acceptable to Architect.

**1.29 Use of Facilities**

The Contractor and subcontractor shall not, during hours of construction or at times when they are on site to perform work under the contract, use any of the campus facilities, including but not limited to, the restrooms, phones and roadways and the like without prior permission of the campus Director of Facilities, Maintenance & Operations.

**1.30 Damages**

The Contractor shall be responsible to report and repair, at no additional cost to the District, any damage to College property caused by Contractor, Contractor's employees, Subcontractors, material suppliers, or any other persons or entities, which are onsite as a result of the Contract and work there under. Contractor shall notify the Director of Facilities, Maintenance & Operations and Construction manager in writing immediately (not exceeding one hour) of the occurrence, and provide a description of the damage and the exact location. The Contractor shall immediately contact the Director of Facilities, Maintenance & Operations, the Construction Manager and Project Inspector, and immediately repair the damage using materials of equal or superior grade to that which was damaged. No backfilling or covering up of damage or repairs shall be performed by the Contractor until such time as the District representative has inspected the work and provided the Contractor with written approval to cover the work.

**1.31 Waste Management**

Contractor shall not use the campus dumpsters, or dispose of waste or any other items, on Campus.

**1.32 State and College Regulations**

The Contractor and his Subcontractors shall comply with all District, City, County and State regulations regarding noise, dust, smoke, fire and safety rules, and shall keep the site and surrounding areas clean and free of debris.

**1.33 Drawings and Plans**

The terms “drawings” and “plans” are used interchangeable in the Contract Documents and have the same meaning.

**1.34 Approval for Commencement of Work**

The Contractor shall obtain approval from the Director of Facilities Maintenance & Operations, before commencing work in any existing occupied area, or before working on existing piping, wiring, or equipment. The Contractor shall indicate the particular area where work will be in progress and the length of time any existing system will be out of service. This work is to be scheduled in such a manner so as not to disrupt present operations, where possible. If new construction requires interruption of present operations, the Contractor shall obtain approval from the parties named above, after providing them with specific information regarding areas, dates, hours of the day, and number of hours any interruption is expected to take place. All interruption of services shall be approved by the Director of Facilities Maintenance & Operations, in writing, prior to such interruptions and at the sole discretion of the District. The Contractor shall perform such work on weekends, after regular working hours, or in incremental blocks of time as directed by the District, at no additional cost to the contract price. Work performed as herein described shall not be a basis for an extension to the contract time for completion of all work.

**1.35 Verify Existing Conditions**

The Contractor shall verify, identify and locate all utilities (above and below grade, visible and concealed), and all conditions and dimensions of the Work as described in the Contract Documents, prior to starting construction. All Subcontractors shall verify at the Site all conditions and measurements related to their work.

**1.36 Scaling Dimensions from Drawings**

In no case shall working dimensions be scaled from plans, sections, or details from the Working Drawings. If no dimension is shown, the Contractor shall request in writing that the Architect provide clarification and dimensions.

**1.37 Similar Conditions**

The intent is to provide a fully functional finished product, complete in every respect. Where a specific detail is not shown, the construction shall be similar to that indicated or noted for similar conditions and as necessary for a complete installation. References of notes and details to specific conditions and locations shall not limit their applicability. Materials for similar use shall be of the same type and manufacturer, unless otherwise indicated or specified as different. Any deviation must be approved in writing, by the Architect and District, prior to incorporation into the work.

**1.38 Handicap Access Regulations**

The Contractor and all Subcontractors shall comply with Title 24, Disabled Access Regulations and ADA, Americans with Disabilities Act Regulations, whether or not specifically indicated on the Contract Documents. Where existing paths of travel are interrupted due to construction, barrier-free paths of travel shall be maintained by the Contractor, without adjustment to Contract Price or Contract Time.

**1.39 Items marked “N.I.C.” (Not in Contract)**

Items marked N.I.C. in the Drawings are not part of the Work. In most instances, they are included for coordination under this Contract of the Work with concurrent or future work outside this contract. However, the Contractor shall review all items marked N.I.C. and provide the District and Architect notice and deadline dates of when the items are needed onsite for coordination and incorporation into the project. Failure by the Contractor to give notice to the District and Architect and to provide such notice in sufficient time so as to allow District to select, order and receive the items shall not be the basis for delay claims, time extensions, or increased cost to the contract price.

**1.40 Coordination for all Trades**

The Contractor shall be responsible for the proper location and size of openings for all trades, and shall coordinate all construction as indicated by the Contract Documents, including Shop Drawings reviewed by the Architect.

**1.41 Items Not Identified in Construction Documents**

Any conditions or installations not identified in the Contract Documents and affecting the Work to be performed shall be brought to the attention of the Architect in order that cost and responsibility for any added work may be determined before work is undertaken. The Contractor’s notice to the Architect of such installations or conditions shall be in writing. Pending receipt of written direction from the Architect, the Contractor shall not disturb or perform construction operations in any area affected by such installations or conditions.

**1.42 Vehicular Access and Parking**

Construction, which might affect existing College vehicular access and parking, shall be scheduled during non-school hours. The Contractor shall immediately vacate any area if Contractor’s operations or activities curtail vehicular access to the campus or to parking. Fire Department vehicular access to and around the construction area shall be maintained at all times by the Contractor clear of obstruction. Contractor shall provide keys to all gates to local Fire Department and District representatives for gate access.

**1.43 Right of Access**

The District, or its representative(s), and the Architect shall be able at all times to enter the construction site and observe the work. They shall have the right to reject defective materials and workmanship and to require appropriate corrections

at the Contractor's expense. The Contractor shall not be relieved of any responsibility under this contract to provide materials and equipment in accordance with the Contract Documents for failure by the Architect and/or District representatives to discover, or otherwise bring to the attention of the Contractor, any deficiencies with the work.

#### **1.44 Restoration of Existing Conditions**

The Contractor shall restore all landscaping, paving, and grading to the original condition at all areas adjoining the construction sites. Prior to performing any work on the project, the Contractor shall, at his sole expense, locate and mark the locations of all components of the irrigation systems which will, or may be, affected by or interfere with work under the contract. The Contractor shall meet with the Director of Facilities, Maintenance & Operations to develop a plan and schedule to expose and rework the irrigation system as necessary to maintain continuous uninterrupted functioning of the irrigation system. In the event that irrigation lines, sprinklers, control wiring or the like are damaged, the Contractor shall notify the District Project Manager/Director of Facilities Maintenance & Operations Office representative within one (1) hour, and within four (4) hours of the occurrence provide a written description of the damage and its exact location. The Contractor shall immediately repair the damage using materials of equal or superior grade to that which was damaged. No backfilling or covering up of damage or repair shall be performed by the Contractor until such time as the Director of Facilities Maintenance & Operations Office representative has inspected the work and provided the Contractor with approval to cover the work.

Should cutting or removal of existing concrete be necessary in the execution of the work, such cutting and or removal shall extend from panel joint to panel joint. Replacement concrete for all walkways shall be a minimum of 3,500 pound compressive strength with minimum ¾" aggregate, or greater as directed by the Architect or Structural Engineer. Replacement concrete shall be a minimum of 4" thick, with edges thickened to 6" minimum, and shall contain #4 rebar, 18" O.C. ea. way, and doweled a minimum of 6" into adjacent concrete and fastened in place with two part epoxy designed for this purpose. Contractor shall provide deep scored control joints at 10' O.C. intervals unless otherwise directed by the Architect or the District. All soil beneath concrete shall be brought to minimum 90% compaction, or as directed by the Soils Engineer.

#### **1.45 Municipal Laws and Regulations**

The Contractor shall have full knowledge of, and at no additional cost to the contract comply with, all laws and regulations including, but not limited to, limitations on noise, hours of operation, hauling routes or limits on weight of equipment traveling on adjacent streets, and any other limitations which might affect the Contractor's work and operations.

**1.46 Weekend Hours**

The contract time is expressed in calendar days. The Contractor may perform work, with prior notification as per Article 1.07 of the Special Conditions, on weekends or holidays, at his discretion. Should it be necessary for inspectors, District personnel, consultants, or Construction Manager to visit the work site on weekends or holidays, additional cost, if any, shall be reimbursed to the District by the Contractor. The District, at its sole discretion, may direct certain portions of the work to be performed after hours, or on weekends or holidays, in order to minimize interruption to the academic operations of the College. The Contractor shall reflect in his Progress Schedule all work, which may impact academic operations, and at Contractor's sole expense, and as directed by the District, perform all work at times convenient to the District.

**1.47 Grading Permit & Haul Permit**

Contractor must meet all insurance and bond requirement to pull a grading permit and haul permit from the City of Moorpark. The District will pay the cost of the grading permit directly to the City of Moorpark and the Contractor will be responsible for paying for the haul permit.

**1.48 Testing and Inspection Costs**

**1.48.1** All costs for testing and inspection shall be paid by the District. However, the Contractor shall be responsible for all costs incurred for re-testing that may be required due to failed tests. Upon receipt from the Contractor of a Progress Schedule in accordance with the Contract Documents, the District shall provide a copy of the Progress Schedule to the Testing Laboratory and obtain from them a cost to perform all necessary inspections for the project based on the timeframes set forth in the Progress Schedule. The Contractor shall reimburse the District for quantities, which exceed the scheduled amounts of time.

**1.48.2** If the Contractor uses a fabricator or supplier subject to DSA inspection or documentation from beyond a 100 mile radius of the Project Site, costs above and beyond those for the same inspections and documentation were it to occur within a 100 mile radius of the Project Site, including, but not limited to, out of state tests and inspections, per diem, travel, or the like, will be paid by the District and the District shall be reimbursed by the Contractor upon submittal by the District to the Contractor of the costs incurred.

**1.49 Needless Requests for Information**

Any needless Request for Information (RFI) will be billed to the Contractor by the A/E team at the additional service rate contained in their respective contracts. A needless RFI is any request for which an answer is in the plans or specifications, or Contract related correspondence, prior to the date of the RFI. Needless punch list visits will be billed in the same way.

**1.50 E-Mail Address**

All parties shall have an Email address and be responsible for all correspondence distributed via Email.

**1.51 Service Charges**

Electrical, water, telephone, and other utility charges will be billed to the contract at the same rate paid by the Ventura County Community College District (VCCCD).

**1.52 Material Substitutions**

Any and all material specification substitutions must be submitted to the Architect for approval no later than seven (7) days prior to the bid due date. Any substitutions submittal after that date will not be consider, unless specified product has ceased to exist.

**1.53 Electronic Schedule Files**

Pursuant to the requirements of the General Conditions under Article 7, the Contractor shall provide copies of project schedules submitted to the District on paper, including but not limited to, weekly, semi-monthly & monthly schedule updates, on compact discs, in the proper file format to function in the scheduling program provided by the Contractor to the District as required under Article 7 of the General Conditions.

**1.54 Changes to the Work for Contractor Convenience**

Any changes to the Work resulting from a request by the Contractor to deviate from the approved Contract Documents or as a result of the Contractor not following the Contract Documents that requires additional architectural or engineering services, including but not limited to document submittal to the Division of State Architects (DSA), will be billed to the Contractor by the A/E team at the additional service rate contained in their respective contracts.

**1.55 Mark-Ups on Changes to the Work**

In the event of Changes to the Work, the mark-up for all general conditions, costs, overhead (including home and field office overhead), profit and bond, shall not exceed **Twenty Percent (20%)** of the direct actual costs of the performance of an additive Change, as determined in accordance with the provisions of Article 9.4 of the General Conditions. However, in the event that Contractor self-performs the entirety of the Change, the mark-up for all general conditions, costs, overhead (including home and field office overhead), profit and bond, shall not exceed **Fifteen Percent (15%)** of the direct actual costs of the performance of an additive Change, as determined in accordance with the provisions of Article 9.4 of the General Conditions. In addition, the mark-up shall include the actual, direct cost of the bond for such Change.

The foregoing limitation or mark-up shall apply regardless of the number of subcontractors, of any tier, performing any portion of such additive Change to the Work. In the event that the Work of such additive Change is performed in part by a

subcontractor, Contractor agrees to allocate at least Ten Percent (10%) to such subcontractor. In the event the Change is deductive, the District shall receive a credit equal to the value of the direct actual costs of the Work of the deductive Change plus Five (5%) of such direct actual costs for all general conditions, overhead (including home and field office overhead), profit and bond. General Contractor may charge Overhead and Profit based on the direct cost to the Subcontractor(s). General Contractor's Overhead and Profit shall not be charged or calculated on top of, or as percentage of, the Subcontractor(s) or Vendor's Overhead and Profit.

**1.56 Allowances**

The following allowances are in addition to the scope of the Work as defined in the Contract Documents and the Contractor shall add all Allowances to complete the work and shall include the total Allowances amount in the Bid Proposal Lump Sum Amount (Refer to Bid Proposal, Section 00210).

List of Allowances

Item	Description	Amount (\$)
1	No Allowance included in the Project	[Enter Amount(s)]

The District may utilize the above allowances up to the total amount during the course of construction by issuing a Work Order(s) to the Contractor. A deductive Change Order will be issued at the completion of the Work to return the entire balance of the unused allowances to the District, without application of any mark-up.

**1.57 Inclement Weather Days**

Pursuant to Article 7.4.1 of the General Conditions, the number of Working Rain Days (including inclement weather) for this Contract is Twenty Five (25) Calendar days. Saturday & Sunday days apply only if Contractor had requested to work on those days as required per 1.07.

**1.58 District's Construction Manager**

The District's Construction Manager is Heery International, Inc.

**1.59 Communication via Phone/Fax/email**

Contractor's phone, fax and email systems shall be in service at all times 24/7 for the duration of the contract.

**1.60 Storm Water Prevention Pollution Plan, SWPPP**

Contractor is responsible to implement and maintain the SWPPP program to comply with all local and State regulatory requirements. Testing and inspections will be performed by Independent consultant. All implementations of the SWPPP requirements will be the cost of the Contractor and all cost to be included in proposal. SWPPP plan and manual included in bid package. Refer to [www.casqa.org](http://www.casqa.org) for BMP Fact Sheet.

*[End of Section]*



**SECTION 00900**  
**VENTURA COUNTY COMMUNITY COLLEGE DISTRICT**  
**LABOR COMPLIANCE PROGRAM**

On this day, \_\_\_\_\_\* the Board of Trustees (“Board”) of the Ventura  
(Date)  
County Community College District (“District”) hereby finds that the Ventura County Community  
College District has initiated and enforced its LCP, pursuant to Labor Code Section 1771.7(d)(1).(2),  
which has been approved by the Department of Industrial Relations.

\_\_\_\_\_  
Contact Person

\_\_\_\_\_  
Initial Approval Date

*\*VCCCD Resolution C-18B - adopting a labor compliance program under AB 1506 for  
Proposition 47 and 55-funded public works projects - was adopted by the Board of Trustees  
December 7, 2004.*

**INTRODUCTION**

The Ventura County Community College District (District) issues this Labor Compliance Program (LCP) manual for the purpose of identifying its policy relative to the responsibilities and procedures applicable to the labor compliance provisions of the state and federally funded public works contracts. This LCP contains the labor compliance standards required by state and federal laws, regulations, directives, as well as District policies and contract provisions.

The California Labor Code Sections 1770 *et seq.* and Education Code Section 17424 require that all contractors on public works pay their workers based on the prevailing wage rates, which are established and issued by the Department of Industrial Relations, Division of Labor Statistics and Research.

In establishing this LCP, the District adheres to the statutory requirements as enunciated in Section 1771.5(b) of the Labor Code, which include:

1. All bid invitations and public works contracts shall contain appropriate language concerning the requirements of this chapter.
2. A pre-construction conference shall be conducted with the contractor and subcontractors to discuss federal and state labor law requirements applicable to the contract.
3. Project contractors and subcontractors shall maintain and furnish, at a designated time, a certified copy of each weekly payroll containing a statement of compliance signed under penalty of perjury.
4. The District shall review, and, if appropriate, audit payroll records to verify compliance with this chapter.
5. The District shall withhold contract payments when payroll records are delinquent or inadequate.
6. The District shall withhold contract payments equal to the amount of underpayment and applicable penalties when, after investigation, it is established that underpayment has occurred.

It is the intent of the District to actively enforce this LCP on all District public works projects which use funds derived from either the Kindergarten - University Public Facilities Bond Act of 2002 or 2004 in accordance with Labor Code Section 1771.7.

Should applicable sections of the Labor Code or Title 8 of the California Code of Regulations undergo alteration, amendment, or deletion, the District will modify the affected portions of this program accordingly.

**Questions regarding the District's LCP and questions regarding the California Labor Code, including issues relating to this LCP, should be directed to: Ventura County Community College District, Attn: Capital Planning, Design and Construction, 103 Durley Avenue, Camarillo, CA 93010.**

## **I. PUBLIC WORKS SUBJECT TO PREVAILING WAGE LAWS**

State prevailing wage rates apply to all public works contracts as set forth in Labor Code Sections 1720, *et seq.*, and include, but are not limited to, such types of work performed under contract as construction, modernization, alteration, demolition, installation or repair. The Division of Labor Statistics and Research (DLSR) predetermines the appropriate prevailing wage rates for particular construction trades and crafts by county.

Applicable Dates for Enforcement of the LCP:

The applicable dates for enforcement of a District's LCP are established by Section 16425 of the California Code of Regulations. Contracts are not subject to the jurisdiction of the LCP until after the Program has received initial or final approval.

## **II. COMPETITIVE BIDDING ON DISTRICT PUBLIC WORKS CONTRACTS**

The District publicly advertises upcoming public works projects to be awarded according to a competitive bidding process.

All District bid advertisements (or bid invitations) and construction contracts shall contain appropriate language concerning the requirements of the Public Works chapter of the Labor Code.

## **III. PRE-CONSTRUCTION MEETING**

After the District awards the public works contract and prior to the commencement of the work, a Pre-Construction Conference shall be held by the District with the Contractor and listed subcontractor(s). At that meeting, the District will discuss the federal and state labor law requirements applicable to the contract and will provide the Contractor and each listed subcontractor with a Checklist of Labor Law Requirements (presented in Attachment A) and will discuss in detail the following checklist items:

1. The Contractor's and subcontractor(s) duty to pay prevailing wages (Labor Code Section 1770, *et seq.*);
2. The Contractor's and subcontractor(s) duty to employ registered apprentices on public works projects (Labor Code Section 1777.5);
3. The penalties for failure to pay prevailing wages, failure to employ registered apprentices, and failure to submit complete Certified Payroll Records, which include forfeitures and debarment (Labor Code Sections 1775, 1776, 1777.7, and 1813);
4. The requirement to maintain and submit copies of weekly certified payroll records to the District with the pay application, but not less than monthly or within 10 days of request by the District and penalties for failure to do so under Labor Code Section 1776 (g).

This requirement includes and applies to all subcontractors performing work on District projects even if their portion of the work is less than one half of one percent (0.5%) of the total amount of the contract;

5. The prohibition against employment discrimination (Labor Code Sections 1735 and 1777.6; the Government Code; and Title VII of the Civil Rights Act of 1964, as amended);
6. The prohibition against accepting or extracting kickbacks from employee wages (Labor Code Section 1778);
7. The prohibition against accepting fees for registering any person for public works (Labor Code Section 1779) or for filing work orders on public works (Labor Code Section 1780);
8. The requirement to list subcontractors (Public Contract Code Section 4100, *et seq.*);
9. The requirement to provide the District's Labor Compliance Program Representative(s) (LCPR(s)) a list of all subcontractors with contract amounts less than one half of one percent (0.5%). The District's LCP also requires prompt notification of any changes, additions or deletions to the subcontractors list;
10. The requirement to be properly licensed and to require all subcontractors to be properly licensed, and the penalty for employing workers while unlicensed (Labor Code Sections 1021 and 1021.5, and Business and Professions Code Section 7000, *et seq.*, under California Contractors License Law);
11. The prohibition against unfair competition (Business and Professions Code Sections 17200-17208);
12. The requirement that the Contractor and subcontractor(s) be properly insured for Workers' Compensation (Labor Code Section 1861);
13. The requirement that the contractor(s) abide by the Occupational Safety and Health laws and regulations that apply to the particular public works project.

The Contractor and subcontractor(s) present at the meeting will be given the opportunity to ask questions of the LCPR(s) relative to any of the Labor Law Requirements Checklist. The Checklist of Labor Law Requirements will then be signed by the prime contractor's representative, each subcontractor's representative, and the District's LCPR. If a subcontractor cannot attend the Pre-Construction Conference, then it shall be the prime contractor's responsibility to forward the checklist of Labor Law requirements and any relevant information. Furthermore, the prime contractor shall collect signed copies from the absent subcontractors and submit them to the District as required in the contract for upfront documentation.

At the Pre-Construction meeting, the LCPR will provide the prime contractor(s) with a copy of the District's approved LCP and all applicable Prevailing Wage Rate Determinations. Each contractor present will receive a pre-construction packet which includes: a copy of the checklist of Labor Law Requirements, applicable Prevailing Wage Rate Determinations, a blank certified payroll record form A-1-131, a blank fringe benefit statement, and additional information and forms pertaining to Labor Compliance. The LCPR will also state where a copy of the District's LCP, applicable Prevailing Wage Rate Determinations, and Labor Code relating to Public Works and Public Agencies (Part 7, Chapter 1, Sections 1720-1861) will be available at all times.

It will be the Contractor's responsibility to provide copies of the approved LCP, if requested, to all subcontractors and to any substituted subcontractor performing work on the District's project(s).

#### **IV. RESPONSIBILITIES OF CONTRACTOR(S) AND EACH SUBCONTRACTOR**

##### **A. Certified Payroll Records Required**

The Contractor shall maintain payrolls and "basic payroll records" during the course of the work and shall preserve them for a period of three (3) years thereafter for all trades workers working at the District's project sites. Such records shall include the name, address, and social security number of each worker, his or her classification, a general description of the work each employee performed each day, the rate of pay (including rates of contributions for, or costs assumed to provide fringe benefits), daily and weekly number of hours worked, deductions made, and actual wages paid.

##### **1. Submission of Certified Payroll Records**

The Contractor shall maintain and submit all weekly certified payroll records, including those of all subcontractors, to the District with the pay application, but not less than monthly. The District reserves the right to modify the CPR submittal frequency at its discretion. Additionally, the Contractor shall be responsible for the submittal of payroll records of all subcontractors performing work on the public works project. All weekly-certified payroll records shall be accompanied by an original statement of compliance signed by the contractor(s) under penalty of perjury pursuant to Labor Code Section 1771.5(b)(3) and applicable regulations.

Owner-Operators are to be reported by the Contractor employing them, rental equipment operators are to be reported by the rental company paying the workers' wages.

Sole owners and partners who work on a contract must also submit a CPR listing

the days and hours worked, and the trade classification descriptive of the work actually done.

Basic payroll records may be requested by the District or LCPR at any time and shall be provided within 10 days following the receipt of the request.

2. Review of Certified Payroll Records

Certified payroll records shall be routinely reviewed by the Contractor for the payment of prevailing wage rates.

3. Full Accountability

Pursuant to Labor Code Section 1772, workers employed by the Contractor and subcontractor(s) in the execution of any contract for public works are deemed to be employed upon the public work.

The name, address and social security number of every individual, laborer or craftsperson working at the project site must appear on the payroll along with the classification of the work performed, the wages being paid, and the days and hours worked. The basic concept is that the employer who pays the trades worker must report that individual on its payroll. This includes individuals working as apprentices in an apprenticeship craft.

In addition to submitting the certified payroll records to the District, the contractor(s) shall make the records available for inspection by the LCPR(s), an authorized representative of the District and the Department of Industrial Relations, and shall permit such representatives to interview trades workers during working hours on the project site.

4. Responsibility for Subcontractor(s)

The Contractor shall be responsible for ensuring adherence to labor standards provisions by its subcontractor(s). Moreover, the Contractor is responsible for Labor Code violations by its subcontractors in accordance with Labor Code Section 1775 and applicable sections of the Labor Code and California Code of Regulations.

5. Payment to Employees

Employees must be paid unconditionally the full amounts which are due and payable for the period. Therefore, an employer must establish a fixed workweek (i.e., Sunday through Saturday) with an established payday (such as every Friday, every other Friday, or the preceding day should such payday fall on a

holiday) but in no case less than semi-monthly (Labor Code Section 204). On each and every payday, each worker must be paid all sums due as of the end of the preceding pay period and must be provided with an itemized wage statement (Labor Code Section 226).

As previously stated, any person who does not hold a valid contractor's license cannot be a subcontractor (Labor Code Sections 1020-1024). Therefore, such a person and anyone hired by such a person is the worker or employee of the Contractor or bona fide subcontractor who contracted for his or her services for purposes of prevailing wage requirements, certified payroll reporting and workers' compensation laws.

A worker's total hourly rate must equal or exceed the rate specified in the contract by reference to the Prevailing Wage Rate Determinations for the class of work actually performed. Any work performed on Saturday, Sunday, and/or a holiday, or a portion thereof, must be paid the prevailing rate established for those days regardless of the fixed workweek. The hourly rate for hours worked in excess of 8 hours in a day or 40 hours in a workweek shall be premium pay. All work performed in excess of 8 hours per day, 40 hours per week, on Saturday, on Sunday, and on holidays shall be paid in accordance with the applicable Prevailing Wage Determination.

B. Apprentices

Contractors (general, prime, specialty, or subcontractor) shall employ Apprentices registered, individually, under a bona fide apprenticeship program registered with a State apprenticeship agency which is recognized by the State Division of Apprenticeship Standards. The allowable ratio of apprentices to journey persons in any craft/classification shall not be greater than the ratio permitted to the contractor as to its entire workforce under the registered program. Any worker listed on a payroll at an apprentice wage rate who is not registered shall be paid the journey level wage rate determined by the Department of Industrial Relations for the classification of the work he/she actually performed. An apprentice who is registered and has worked outside of the prescribed geographic area is not qualified to receive the apprentice rate and must be paid the journey level rate. Apprentices employed on public works must at all times work with or under the direct supervision of a journeyman (California Code of Regulations, Article 10, Section 230.1).

Contractors who are not already approved to train by an applicable joint apprenticeship committee or unilateral committee must request the dispatch of required apprentices from one of the applicable apprenticeship committees whose geographical area of operation includes the site of the public work by giving the committee actual notice of at least 48 hours before the date the apprentices are required (CCR, Article 10, Section 230.1). The contractor shall furnish written evidence of the registration (i.e., Apprenticeship Agreement or Statement of Registration) of apprentices employed on the

public works project, as well as the ratios allowed and the wage rates required to be paid thereunder for the area of construction. This evidence shall accompany the weekly-certified payroll records reporting the apprentices in order to verify the payment of prevailing wages.

Pre-apprentice trainees, trainees in nonapprenticeable crafts, and others who are not duly registered will not be permitted on public works projects unless they are paid full prevailing wage rates as journeypersons.

Compliance with California Labor Code Section 1777.5 requires all public works contractors and subcontractors to:

1. Submit contract award information (DAS 140) to an applicable apprenticeship program for the employment and training of apprentices for each craft or trade;
2. Request dispatch of apprentices and employ apprentices as available on public works projects in a ratio to journey persons as stipulated in the Apprenticeship Standards under which each Joint Apprenticeship Committee operates, but, except as otherwise provided in Labor Code Section 1777.5, in no case shall the ratio be less than one (1) apprentice hour to each five (5) journey person hours, unless a Certificate of Exemption is obtained and provided to the LCPR;
3. Contribute to the training fund in the amount identified in the prevailing wage rate publication for journey persons and apprentices. Where the trust fund administrators cannot accept the contributions, then payment shall be made to the California Apprenticeship Council, utilizing the Training Fund Contributions” Form CAC 2, which should be forwarded to Post Office Box 420603, San Francisco, CA 94142; and
4. If the contractor is registered to train apprentices it should be noted that a prior approval for a separate project does not confirm approval to train on another project. The contractor/subcontractor must check with the applicable Joint Apprenticeship Committee to verify status.

## V. ENFORCEMENT ACTION

### A. Duties of the District Under its LCP

The District, as the District having an approved LCP, has a duty to the Director of the Department of Industrial Relations to enforce Labor Code Section 1720 et seq. in a manner consistent with the practice of the Division of Labor Standards Enforcement (DLSE) and as set forth in regulations found at 8 CCR Section 16000 et seq., and in



accordance with Precedential Public Works Decisions issued by the Director all of which are available at the Department of Industrial Relations Home Page (www.dir.ca.gov). The District shall undertake enforcement action in furtherance of its responsibilities as follows:

1. Review Certified Payroll Records. Certified payroll records furnished by contractors and subcontractors shall be regularly and timely reviewed by the District to monitor payment of prevailing wages. The District will withhold the progress payments when payroll records are delinquent or inadequate (Labor Code Section 1771.5 (b.5)).
2. Audits/Investigations. Audits/investigations may be conducted by the District when deemed necessary, and shall be conducted at the request of the Labor Commissioner.
  - a. An audit consists of a comparison of payroll records to the best available information as to the actual hours worked and classifications of workers employed on the contract. Records should be made available to show that the audits conducted are sufficiently detailed to verify compliance with the prevailing wage requirements of the Labor Code.
  - b. An audit record in the form set out in Attachment B, and as provided in 8 CCR Section 16432, complies with the Labor Code requirements.
3. Withholding Contract Payments for Violations of the Requirements of Chapter 1 of Part 7 of Division 2 of the Labor Code. The District shall withhold contract payments when payroll records are delinquent or inadequate or when, after an investigation, it is established that underpayment of the prevailing wage has occurred. The authority of an approved LCP to withhold contract payments is found in Labor Code Section 1771.6 and is also subject to provisions contained at 8 CCR Section 16435 et seq. As explained more fully below, the District will first obtain approval from the Labor Commissioner of the amounts of unpaid penalty and wage money assessed by the District (“forfeitures”) for violations of the prevailing wage laws; thereafter, the District will provide notice of withholding of contract payments to the contractor and other affected parties (a subcontractor and bonding company, if applicable) as required by law. The procedures to be followed by the District in obtaining approval of a forfeiture from the Labor Commissioner and providing notice of withholding to the contractor and other affected parties will be consistent with the code sections and regulations cited above, and definitions included therein (see Appendix A – “Definitions” – attached hereto), and are summarized as follows:

## **Step No. 1 Approval of Amount of Forfeiture by the Labor Commissioner**

- A. The District shall request approval of the amount of a proposed forfeiture by

filing a report with the Labor Commissioner which contains at least the following information:

1. The date that the public work was accepted, and the date that a Notice of Completion was recorded;
2. Any other deadline which if missed would impede collection;
3. Evidence of violation, in narrative form;
4. Evidence of the audit/investigation that has occurred;

**Note: A report requesting approval of the amount of a proposed forfeiture only assessed for delinquent or inadequate payroll records pursuant to Labor Code Section 1776 (g) need only refer to evidence that the contractor failed to provide certified payroll records or basic payroll records (see, section IV A. 1. above) within ten (10) days of receipt of the request, and the amount of the proposed forfeiture for delinquent or inadequate payroll records calculated at twenty-five dollars (\$25) for each calendar day, or portion thereof, for each worker, until strict compliance is effectuated.**

5. Evidence that the contractor and subcontractor were given the opportunity to explain why there was no violation, or whether the failure to pay the correct rate of wages was a good faith mistake and, if so, whether the error was promptly and voluntarily corrected upon being brought to the attention of the contractor and subcontractor;
6. Where the District seeks not only amounts of wages but also a penalty under Labor Code Section 1775 as part of the forfeiture, and the contractor or subcontractor has unsuccessfully contended that the cause of the violation was a good faith mistake, a short statement should recommend a penalty amount (computed at not more than fifty dollars (\$50) for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rates), except as provided under subdivision (b) of Labor Code 1775, by any subcontractor under the contractor, whereas the penalty may not be less than ten dollars (\$10) for each calendar day, or portion thereof, for each workers paid less than the prevailing wage rate, unless the failure of the contractor or subcontractor was a good faith mistake and, if so, the error was promptly and voluntarily corrected when brought to the attention of the contractor or subcontractor; whereas the penalty may not be less than twenty dollars (\$20) for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rate, if the contractor or subcontractor has been assessed penalties within the previous three years for failing to meet its prevailing wage obligations on a separate contract, unless those penalties were

subsequently withdrawn or overturned; and whereas the penalty may not be less than thirty dollars (\$30) for each calendar day, or portion thereof, for each worker paid less than the prevailing wage rate, if the Labor Commissioner determines that the violation was willful, as defined in subdivision (c) of Section 1777.1 and reasons therefore; if the amount of wages sought involves overtime, penalties under Labor Code Section 1813 should be calculated as follows: twenty-five dollars (\$25) for each calendar day during which each worker was required or permitted to work more than eight hours in any one calendar day and 40 hours in any one calendar week;

7. Where the District seeks only wages, or a penalty under Labor Code Section 1775 of no more than fifty dollars (\$50) per calendar day as part of the forfeiture, and the contractor has successfully contended that the cause of the violation was a good faith mistake, a short statement should recommend a penalty amount, and reasons therefore, pursuant to Labor Code Section 1775; if the amount of wages sought involves overtime, penalties under Labor Code Section 1813 should be calculated as follows: twenty-five dollars (\$25) for each calendar day during which each worker was required or permitted to work more than eight hours in any one calendar day and 40 hours in any one calendar week;
8. Interest shall accrue on all due and unpaid wages at the rate described in subdivision (b) of Section 3289 of the Civil Code, as per subdivision (b) of Labor Code 1741. The interest shall accrue from the date that the wages were due and payable, as provided in part 7 (commencing with Section 1720) of Division 2, until the wages are paid.
9. Whether the affected Contractor or Subcontractor has a prior record of failing to meet its prevailing wage obligations.
10. Whether the LCP for the District has been granted initial, extended initial or final approval.
  - a. The report should be served on the Labor Commissioner as soon as practicable after the violation has been discovered, and not less than thirty days before final payment, but in no event later than 320 days after the District's acceptance of the public work or 320 days after the filing of a valid Notice of Completion in the Office of the County Recorder, whichever occurs last.
  - b. A copy of the proposed forfeiture and the report shall be served on the contractor and subcontractor, if applicable, at the same time as it is sent to the Labor Commissioner. The District may exclude from the documents served on the affected Contractor

and Subcontractor copies of documents secured from the affected Contractor or Subcontractor during an audit, investigation, or meeting, if those are clearly referenced in the report. The Notice of Deadlines form attached hereto, as Attachment C shall accompany the report.

- c. The Labor Commissioner shall affirm, reject, or modify the forfeiture in whole or in part as to penalty and/or wages due.
- d. The Labor Commissioner's determination of forfeiture is effective on one of the two following dates:
  - i. For programs with initial approval or an extension of initial approval pursuant to 8 CCR Section 16426, on the date the Labor Commissioner serves by first class mail, on the political subdivision and on the Contractor, an endorsed copy of the proposed forfeiture, or a newly drafted forfeiture statement which sets out the amount of forfeiture approved. Service on the contractor is effective if made on the last address supplied by the contractor in the record. The Labor Commissioner's approval, modification or disapproval of the proposed forfeiture shall be served within 30 days of receipt of the proposed forfeiture.
  - ii. For programs with final approval, approval is effective 20 days after the requested forfeitures are served upon the Labor Commissioner, unless the Labor Commissioner serves a notice upon the parties, within that time period, that this forfeiture request is subject to further review. For such programs, a notice that approval will follow such a procedure will be included in the transmittal of the forfeiture request to the contractor. If the Labor Commissioner notifies the parties of a decision to undertake further review, the Labor Commissioner's final approval, modification or disapproval of the proposed forfeiture shall be served within 30 days of the date of notice of further review.

## **Step No. 2 Notice of Withholding and Review Thereof**

### **A. Notice of Withholding of Contract Payments**

- 1. After determination of the amount of forfeiture by the Labor Commissioner, the District shall provide notice of withholding of

contract payments to the Contractor and Subcontractor, if applicable. The notice shall be in writing and shall describe the nature of the violation and the amount of wages, penalties, and forfeitures withheld. Service of the notice shall be completed pursuant to Section 1013 of the Code of Civil Procedure by first-class and certified mail to the Contractor and Subcontractor, if applicable. The notice shall advise the Contractor and Subcontractor, if applicable, of the procedure for obtaining review of the withholding of contract payments. The District shall also serve a copy of the notice by certified mail to any bonding company issuing a bond that secures the payment of prevailing wages covered by the notice and to any surety on a bond, if their identities are known to the District.

**A copy of the Notice of Withholding of Contract Payments (NWCP) to be utilized by the District is found as Attachment D to this document.**

**B. Opportunity for Early Settlement**

1. The Affected Contractor or Subcontractor may, within 30 days following the service of a NWCP, request a meeting with the District for the purpose of attempting to settle the dispute regarding the Notice. The meeting shall be held in person or by telephone and shall take place before the expiration of the 60-day limit for filing a Request for Review.
2. No evidence of anything said or any admission made for the purpose of, in the course of, or pursuant to, such settlement meeting shall be admissible or subject to discovery in any administrative or civil proceeding. No writing prepared for the purpose of, in the course of, or pursuant to, such a settlement meeting, other than a final settlement agreement, shall be admissible or subject to discovery in any administrative or civil proceeding (C.C.R. Article 8, Section 17221).

**C. Request for Review of NWCP**

1. An Affected Contractor or Subcontractor may obtain review of a NWCP under this chapter by transmitting a written request for a review to the office of the LCP that appears on the NWCP within 60 days after service of the NWCP. If no hearing is requested within 60 days after the service of the NWCP, the NWCP shall become final.
2. Within 10 days following the receipt of the request for a review hearing, the LCP shall transmit to the Office of the Director-Legal Unit the request for review and copies of the Notice of Withholding of Contract Payments, any audit summary that accompanied the notice, and a proof

of service or other documents showing the name and address of any bonding company or surety that secures the payment of the wages covered by the notice.

**A copy of the required Notice of Transmittal to be utilized by the District is found as Attachment E to this document.**

3. Within 10 days following its receipt of a Request for Review, the District shall also notify the Affected Contractor or Subcontractor of its opportunity and procedures for reviewing evidence to be utilized by the District at the hearing on the Request for Review. The contractor or subcontractor shall be provided an opportunity to review evidence to be utilized by the LCP at the hearing within 20 days of the receipt by the LCP of the written request for a hearing. Any evidence obtained by the LCP subsequent to the 20-day cutoff shall be promptly disclosed to the contractor or subcontractor (C.C.R. Article 8, Section 17224). Upon receipt of a timely request, a hearing shall be commenced within 90 days before the director, who shall appoint an impartial hearing officer possessing the qualifications of an administrative law judge pursuant to subdivision (b) of Section 11502 of the Government Code. The appointed hearing officer shall be an employee of the department, but shall not be an employee of the Division of Labor Standards Enforcement.

**A copy of the Notice of Opportunity to Review Evidence Pursuant to Labor Code Section 1742 (b) form is found as Attachment F to this document.**

- D. Finality of Assessment or of Withholding of Contract Payments When No Timely Request for Review is filed; Authority of District to Disburse Withheld Funds.
  1. Upon the failure of an Affected Contractor or Subcontractor to file a timely Request for Review under Labor Code Section 1742(a) and C.C.R. Article 8, Section 17228, the Assessment or NWCP shall become a “final order” as to the Affected Contractor or Subcontractor that the Labor Commissioner may certify and file with the superior court in accordance with Labor Code Section 1742(d).

### **Step No. 3 Burdens of Proof on Wages and Penalties**

- A. The District has the burden of coming forward with evidence that the Affected Contractor or Subcontractor:
  1. Was served with an Assessment of NWCP in accordance with C.C.R.

Article 8, Section 17220;

2. Was provided a reasonable opportunity to review evidence to be utilized at the hearing in accordance with C.C.R. Article 8, Section 17224;
3. That such evidence provides prima facie support for the Assessment or NWCP.

If the District meets its initial burden, the Affected Contractor or Subcontractor shall have the burden of proving that the basis for the NWCP is incorrect (CCR, Article 8 Section 17250). The NWCP shall be sufficiently detailed to provide fair notice to the contractor or subcontractor of the issues at the hearing.

**Step No. 4 Liquidated Damages (C.C.R. Article 8 Section 17251)**

- A. With respect to any liquidated damages for which an Affected Contractor, Subcontractor, or Surety on a bond becomes liable under Labor Code Section 1742.1, the District shall have a further burden of coming forward with evidence to show the amount of wages that remained unpaid as of 60 days following the service of the Assessment or the NWCP. The Affected Contractor or Subcontractor shall have the burden of demonstrating that he or she had substantial grounds for believing the Assessment or NWCP to be in error. Adequate demonstration of the following is required:
  1. Establish that it had a reasonable subjective belief that the Assessment or NWCP was in error;
  2. There is an objective basis in law and fact for the claimed error; and
  3. That the claimed error is one that would have substantially reduced or eliminated any duty to pay additional wages under the Assessment or NWCP.
- B. Within 45 days of the conclusion of the hearing, the director shall issue a written decision affirming, modifying, or dismissing the assessment. The decision of the director shall consist of a notice of findings, findings, and an order. This decision shall be served on all parties pursuant to Section 1013 of the Code of Civil Procedure by first-class mail at the last known address of the party on file with the LCP. Within 15 days of the issuance of the decision, the director may reconsider or modify the decision to correct an error, except that a clerical error may be corrected at any time.
- C. The director has adopted regulations setting forth procedures for hearings under this subdivision.

**The regulations are found as Attachment G to this document.**

- D. An Affected Contractor or Subcontractor may obtain review of the decision of the director by filing a petition for a writ of mandate to the appropriate superior court pursuant to Section 1094.5 of the Code of Civil Procedure within 45 days after service of the decision. If no petition for a writ of mandate is filed within 45 days after service of the decision, the order shall become final. If it is claimed in a petition for writ of mandate that the findings are not supported by the evidence, abuse of discretion is established if the court determines that the findings are not supported by substantial evidence in the light of the whole record.
- E. A certified copy of a final order may be filed by the Labor Commissioner in the office of the clerk of the superior court in any county in which the Affected Contractor or Subcontractor has property or has or had a place of business. The clerk, immediately upon the filing, shall enter judgment for the state against the person assessed in the amount shown on the certified order.
- F. A judgment entered pursuant to this procedure shall bear the same rate of interest and shall have the same effect as other judgments and shall be given the same preference allowed by law on other judgments rendered for claims for taxes. The clerk shall not charge for the service performed by him or her pursuant to this section.
- G. This procedure shall provide the exclusive method for review of a decision by the District to withhold contract payments pursuant to Section 1771.5.

**Note: A release under Civil Code Section 3196 may not be posted for the release of funds being withheld for violations of the prevailing wage law.**

**Step No. 5 Deposits of Penalties and Forfeitures Withheld**

- A. Where the involvement of the Labor Commissioner has been limited to a determination of the actual amount of penalty, forfeiture, or underpayment of wages and the matter has been resolved without litigation by or against the Labor Commissioner, the District shall deposit penalties and forfeitures into its construction fund or other fund of its choice.
- B. Where collection of fines, penalties, or forfeitures results from court action to which the Labor Commissioner and the District are both parties, the fines, penalties, or forfeitures shall be divided between the General Funds of the State and the construction fund or other fund of the District's choice, as the court may decide.
- C. All amounts recovered by suit brought by the Labor Commissioner, and to which the District is not a party, shall be deposited in the General Fund of the State of



California.

- D. All wages and benefits which belong to a worker and are withheld or collected from a contractor or subcontractor, either by withholding or as a result of court action pursuant to Labor Code Section 1775, and which have not been paid to the worker or irrevocably committed on the worker's behalf to a benefits fund, shall be deposited with the Labor Commissioner, who will deal with such wages and benefits in accordance with Labor Code Section 96.7.

## **I. REPORTING OF WILLFUL VIOLATIONS TO THE LABOR COMMISSIONER**

### **A. Debarment Policy**

It is the policy of the District that the public works prevailing wage requirements set forth in the California Labor Code, Sections 1720-1861, be strictly enforced. In furtherance thereof, contractors and subcontractors found to be willful violators under Section 1777.1 of the California Labor Code shall be referred to the Labor Commissioner for debarment from bidding on or otherwise being awarded any public work contract, within the state of California, for the performance of construction and/or maintenance services for the period not to exceed three (3) years in duration.

The duration of the debarment period shall depend upon the nature and severity of the labor code violations and any mitigating and/or aggravating factors, which may be presented at the hearing conducted by the Labor Commissioner for such purpose.

If an investigation reveals that a willful violation of the Labor Code Section 1777.1 has occurred, the LCPR will make a written report to the District and the Labor Commissioner which shall include: (1) an audit consisting of a comparison of payroll records to the best available information as to the actual hours worked and (2) the classification of workers employed on the public works contract. Six types of willful violations are reported as follows:

### **B. For Failure to Comply with Prevailing Wage Rate Requirements**

Failure to comply with prevailing wage rate requirements (as set forth in the Labor Code and District contracts) is determined a willful violation whenever less than the stipulated basic hourly rate is paid to tradesworkers, or if overtime, holiday rates, fringe benefits, and/or employer payments are paid at a rate less than stipulated.

The facts related to such willful violations may result in a determination that the contractor intended to defraud its employees of their wages.

### **C. For Falsification of Payroll Records, Misclassification of Work, and/or Failure to Accurately Report Hours of Work**

Falsification of payroll records and failure to accurately report hours of work is characterized by deliberate underreporting of hours of work; underreporting the headcount; stating that the proper prevailing wage rate was paid when, in fact, it was not; clearly misclassifying the work performed by the worker; and any other deliberate and/or willful act which results in the falsification or inaccurate reporting of payroll records. Such violations are deemed to be willful violations committed with the intent to defraud.

D. For Failure to Submit Certified Payrolls

Refusing to comply with a request by the LCPR for certified payroll records or substantiating information and records as contained in Section IV.A.1. will be determined to be a willful violation of the Labor Code. Additionally, refusing to correct inaccuracies or omissions that have been discovered will also be determined to be willful violation of the Labor Code.

E. For Failure to Pay Fringe Benefits

Fringe benefits are defined as the amounts stipulated for employer payments or trust fund contributions and are determined to be part of the required prevailing wage rate. Failure to pay or provide fringe benefits and/or make trust fund contributions in a timely manner is equivalent to payment of less than the stipulated wage rate and shall be reported to the District and Labor Commissioner as a willful violation, upon completion of an investigation and audit.

F. For Failure to Pay the Correct Apprentice Rates and/or Misclassification of Workers as Apprentices

Failure to pay the correct apprentice rate or classifying a worker as an apprentice when not properly registered is equivalent to payment of less than the stipulated wage rate and shall be reported to the District and Labor Commissioner as a willful violation, upon completion of an investigation and audit.

G. For the Taking of Kickbacks

Accepting or extracting kickbacks from employee wages under Labor Code Section 1778 constitutes a felony and may be prosecuted by the appropriate enforcement agency.

**II. PRIORITY DISTRIBUTION OF FORFEITED SUMS**

A. Withholding of Forfeited Sums

Pursuant to Labor Code Sections 1726 and 1771.6, it shall be the policy of the District that prior to making payment to the prime contractor of monies due under any contract for public works, the District shall withhold and retain from the prime contractor's account all amounts which have been forfeited pursuant to any stipulation under said contract for public works.

**B. Disposition of Forfeited Sums**

Out of any funds withheld, recovered, or both, there shall first be paid the amount due each worker notwithstanding the filing of any Stop Notice by any person pursuant to Civil Code Section 3179, *et seq.* Thus, all workers employed on the public works project who are paid less than the prevailing wage rate shall have **PRIORITY** over all Stop Notices filed against the prime contractor.

In the event that there are "insufficient funds" available in the prime contractor's account to pay the total amount of prevailing wage violations and penalty amounts due, the unpaid prevailing wages shall have **PRIORITY STATUS** and must be paid first.

Furthermore, if insufficient funds are withheld, recovered, or both, to pay each underpaid worker in full, the money shall be prorated among all workers affected. From the amount recovered by the District, the wage claim shall be satisfied prior to the amount being applied to penalties. If insufficient money is recovered to pay each worker in full, the money shall be prorated among all workers. Wages for workers who cannot be located shall be placed in the Industrial Relations Unpaid Wage Fund and held in trust for the workers pursuant to Section 96.7. Penalties shall be paid into a construction fund or other fund of the District's choosing.

**III. ANNUAL REPORTS**

**A. Annual Report on the District Labor Compliance Program to the Director of the Department of Industrial Relations**

The District shall submit to the Director of the Department of Industrial Relations an Annual Report on the operation of its LCP within sixty (60) days after the close of its fiscal year, or accompany its request for an extension of initial approval, whichever comes first. Pursuant to Title 8, CCR Section 16431, the Annual Report shall contain, at the minimum, the following information:

1. Number of construction contracts using bond funds subject to the LCP which were awarded, and their total value;
2. A summary of wages due to workers resulting from failure by contractors to pay prevailing wage rates, the total amount withheld from money due to the contractors, and the total amount recovered by action in any court of competent jurisdiction;

3. A summary of penalties and forfeitures imposed and withheld, or recovered in a court of competent jurisdiction;
4. A LCP whose contract responsibilities are statewide, or which involves widely dispersed and numerous contracts, or which is required to report contract enforcement to federal authorities in a federal format, may adopt a summary reporting format to aggregate small contracts and estimate numbers and dollar values required by 1 and 2. A summary reporting format may be adopted by agreement with the Director after advance notice to interested parties, and a list of parties requesting such notice shall be kept by the Director.

Copies of the LCP's required Annual Report submitted to the Director of the Department of Industrial Relations will be distributed to the Chancellor and Board of the District.

## APPENDIX A DEFINITIONS

1. “Amount equal to the underpayment” is the total of the following determined by payroll review, investigation, audit, or admission of the contractor or subcontractor:
  - a. The difference between the amounts paid to workers and the correct General Prevailing Wage Rate of Per Diem Wages as defined in Title 8, CCR Section 16000, *et seq.*;
  - b. The difference between the amounts paid to workers and the correct amounts of employer payments, as defined in Title 8, CCR Section 16000, *et seq.* and determined to be part of the prevailing rate costs of contractors due for employment of workers in such craft, classification or trade in which they were employed and the amounts paid.
  - c. Estimated amounts of “illegal taking of wages,” and
  - d. Amounts of apprenticeship training contributions paid to neither the program sponsor’s training trust nor the California Apprenticeship Council.
2. “Basic Payroll Records” means time cards, front and back copies of cancelled checks, cash receipts, trust fund forms, daily logs, employee sign-in sheets, accounting ledgers, tax forms and/or any other record maintained for the purposes of reporting payroll.
3. “Contracts,” except as otherwise provided by agreement, means only contracts under a single master contract, or contracts entered into as stages of a single project which may be the subject of withholding pursuant to Labor Code Sections 1720, 1720.2, 1720.3, 1720.4, 1771, and 1771.5;
4. “Delinquent payroll records” means those not submitted on the basis set forth in the District contract and the LCP;
5. “Failing to pay the correct rate of prevailing wages” means those public works violations which the Labor Commissioner has exclusive authority to approve before they are recoverable by the LCP, and which are appealable by the contractor in court or before the Director of the Department of Industrial Relations under Labor Code Sections 1742 and 1742.1 pursuant to the California Code of Regulations Title 8, Chapter 8, Subchapter 8 Sections 17201 through 17270. Regardless of what is defined as prevailing “wages” in contract terms, noncompliance with the following are considered failures to pay prevailing wages:
  - a. Nonpayment of items defined as “Employer Payments” and “General Prevailing Rate of Per Diem Wages” in Title 8, CCR Section 16000 and Labor Code Section 1771.
  - b. Payroll records required by Labor Code Section 1776;

- c. Labor Code Section 1777.5 but only insofar as the failure consists of paying apprentice wages lower than the journey level rate to a worker who is not an apprentice as defined in Labor Code Section 3077, working under an apprentice agreement in a recognized program;
  - d. Labor Code Section 1778, Kickbacks;
  - e. Labor Code Section 1779, Fee for Registration;
  - f. Labor Code Sections 1813, 1815, and Title 8, CCR Section 16200(a)(3)(F) overtime for work over eight (8) hours in any one (1) day or forty (40) hours in any one (1) week (Monday through Friday). All work performed on Saturday, Sunday, and/or a holiday shall be paid pursuant to the prevailing wage determination.
6. “Forfeitures” are the amounts of unpaid penalties and wages assessed by the District for violations of the prevailing wage laws.
  7. “Inadequate payroll records” are any one of the following:
    - a. A record lacking the information required by Labor Code Section 1776;
    - b. A record which contains the required information but which is not certified, or certified by someone not an agent of the contractor or subcontractor;
    - c. A record remaining uncorrected for one (1) payroll period, after the District has given the contractor notice of inaccuracies detected by audit or record review; provided, however, that prompt correction will stop any duty to withhold if such inaccuracies do not amount to one percent (1%) of the entire certified weekly payroll in dollar value and do not affect more than half the persons listed as workers employed on that certified weekly payroll, as defined in Labor Code Section 1776 and Title 8 CCR Section 16401. Prompt correction will stop any duty to withhold if such inaccuracies are de minimus.
  8. “Withhold” means to cease payments by the District, or others who pay on its behalf, or agents, to the general contractor.

**ATTACHMENT A**

**CHECKLIST OF LABOR LAW REQUIREMENTS TO REVIEW AT  
PRE-CONSTRUCTION MEETINGS**

(Pursuant to Title 8, Section 16430 of the California Code of Regulations)

NAME (print) \_\_\_\_\_ Date \_\_\_\_\_

COMPANY \_\_\_\_\_ Phone \_\_\_\_\_

ADDRESS \_\_\_\_\_ Fax # \_\_\_\_\_

\_\_\_\_\_ School \_\_\_\_\_

CHANCELLOR \_\_\_\_\_ Project # \_\_\_\_\_

The federal and state labor law requirements applicable to the contract are composed of, but not limited to, the following:

**1. Payment of Prevailing Wage Rates**

The contractor to whom the contract is awarded and its subcontractors hired for the public works project are required to pay not less than the specified general prevailing wage rates to all workers employed in the execution of the contract.

The contractor is responsible for ascertaining and complying with all current general prevailing wage rates for crafts and any rate changes that occur during the life of the contract. Information on all prevailing wage rates and all rate changes are to be posted at the job site for all workers to view;

**2. Apprentices**

It is the duty of the contractor and subcontractors to employ registered apprentices on the public works project under Labor Code Section 1777.5;

**3. Penalties**

There are penalties required for contractor's/subcontractor's failure to pay prevailing wages and for failure to employ apprentices, including forfeitures and debarment under Labor Code Sections 1775; 1776; 1777.1; 1777.7 and 1813;

**4. Certified Payroll Records**

Under Labor Code Section 1776, contractors and subcontractors are required to keep accurate payroll records showing the name, address, social security number and work classification of each employee and owner performing work; also the straight time and overtime hours worked each day and each week, the fringe benefits, and, the actual per diem wage paid to each owner, journey person, apprentice worker or other employee hired in connection with the public works project.

Employee payroll records shall be certified and shall be made available for inspection at all reasonable hours at the principal office of the contractor/subcontractor, or shall be furnished to any employee, or his/her authorized representative on request, pursuant to Labor Code Section 1776;

Each contractor and subcontractor shall submit its weekly certified payroll records to the District at times designated in the contract, but, in no event less than monthly. In the event that there has been no work performed during a given week, the Certified Payroll Report shall be annotated: "No work" for that week.

Certified payroll records may be requested by the District or LCPR at any time and shall be provided within 10 days following the receipt of the request.

Under Labor Code Section 1776(g) there are penalties required for Contractor's/Subcontractor's failure to maintain and submit copies of certified payroll records on request.

The final certified payroll record submitted by the contractor and subcontractors shall be marked "final."

**5. Nondiscrimination in Employment**

There exist prohibitions against employment discrimination under Labor Code Sections 1735 and 1777.6, the Government Code, the Public Contracts Code, and Title VII of the Civil Rights Act of 1964;

**6. Kickbacks Prohibited**

Contractors and subcontractors are prohibited from recapturing wages illegally or extracting "kickbacks" from employee wages under Labor Code Section 1778;

**7. Acceptance of Fees Prohibited**

There exists a prohibition against contractor/subcontractor acceptance of fees for registering any person for public work under Labor Code Section 1779; or for filling work orders on public works contracts pursuant to Labor Code Section 1780;



**8. Listing of Subcontractors**

All prime contractors are required to list properly all subcontractors hired to perform work on the public works projects covering more than one-half of one percent, pursuant to Public Contract Code Section 4100 et seq.;

**9. Listing of All Subcontractors to LCPR**

The requirement to provide the District’s LCPR a list of all subcontractors with contract amounts less than one half of one percent (0.5%). The District’s LCP also requires prompt notification of any changes, additions, or deletions to the subcontractor list.

**10. Proper Licensing**

Contractors are required to be licensed properly and to require that all subcontractors be properly licensed. Penalties are required for employing workers while unlicensed under Labor Code Section 1021 and under the California Contractor License Law found at Business and Professions Code Section 7000 et seq.

**11. Unfair Competition Prohibited**

Contractors/Subcontractors are prohibited from engaging in unfair competition as specified under Business and Professions Code Sections 17200 to 17208;

**12. Workers Compensation Insurance**

Labor Code Section 1861 requires that contractors and subcontractors be insured properly for Workers Compensation.

**13. OSHA**

Contractors and subcontractors are required to abide by the Occupational, Safety and Health laws and regulations that apply to the particular construction project.

In accordance with federal and state laws and with District contract documents, the undersigned prime contractor wishes to assure the District that it intends to comply with the above-referenced labor law requirements, fully understanding that failure to comply with the above requirements may subject it to penalties as provided above.

For the Contractor:

For the District:

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Signature)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
(Date)

\_\_\_\_\_  
Prime Contractor

\_\_\_\_\_  
Project Name

**ATTACHMENT B**  
**AUDIT RECORD FORM**

(For Use With Title 8, CCR Section 16432 Audits)

An audit record is sufficiently detailed to "verify compliance with the requirements of Chapter 1, Public Works, Part 7 of Division 2" when the audit record displays that the following procedures were accomplished:

1. Audits of the obligation to secure workers' compensation means demanding written evidence of a binder issued by the carrier, or telephone or written inquiry to the Workers' Compensation Insurance Rating Bureau;
2. Audits of the obligations to employ and train apprentices means inquiry to the program sponsor for the apprenticeable craft or trade in the area of the public works as to: whether contract award information was received, including an estimate of journey person hours to be performed and the number of apprentices to be employed; whether apprentices have been requested, and whether the request has been met; whether the program sponsor knows of any amounts sent by the contractor or subcontractor to it for the training trust, or the California Apprenticeship Council; and whether persons listed on the certified payroll in that craft or trade as being paid less than the journey person rate are apprentices registered with that program and working under apprentice agreements approved by the Division of Apprenticeship Standards;
3. Audits of the obligation to pass through amounts for apprenticeship training contributions, to either the training trust or the California Apprenticeship Council, means asking for copies of checks sent, or when the audit occurs more than 30 days after the month in which payroll has been paid, copies of cancelled checks;
4. Audits of "illegal taking of wages" means inspection of written authorizations for deductions (listed in Labor Code Section 224) in the contractor's or subcontractor's files and comparison to wage deduction statements furnished to employees (Labor Code Section 226), together with an interview of employees when warranted as to any payments not shown on the wage deduction statements;
5. Audits of the obligation to keep records of working hours and pay not less than required by Title 8, CCR Section 16200(a)(3)(F) for hours worked in excess of 8 hours per day or forty hours per week are the steps for review and audit of Certified Weekly Payrolls under Title 8, CCR Section 16432;
6. Audits of the obligations to pay the prevailing per diem wage, means such steps for review and audit of Certified Weekly Payrolls which will produce a report covering compliance in the areas of:
  - A. All elements defined as the "General Prevailing Rate of Per Diem Wages" in Title 8, CCR Section 16000, which were determined to be prevailing in the Director's determination which was in effect on the date of the call for bids, available in its principal LCP office and posted at the public works job site;
  - B. All elements defined as "Employer Payments" set forth in Section 16000 of these regulations, which were determined to be prevailing in the Director's Determination which was in effect on the date of the call for bids, and pursuant to Labor Code Section 1773.2 was to be specified in the call for bids, made available in its principal LCP office and posted at the public works job site.

## ATTACHMENT C

### NOTICE OF DEADLINES

(To go to Contractor for Forfeitures under Title 8, CCR Section 16437)

"This document requests the Labor Commissioner of California to approve a forfeiture of money you otherwise would be paid. The (Name of the labor compliance program) for the (Name of the District) is asking the Labor Commissioner of California to agree, in 30 days, that the enclosed package of materials indicates that you have violated the law."

"Failure to respond to the (Name of the labor compliance program's) request that the Labor Commissioner approve a forfeiture by writing to the Labor Commissioner within 30 days of the date of service (date of postmark) of this document on you may lead the Labor Commissioner to affirm the proposed forfeiture. You must serve any written response on the Labor Commissioner, the (Name of the labor compliance program) and (Name of District) by return receipt requested/certified mail. If you serve a written explanation, with evidence, as to why the violation did not occur, or why the penalties should not be assessed, within the 30-day period, it will be considered,"

and

"If you change address, or decide to hire an attorney, it is your responsibility to advise both the (Name of the labor compliance program) and the Labor Commissioner by certified mail. Otherwise, notices will be served at your last address on file, and deadlines might pass before you receive such notices."

**ATTACHMENT D**

<b>Labor Compliance Program</b>	(Seal)
Phone:	
Fax:	
Date:	In Reply Refer to Case No.:

**Notice of Withholding Contract Payments**

District	Work Performed in County of
Project Name	Project No.
Prime Contractor	
Subcontractor	

After an investigation concerning the payment of wages to workers employed in the execution of the contract for the above-named public works project, the Labor Compliance Program (“Labor Compliance Program”) has determined that violations of the California Labor Code have been committed by the contractor and/or subcontractor identified above. In accordance with Labor Code Sections 1771.5 and 1771.6, the Labor Compliance Program hereby issues this Notice of Withholding of Contract Payments.

The nature of the violations of the Labor Code and the basis for the assessment are as follows:

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The Labor Compliance Program has determined that the total amount of wages due is: \$ \_\_\_\_\_

The Labor Compliance Program has determined that the total amount of penalties assessed under Labor Code Sections 1775 and 1813 is: \$ \_\_\_\_\_

The Labor Compliance Program has determined that the total amount of penalties assessed under Labor Code Section 1776 is: \$ \_\_\_\_\_

The Labor Compliance Program has determined that the total amount of interest assessed under Labor Code Section 1741 is: \$ \_\_\_\_\_

**LABOR COMPLIANCE PROGRAM**

By: \_\_\_\_\_



**Notice of Right to Obtain Review – Formal Hearing**

In accordance with Labor Code Sections 1742 and 1771.6, an affected contractor or subcontractor may obtain review of this Notice of Withholding of Contract Payments by transmitting a written request to the office of the Labor Compliance Program that appears below within 60 days after service of the notice. **To obtain a hearing, a written Request for Review must be transmitted to the following address:**

Labor Compliance Program

\_\_\_\_\_  
Review Office-Notice of Withholding of Contract Payments

\_\_\_\_\_  
\_\_\_\_\_

A **Request for Review** either shall clearly identify the Notice of Withholding of Contract Payments from which review is sought, including the date of the notice, or it shall include a copy of the notice as an attachment, and shall also set forth the basis upon which the notice is being contested. In accordance with Labor Code Section 1742, the contractor or subcontractor shall be provided an opportunity to review evidence to be utilized by the Labor Compliance Program at the hearing within 20 days of the Labor Compliance Program’s receipt of the written **Request for Review**.

**Failure by a contractor or subcontractor to submit a timely Request for Review will result in a final order which shall be binding on the contractor and subcontractor, and which shall also be binding, with respect to the amount due, on a bonding company issuing a bond that secures the payment of wages and a surety on a bond.  
Labor Code Section 1743.**

In accordance with Labor Code Section 1742(d), a certified copy of a final order may be filed by the Labor Commissioner in the office of the clerk of the superior court in any county in which the affected contractor or subcontractor has property or has or had a place of business. The clerk, immediately upon the filing, shall enter judgment for the State against the person assessed in the amount shown on the certified order.

(continued on next page)

### Opportunity for Settlement Meeting

In accordance with Labor Code Section 1742.1 (b), the Labor Compliance Program shall, upon receipt of a request from the affected contractor or subcontractor within 30 days following the service of this Notice of Withholding of Contract Payments, afford the contractor or subcontractor the opportunity to meet with the Labor Compliance Program's designee **to attempt to settle a dispute regarding the notice**. The settlement meeting may be held in person or by telephone and shall take place before the expiration of the 60-day period for seeking a hearing as set forth above under the heading Notice of Right to Obtain Review.

No evidence of anything said or any admission made for the purpose of, in the course of, or pursuant to, the settlement meeting is admissible or subject to discovery in any administrative or civil proceeding. No writing prepared for the purpose of, in the course of, or pursuant to, the settlement meeting, other than a final settlement agreement, is admissible or subject to discovery in any administrative or civil proceeding. This opportunity to timely request an informal settlement meeting is **in addition** to the right to obtain a formal hearing, and a settlement meeting may be requested even if a written **Request for Review** has already been made. Requesting a settlement meeting, however, does not extend the 60-day period during which a formal hearing may be requested.

A written request to meet with the Labor Compliance Program's designee to attempt to settle a dispute regarding this notice must be transmitted to \_\_\_\_\_ at the following address:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### Liquidated Damages

In accordance with Labor Code Section 1742.1, after 60 days following the service of this Notice of Withholding of Contract Payments, the affected contractor, subcontractor, and surety on a bond or bonds issued to secure the payment of wages covered by the notice shall be liable for liquidated damages in an amount equal to the wages, or portion thereof that still remain unpaid. If the notice subsequently is overturned or modified after administrative or judicial review, liquidated damages shall be payable only on the wages found to be due and unpaid. If the contractor or subcontractor demonstrates to the satisfaction of the Director of the Department of Industrial Relations that he or she had substantial grounds for believing the assessment or notice to be an error, the Director shall waive payment of the liquidated damages.

**The Amount of Liquidated Damages Available Under this Notice is \$\_\_\_\_\_.**

Distribution:

- Prime Contractor
- Subcontractor
- Surety(s) on Bond

**ATTACHMENT E**

<b>LABOR COMPLIANCE PROGRAM</b> <hr/> <p>Review Office - Notice of Withholding of Contract Payments</p> <hr/> <hr/> <hr/> <p>Phone: Fax:</p>	(SEAL)
Date:	In Reply Refer to Case No.:

**Notice of Transmittal**

To: Department of Industrial Relations  
Office of the Director-Legal Unit  
Attention: Lead Hearing Officer  
P. O. Box 420603  
San Francisco, CA 94142-0603

Enclosed herewith please find a Request for Review, dated \_\_\_\_\_, postmarked \_\_\_\_\_, and received by this office on \_\_\_\_\_.

Also enclosed please find the following:

- \_\_\_\_\_ Copy of Notice of Withholding of Contract Payments
- \_\_\_\_\_ Copy of Audit Summary

**LABOR COMPLIANCE PROGRAM**

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By: \_\_\_\_\_

cc: Prime Contractor  
Subcontractor  
Bonding Company

Please be advised that the Request for Review identified above has been received and transmitted to the address indicated. Please be further advised that the governing procedures applicable to these hearings are set forth at Title 8, California Code of Regulations Sections 17201-17270. These hearings are **not** governed by Chapter 5 of the Government Code, commencing with Section 11500.



**ATTACHMENT F**

<p><b>LABOR COMPLIANCE PROGRAM</b></p> <hr/> <p>Review Office - Notice of Withholding of Contract Payments</p> <hr/> <hr/> <hr/> <p>Phone: Fax:</p>	<p>(SEAL)</p>
Date:	In Reply Refer to Case No.:

**Notice of Opportunity to Review Evidence Pursuant to Labor Code Section 1742(b)**

To: Prime Contractor

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Subcontractor

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Please be advised that this office has received your **Request for Review**, dated \_\_\_\_\_, and pertaining to the Notice of Withholding of Contract Payments issued by the Labor Compliance Program in Case No. \_\_\_\_\_.

In accordance with Labor Code Section 1742(b), this notice provides you with an opportunity to review evidence to be utilized by the Labor Compliance Program at the hearing on the Request for Review, and the procedures for reviewing such evidence.

Rule 17224 of the Prevailing Wage Hearing Regulations provides as follows:

“(a) Within ten (10) days following its receipt of a Request for Review, the Enforcing Agency shall also notify the affected contractor or subcontractor of its opportunity and the procedures for reviewing evidence to be utilized by the Enforcing Agency at the hearing of the Request for Review.

(b) An Enforcing Agency shall be deemed to have provided the opportunity to review evidence required by this Rule if it (1) gives the affected contractor or subcontractor the option at said party's own expense to either (i) obtain copies of all such evidence through a commercial copying service or (ii) inspect and copy such evidence at the office of the Enforcing Agency during normal business hours; or if (2) The Enforcing Agency at its own expense forwards copies of all such evidence to the affected contractor or subcontractor.

(c) The evidence required to be provided under this Rule shall include the identity of witnesses whose testimony the Enforcing Agency intends to present, either in person at the hearing or by declaration or affidavit. This provision shall not be construed as requiring the Enforcing Agency to prepare or provide any separate listing of witnesses whose identities are disclosed within the written materials made available under subpart (a).

(d) The Enforcing Agency shall make evidence available for review as specified in subparts (a) through (c) within 20 days of its receipt of the Request for Review; *provided that*, this deadline may be extended by written request or agreement of the affected contractor or subcontractor. The Enforcing Agency's failure to make evidence available for review as required by Labor Code Section 1742(b) and this Rule, shall preclude the enforcing agency from introducing such evidence in proceedings before the Hearing officer or the Director.

(e) This Rule shall not preclude the Enforcing Agency from relying upon or presenting any evidence first obtained after the initial disclosure of evidence under subparts (a) through (d), *provided that*, such evidence is promptly disclosed to the affected contractor or subcontractor. This Rule also shall not preclude the Enforcing Agency from presenting previously undisclosed evidence to rebut new or collateral claims raised by another party in the proceeding.”

In accordance with the above Rule, please be advised that the Labor Compliance Program's procedure for you to exercise your opportunity to review evidence is as follows:

**Within five calendar days of the date of this notice, please transmit the attached Request to Review Evidence to the following address:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Attention:** \_\_\_\_\_

**Request to Review Evidence**

To: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

From: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Regarding Notice of Withholding of Contract Payments Dated \_\_\_\_\_

Our Case No.: \_\_\_\_\_

The undersigned hereby requests an opportunity to review evidence to be utilized by the Labor Compliance Program at the hearing on the Request for Review.

\_\_\_\_\_  
Phone No.: \_\_\_\_\_  
Fax No.: \_\_\_\_\_

**ATTACHMENT G**

Prevailing Wage Hearing Request

*(see Title 8 of the California Code of Regulations Sections 17201-17270)*

- A. Subsurface borings have been taken at the Project Site and a final report on Geotechnical Investigation has been prepared. Site exploration identifies actual subsurface conditions only at those points where samples were taken and when they were taken.
- B. This report was obtained only for the Architect's use in design of the structure and adjoining site work and is not intended to be a part of the Architects 'Contract Documents'. It is available for information only and does not warrant the subsurface conditions.
- C. The information was obtained for use in preparing the foundation design, but is indicative only of the soil conditions where the borings were taken. All soil test data, water table elevations and soil analyses apply only at the location of the test holes and to the depths indicated. The indicated elevation of the water table is that existing at the date the test hole data was determined. A difference in elevation between groundwater shown and groundwater actually encountered during construction will not be considered as a basis for extra compensation.
- D. Contractor is expected to examine the project site and record of investigation to determine the character of materials to be encountered. The actual interface between materials may be far more gradual or abrupt than the report indicates. Actual conditions in areas not sampled may differ from any predictions on the part of the Contractor.
- E. The Contractor shall promptly and before such conditions are disturbed, notify the Architect / Geotechnical Engineer in writing of 1.) Subsurface or physical conditions at the site differing materially from those indicated in the referenced geotechnical report or as given by survey points and instructions. 2.) Unknown physical conditions at the site of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this contract. The Geotechnical Engineer shall promptly investigate the conditions and if the Engineer finds that such conditions do so materially differ and cause an increase or decrease in the cost of, or the time required for performance of this contract, an equitable adjustment will be made in accordance with applicable contract provisions. Any request by the Contractor for adjustment hereunder will not be allowed unless written notice as herein required has been given.
- F. District shall retain the Geotechnical consultant through the earthwork construction stage to identify variances, conduct tests required and to make recommendations to problems encountered on site.
- G. Complete reports are available at the office of the District for examination or may be ordered from the District's consultant.

TITLE: Geotechnical Study  
PROJECT No.: 1003.026  
DATE: February 25, 2011  
CONSULTANT: Geotechniques

END OF SECTION



SECTION 01010  
CONTRACT ADMINISTRATION PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

- A. This section specifies administrative and procedural requirements for handling and processing Contract Administration, including use of the District's Sharepoint site.
- B. Related Sections include the following:
  - 1. Division 0 Section 00700 "General Conditions"
  - 2. Division 1 Section 016000 "Product Requirements", for administrative procedures for handling requests for substitutions made after Contract Award.
  - 3. Section 01320 for Project Meetings.

1.2 PROPOSAL REQUEST (PR)

- A. The Architect will issue a Proposal Request as a Bulletin, which includes a detailed description of a proposed change with supplementary of revised Drawings and specifications, may include a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time which the requested price will be considered valid. Contractor will prepare and submit a detailed proposal within the time permitted within the General Conditions Section 00700. All PRs and responses will be transmitted through the District's sharepoint site.

1.3 REQUESTS FOR INFORMATION (RFI)

- A. Contractor to submit all questions for interpretation to the Architect on an electronic RFI form. RFI's will be accepted from the Contractor only. RFI's from any other party such as subcontractors will not be accepted. Contractor shall be responsible for maintaining the RFI log, and providing the Architect and District an electronic copy at all Project District/Contractor/Architect meetings. All RFI's and responses will be transmitted through the District's sharepoint site.

1.4 CONSTRUCTION CHANGE DIRECTIVE (CCD)

- A. District will issue a Construction Change Directive and Change Proposal Request per the provisions of Section 00700. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time, if any. All CCD's will be transmitted through the District's sharepoint site.

1.5 CHANGE ORDER (CO)

- A. On District's approval of a Change Proposal(s) cost, District will issue a Change Order.

## PART 2 PRODUCTS – NOT USED

## PART 3 EXECUTION

### 1.6 Electronic management and controls system (sharepoint site).

- A. The District will provide an internet-based sharepoint site for the use of the project participants. All contract modifications procedures will be transmitted, recorded, and archived through this site. When required for manual signature, paper documents will be scanned to file.
- B. Access protocol
  - 1. Contractor: Provide to the District the full name, title, and email address of each contractor's employee for which access is requested, along with level of access (read, write, download, upload) requested.
  - 2. Subcontractors: Provide to the District the full name, title, and email address of each subcontractor's employee for which access is requested. Unless agreed to in advance by the District, all Subcontractor access will be read/download only.

*[End of Section]*



**SECTION 01030  
COST BREAK OUT**

**PART 1 – GENERAL**

1.01 SUMMARY

- A. For District accounting purposes, the District requires that the cost for construction of the Police Station and Asphalt Surface Parking be identified.
- B. Successful bidder is to provide break out of cost within seventy Two (72) hours following the Notice of Intent to award.
- C. Break Out cost will need to be one total cost for Police Station and one total cost for surface asphalt parking and lighting

1.02 DESCRIPTION

- A. Police Station: Break Out cost will include all work necessary to construct the Police Station and exterior stairway as shown on Drawing A501. The only exception would be the cost to install electrical equipment in the lower level electrical room.
- B. Asphalt Surface Parking: Break out cost will include a base, asphalt, concrete curb and gutter. Along with electrical lighting pole bases, poles, conduit and wiring to a point 5'0" outside of the parking structure. See civil plan C3.20 and electrical plan E1.60.

Grading, storm drains, catch basins and concrete sidewalks are not to be included in break out cost.

- C. District will assist contractor to answer all questions during the Seventy Two (72) hour period while preparing this break out cost

End of section



**SECTION 01041  
PROJECT COORDINATION**

**PART 1 – GENERAL**

1.01 SUMMARY

- A. Provisions of General Conditions, Special Conditions, and Division One apply to this section.
- B. Section includes:
  - 1. Contractor shall be responsible for the proper location and size of openings for all work and shall coordinate all construction as indicated by the contract documents, including shop drawings reviewed by the Architect.
  - 2. Establish on-site lines of authority and communication.

1.02 DESCRIPTION

- A. Coordinate the work and do not delegate responsibility for coordination to any subcontractor.
- B. Anticipate the interrelationship of all subcontractors and their relationship with the work.
- C. Resolve differences or disputes between subcontractors concerning coordination, interference, or extent of work between sections of the work.
- D. Coordinate the work of subcontractors so that portions of the work are performed in a manner that minimizes interference with the program of the work.
- E. Do not obstruct spaces and installations that are required to be clear by applicable Code requirements. Refer to Section 01060, Regulatory Requirements.
- F. Do not cover any piping, wiring, ducts, or other installations until they have been inspected and accepted and required certificates of inspection issued.
- G. 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 increase to the contract sum or the contract time.

H. 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 Construction Manager, Project's Inspector and Architect.

1. For portions of the work specified for engineering development by contractor's professional engineer, shop drawings, calculations, and other data shall be submitted bearing the registration seal and self-written signature of the contractor's professional engineer.
2. Contractor's California registered professional engineer shall review the material proposed by contractor, related to the portion of work requiring contractor's engineering development, for conformance with the contract documents and for compliance with contractor's professional engineer's own engineering design.

I. INTERRUPTION OF PRESENT OPERATIONS

1. Interruption of existing utilities and lighting shall be limited to weekends and holiday periods, insofar as possible. Whenever an interruption is to occur, the Contractor shall notify the Director of Facilities, Maintenance and Operations, in sufficient time in advance of the expected date and duration of the interruption so the campus can be prepared for the interruption. Parking lot lighting shall remain operable throughout duration of construction.
2. Obtain approval from the Director of Facilities, Maintenance and Operations before commencing work outside designated construction area, or before working on existing piping, wiring, or equipment. Provide complete plan of operations, indicating the affected areas and the length of time the existing system will be interrupted or out of service. Work shall be scheduled in such a manner not to disrupt present operations. Where new construction requires interruption of existing operations, services or utilities, obtain prior approval from the Director of Facilities, Maintenance and Operations regarding areas, dates, hours of the day, and number of hour's interruption is expected to take place. The District may, in its sole discretion, grant, deny or limit approval of the Contractor's request for interruption of operations, services or utilities.

J. VERIFICATION OF FIELD DIMENSIONS

1. Verify all conditions, grades, elevations and dimensions shown or indicated on the drawings with the actual field conditions to ensure all work under the contract will be properly installed.

2. If variations or discrepancies are encountered which will or may impact the work in progress or subsequent work, or adjustments are or may be required to meet field conditions, notify the Architect and obtain instruction prior to proceeding with the work in the affected areas.
3. Record the actual field dimensions of all work.

#### K. REPORTS AND RECORDS

1. Maintain a daily log of progress of work at the site, and make the log available to District, Inspector and Architect at all times.
2. Maintain cost accounting records for authorized work performed under unit costs, actual costs for labor and materials, and other basis requiring accounting records.
3. Maintain all records including but not limited to contracts, purchase orders, materials and equipment records, applicable codes, handbooks and standards.

#### L. EXISTING CONDITIONS

1. Repair damage to adjacent property caused by the work of the contract. Repair work shall be done promptly within a reasonable time period at no cost to the District.
2. Restore landscaping, paving, and grading to the original condition at areas adjoining the construction sites, including travel routes, unless otherwise indicated or specified.
3. Keep existing storm drain channels free of debris and protect storm drain inlets adjacent to construction area. Grading operations shall be limited to the area required to be regarded as part of the new work. Existing water sources shall not be disturbed except as otherwise addressed in the extent of new work.
4. Grading contractor to provide a photo record of the existing site. Provide three (3) copies of CD-R of photos to Project Manager, District and architect.
5. Plumbing contractor to rooter all existing sewer lines that are affected by the new work prior to start of work. Certifying in writing that line are clear of obstructions.

M. WORK PERFORMED BY THE DISTRICT OR DISTRICT'S SEPARATE SUBCONTRACTORS

1. Cooperate with and afford other contractors or workers reasonable opportunity for the execution and installation of their work and shall coordinate his work with that of such other contractors.

1.03 COORDINATION AND DETAILING ACTIVITY (CDA)

A. Definition: The CDA is an on site coordination program managed by the Contractor to confirm aspects of the project's design in an orderly, systematic way. The purpose of the CDA is for the Contractor to expeditiously produce fully coordinated drawings showing a composite of all systems and all subsystems along with Civil, landscape/irrigation, architectural, structural, mechanical and electrical elements of the work prior to fabrication of building systems. Contractor and subcontractor's staff are responsible for development of CDA drawings, an a representative of Construction Manager, District's architect and his engineers are required to participate in this program as necessary. The basis of the CDA is to assure that all site and building components are inter- coordinated and accepted by contractor and subcontractors so that all work can be installed in accord with the design documents. At the completion of the CDA, contractor and subcontractors are required to sign off their acceptance indicating that the work represented on the coordination drawings is constructible and has been reviewed by them and that they are in concurrence with information contained on the drawings.

B. Description

1. The CDA effort will be required for all Division of the work.
2. The provisions of this Section 01041 does not lessen contractor's attendance at work site meetings as required by Construction Manager and Architect for any and all work including work not indicated above.

C. Contractor Coordination Responsibilities: Notwithstanding the information shown on the drawings and indicated in the specifications, contractor fully recognizes that the drawings are diagrammatic and are not intended to necessarily represent actual fit, tolerances, clearances, routing, or offsets required to achieve final coordination of systems or building components or to otherwise avoid conflicts between such components or systems. Contractor has adequately reviewed these documents to determine the degree of difficulty required on his part to achieve proper coordination and has allocated sufficient money to accomplish the necessary coordination, fit and routing of systems or components.

- D. Coordination Meeting: Coordination meetings shall be held in accordance with Section 01320, Project Meetings.
- E. Coordination Meetings: During the CDA meeting with District, Construction Manager, project's Inspector and Architect as required, contractor shall discuss and coordinate the locations of all utilities and building elements, problems of fit, trade interfaces, and constructability. As a minimum, coordination meetings are to be held at the 30%, 60%, 90% and 100% points prior to the CDA finish milestone. The purpose of the 100% completion meeting is for Contractor and all subcontractors to sign the fully coordinated drawings indicating their full acceptance and that each subcontractor has fully coordinated his work with the work of all other subcontractors. Architect and Consultants will review and evaluate the routings and placements of all components for compliance with the original design intent only. Contractor may be required to attend additional coordination meetings as required at no additional expense to District. Contractor shall provide One (1) Full Size drawing of the most up-to-date coordination drawings at all coordination meetings and one (1) disk that can be utilized for projection on the monitor. Contractor shall bring the most up-to-date original coordination drawings to all coordination meetings.

*[End of Section]*





**SECTION 01060  
REGULATORY REQUIREMENTS**

**PART 1 - GENERAL**

1.01 DESCRIPTION

- A. The work shall be performed in accordance with Applicable Code requirements and applicable requirements of all other regulatory agencies, including the following:
1. California Code of Regulations (CCR), Title 8, Industrial Safety
  2. CCR, Title 13, Hazardous Materials Transportation
  3. CCR, Title 17, Radiation Safety
  4. CCR, Title 19, Public Safety
  5. CCR, Title 20, Public Utilities and Energy
  6. CCR, Title 21, Public Works
  7. CCR, Title 23, Underground Storage Tank Regulations
  8. CCR, Title 24, California Building Standards Code
    - a. Part 1- 2010 Building Standards Administrative Code , Title 24 C.C.R.
    - b. Part 2 - 2010 California Building Code (C.B.C.) Title 24 C.C.R. (2009 International Building Code and California Amendments)
    - c. Part 3 - 2010 California Electrical Code ((CEC), Title 24 C.C.R. (2008 national Electrical Code and California Amendments)
    - d. Part 4 - 2010 California Mechanical Code (CMC), Title 24 C.C.R. (2009 Uniform Mechanical Code and California Amendments)
    - e. Part 5 – 2010 California Plumbing Code (UPC), Title 24 C.C.R. (2009 Uniform Plumbing Code with all California Amendments)
    - f. Part 6 - 2010 California Energy Code, Title 24 C.C.R.
    - g. Part 7 – Title 8, Division1, Chapter 4, Subchapter 6 for Elevators.
    - h. Part 9 - 2010 California Fire Code, Title 24 C.C.R, (2009 International Fire Code with all California Amendments)

- i. Part 12 - California Referenced Standards, Title 24 C.C.R
    - J Title 19 C.C.R Public safety, State Fire Marshal Regulations.
- 9. CCR, Title 25, Housing and Community Development
- 10. CCR, Title 26, Toxics
- 11. National Fire Protection Association (NFPA):
 

NFPA Standards	Edition
11 Lou-Expansion Foam	latest edition
11A Medium and High-Expansion Foam	latest edition
12 Carbon Dioxide Extinguishing System	latest edition
12A Halon 1301 Fire Extinguishing System	latest edition
13 Installation of Sprinkler Systems	2002 or latest edition
13R Sprinkler Systems for Residential Occupancies	2002 or latest edition
130 Sprinkler Systems for 1 & 2 Family Dwellings	2002 or latest edition
14 Installation of Standpipes and Nose Systems	2007 or latest edition
15 Water Spray Fixed Systems	latest edition
16 Deluge Foam-Water Sprinkler Systems	latest edition
16A Installation of Closed-Head Foam-Water Sprinkler Systems	latest edition
17 Dry Chemical Extinguishing System	2002 or latest edition
17A Wet Chemical Extinguishing Systems	2002 or latest edition
20 Installation of Centrifugal Fire Pumps	2003 or latest edition
22 Water Tanks for Private Fire Protection	2003 or latest edition
24 Installation of Private Fire Service Mains	2007 or latest edition
37 Stationary Combustion Engines and Gas Turbines	latest edition
50 Bulk Oxygen Systems	latest edition
58 Storage & Handling of Liquefied Petroleum Gas	latest edition
72 National Fire Alarm Code (as Amended)	2007 or latest edition
253 Test for Critical Radiant Flux of Floor Covering Systems	2006 or latest edition
2001 Clean Agent Fire Extinguishing Systems	2004 or latest edition
- 12. Comply with all required sections of ASTM for construction testing and applications.
- 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.

- C. Representatives of the Ventura County and City of Moorpark Fire Department, Division of State Architect (DSA) and Office of Safety and Health Administration (DSHA) have the right to inspect all work and workplace conditions.

## 1.02 CONFLICTS

- A. If a conflict exists between referenced regulatory requirements or between referenced regulatory requirements and the Contract Documents, Contractor shall notify Construction Manager 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.” If there is an inconsistency in the Contract Documents, Contractor shall comply with the stricter, more stringent standards and requirements at no additional cost to District.

*[End of Section]*



## SECTION 01090 ABBREVIATIONS

### PART 1 - GENERAL

#### 1.01 SUMMARY

- A. Provisions of General Conditions, Special Conditions, and Division One apply to this section.
- B. This Section covers abbreviations for documents mentioned or referenced elsewhere in the contract documents, and language abbreviations used in the text of the specifications. Abbreviations in drawings and specifications shall be interpreted according to recognized and well-known technical, industry, or trade meanings.

#### 1.02 ORGANIZATION NAME ABBREVIATIONS

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
ADA	American with Disabilities Act
ADAG	American with Disabilities Act Access Guidelines
ADC	Air Diffusion Council
AFBMA	Anti-Friction Bearing Manufacturers Association
AFI	Air Filter Institute
AFPA	American Forest and Paper Association
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
APCD	Air Pollution Control District
APA	APA — The Engineered Wood Systems
API	American Petroleum Institute
AQCMD/AQMD	Air Quality Control Management District/Air Quality Management District
ARI	Air-Conditioning and Refrigeration Institute
ARMA	Asphalt Roofing Manufacturers Association
ASA	American Standards Association
ASAHC	American Society of Architectural Hardware Consultants
ASCE	American Society of Civil Engineers

ASHRAE	American Society of Heating, Refrigerating & Air Conditioning Engineers, Inc.
ASME	American Society of Mechanical Engineers Association, Inc.
ASTM	American Society for Testing and Materials
AWCI	Association of Wall and Ceiling Industries
AWI	Architectural Woodwork Institute
AWPA	American Wood-Preservers' Association
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
CBC	California Building Codes & Standards
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 Electrical Code
CESO	California Elevator Safety Order
CGA	Compressed Gas Association
CGSB	Canadian Government Standards Board
CMC	California Mechanical Code
CODE	UBC, CBC, BOCA, SBCCI, SFBC, as adopted.
CPC	California Plumbing Code
CPSC	Consumer Product Safety Commission
CRA	California Redwood Association
CRSI	Concrete Reinforcing Steel Institute
CS -	Commercial Standards of NBS (U.S. Dept. of Commerce)
See NIST	
CTI	Cooling Tower Institute
CT24	California Title-24
DHI	Door & Hardware Institute
DISS	Diameter Index Safety System
DSA/SS	Division of State Architect/Structural Safety
EBMUD	East Bay Municipal Utility District
EH&S	Environmental Health & Services
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 — See Specific designations that follow
FMEC	Factory Mutual Engineering Corporation
FMRC	Factory Mutual Research Corporation
FME&RC	Factory Mutual Engineering & Research Corporation
FS	Federal Specification
GA	Gypsum Association
HARK	Handbook of Applied Roofing Knowledge
HI	Hydronics Institute
HMI	Hoists Manufacturers Institute
HMMA	Hollow Metal Manufacturers Association
HPMA	Hardwood Plywood Manufacturers Association

IAPMO	International Association of Plumbing and Mechanical Officials
IBEW	International Brothers of Electrical Workers
IBR	Institute of Boiler and Radiator Manufacturers
ICBO	International Conference of Building Officials
ICEA	Insulated Cable Engineering Association
ICRI	International Concrete Repair Institute
IEEE	Institute of Electrical and Electronic Engineers
IEC	International Electric Code
IES	Illuminating Engineers Society
IGCC	Insulation Glass Certification Council
IPC	International Plumbing Code
IRC	International Residence Code
ISA	Instrument Society of America
LIA	Lead Industries Association
MBMA	Metal Building Manufacturer's 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)
See NIST	
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
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NETA	National Electrical Testing Association
NFoPA	National Forest Products Association - See AFPA
NFPA	National Fire Protection Association
NHLA	National Hardwood Lumber Association
NIOSH	National Institute of Occupational Safety and Health
NIST	National Institute of Standards and Technology - Replaced NBS.
NMC	National Mechanical Code
NPA	National Particleboard Association
NPC	National Plumbing Code
NRCA	National Roofing Contractors Association
NRMCA	National Ready Mixed Concrete Association
NSF	National Sanitation Foundation
NTRMA	National Tile Roof Manufacturers Association
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

PCI	Prestressed Concrete Institute
PDI	Plumbing and Drainage Institute
PI	Perlite Institute
PS -	Product Standard of NBS (U.S. Dept. of Commerce)
See NIST	
RFCI	Resilient Floor Covering Institute
RIC/TIMA	Roof Insulation Committee/Thermal Insulation Manufacturers Association
RIS	Redwood Inspection Service (Grading Rules)
SAE	Society of Automotive Engineers
SAS	Saudi Arabian Standard Organization
SAWP	Society of American Wood Preservers
SBC	State Building Code
SBCCI	Standard Building Code by the Southern Building Code Congress International
SCAQMD	South Coast Air Quality Management District
SDI	Steel Door Institute
SFBC	San Francisco Building Code
SFBC	South Florida Building Code
SFBCDC	South Florida Building Code Dade County
SFBCDCP	South Florida Building Code Dade County Protocols
SFEC	South Florida Electrical Code
SFMC	South Florida Mechanical Code
SFPC	South Florida Plumbing Code
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)
SPI/SPFD	Society of Plastics Industry/Spray Polyurethane Foam Division
SPRI	Single Ply Roofing Institute
SSPC	Steel Structures Painting Council
SWI	Sealant and Waterproofers Institute
SWRI	Sealant, Waterproofing and Restoration Institute
TCA	Tile Council of America, Inc.
UBC	Uniform Building Code
UEC	Uniform Electrical Code
UFAS	Uniform Federal Accessibility Standards
UL	Underwriters' Laboratories, Inc.
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
USDA	United States Department of Agriculture
VOC	Volatile Organic Compounds, Architectural Coatings Regulation
WCLIB	West Coast Lumber Inspection Bureau (Grading Rules)
WH	Warnock Hersey
WIC	Woodwork Institute of California
WSLIB	Western States Lumber Inspection Bureau
WSRCA	Western States Roofing Contractors Association
WWPA	Western Wood Products Association (Grading Rules)
WWPI	Western Wood Preservers Institute
SWPPP	Storm Water Pollution Prevention Plan

1.03 TEXT ABBREVIATIONS: Text abbreviations include but are not limited to the following:

ac Alternating current



amp	Ampere
BTU	British thermal unit
cfh	Cubic feet per hour
cfm	Cubic feet per minute
cm	Centimeter
Co.	Company
COP	Coefficient of performance
Corp.	Corporation
d	Penny
db.	Decibel
DB	Dry bulb
dc	Direct current
EER	Energy efficiency ratio
F	Degrees Fahrenheit
fpm	Feet per minute
ft	Foot or feet
gph	Gallons per hour
gpm	Gallons per minute
HP	Horsepower
HVAC	Heating, ventilating and air conditioning
Hz	Hertz
Inc.	Incorporated
KHz	Kilohertz
Kip	Thousand pounds
Ksf	Thousand pounds per square foot
Ksi	Thousand pounds per square inch
Kv	Kilovolt
KVA	Kilovolt amperes
KW	Kilowatt
KWH	Kilowatt hour
LF	Linear foot
MPH	Miles per hour
lb	Pound
LED	Light emitting diode
MBH	1000 BTUs per hour
MHz	Mega hertz
mil	Thousandth of an inch
mm	Millimeter
mph	Miles per hour
oz.	Ounce
PCF	Pounds per cubic foot
pH	Acidity-alkalinity balance
psf	Pounds per square foot
psi	Pounds per square inch
psig	Pounds per square inch, gage
RF	Radio frequency
rpm	Revolutions per minute

SF	Square foot
SY	Square yard
V	Volt
WB	Wet bulb
SWPPP	Storm Water Pollution Prevention Plan

**PART 2 – PRODUCTS - Not Used**

**PART 3 - EXECUTION - Not Used**

*[End of Section]*

## **SECTION 01100 SUMMARY**

### **PART 1 – GENERAL**

#### 1.01 SUMMARY

- A. Provisions of General Conditions, Special Conditions, and Division one apply to this section.
- B. Work Included:
  - 1. The work of this Contract comprises construction of the 600 space parking structure, surface parking and construction of new Campus Police Station at Moorpark College, 7075 Campus Road, Moorpark, CA 93021. Included all grading, utilities, paving, concrete, masonry, metal & glass structure with plumbing mechanical, electrical and all finishes and furnishing. All work to be completed within Four Hundred Twenty (420) Calendar Days.
  - 2. Work not included in this Contract: Items marked NIC on drawings. These items are included in the contract documents for coordination purposes only.
  - 3. Perform the work per the Agreement to be executed between the District and Contractor.
  - 4. Perform work in accordance with the codes, ordinances, and amendments in effect in the location of the Project.
- C. Contractor's Duties:
  - 1. Except as specifically noted, provide and pay for:  
Supervision, Labor, Material and equipment;  
Tools, construction, equipment and machinery;  
Water, heat, and utilities required for construction;  
Other facilities and services necessary for proper execution and completion of work.
  - 2. Pay legally required sales, consumer, and use taxes.
  - 3. Secure all fees and licenses, as necessary for proper execution and completion of work which are customarily secured after the start of construction and which are applicable at time of receipt of bids, except as noted in general conditions.

4. Give required notices.
5. Comply with laws, codes, ordinances, rules, regulations, lawful orders and other legal requirements of the District, public and quasi-public authorities which bear on performance of work.
6. Promptly submit written notice to Architect of observed variance of contract documents from legal requirements.
7. Enforce strict discipline and good order among employees. Do not employ on work unfit persons or persons not skilled an assigned work.
8. Behavior of Contractor Personnel: Loud or foul language or remarks, whistling, or other activities directed at the College students or staff will not be permitted. Radios, headphones or other items, if their use is deemed to cause a safety hazard or interfere with college operations will not be permitted.
9. Tobacco/alcohol/narcotics: The project site is a non-smoking environment, and smoking will not be permitted anywhere on the premises. In addition, the use of alcoholic beverages and non-prescription narcotics is strictly prohibited by Contractor. Contractor shall rigidly enforce these regulations among his employees and visitors. Violators will be subject to prosecution.

#### 1.02 CONTRACTORS USE OF PREMISES

- A. Confine operations at project site to areas permitted by: la, ordinances, permit and contract documents.
- B. Do not unreasonably encumber project site with materials or equipment.
- C. Do not load structure with weights that will endanger structure.
- D. Assume full responsibility for protection and safekeeping of products stored on premises.
- E. Move any stored products that interfere with operations of District or other contractors.
- F. Access for emergency vehicles shall be maintained at all times

- G. During the construction period, the Contractor shall have limited use of the premises for construction operations, including use of the site. Coordinate site limitations with the Director of Facilities, Maintenance & Operations.

#### 1.03 LINES AND LEVELS

- A. Be responsible for the accuracy of the building lines and levels. Employ a licensed civil engineer or surveyor to establish and maintain all lines and levels and notify the Architect of any discrepancies before proceeding with the work

#### 1.04 REFERENCE STANDARDS AND SPECIFICATIONS

- A. Comply with the applicable portions of standards and specifications published by the technical societies, institutions, associations and governmental agencies referred to in the specifications.
- B. Comply with referenced standards and specifications; latest revision in effect at the time the Contract is executed, unless otherwise identified by date.
  - 1. Exception: Comply with issues in effect as listed in governing legal requirements.
- C. Listed hereinafter are the various organizations or references that may appear in the specifications, along with their respective acronyms:

#### 1.05 PRODUCT HANDLING AND PROTECTION

- A. Transport, deliver, handle, and store materials and equipment at the project site as prescribed by the manufacturer or as indicated in the specifications in such a manner as to prevent the intrusion of foreign matter or moisture and to prevent damage.
- B. Packing: Provide packaged material in manufacturer's original containers with seals unbroken and labels intact until incorporated into the work.
- C. Remove all damaged or otherwise unsuitable material and equipment promptly from the project site.
- D. Protection: Protect all finished surfaces.

- E. Maintain at the Project Site all Material Data Safety Sheets (MSDS) accompanying any materials or equipment delivered to the Project Site.

#### 1.06 GOVERNING AGENCIES

- A. Permits from local Agencies: The Contractor shall obtain all permits as required by local and state authorities. The District will reimburse the direct cost of the required permits, except for a haul permit required by the City of Moorpark. Contractor shall coordinate these activities by meeting with the local fire authority. **Contractor to obtain Grading Permit from City of Moorpark.**
- B. Municipal Laws and Regulations: The project is located on College property in Ventura County, California. The project is not under the jurisdiction of the city or county building department except for grading and drainage; it is under the jurisdiction of the Division of the State Architect. However, the Contractor shall have full knowledge of Ventura County laws and regulations including, but not limited to, limitations on noise, hours of operation, hauling routes or limits on weight of equipment traveling on adjacent streets, and any other limitations which might affect the Contractor's work and operations. Contractor will be responsible to obtain an approved haul route from the City of Moorpark and pay any and all required haul route fees and permits.
- C. Division of the State Architect (DSA)
  - 1. Contractor shall be familiar with DSA procedures and approvals for all aspects of construction.
  - 2. All (Field Change Documents) that require approval from DSA, shall have DSA approval prior to construction of the change. Contractor shall be responsible for all costs incurred for removal, rework and reinstallation of work prior to DSA approval.
- D. All work performed under this contract shall be done in strict compliance with the Cal-OSHA Rules and Regulations, Stormwater Pollution Prevention Plan.

#### 1.07 CONSTRUCTION DOCUMENTS

- A. All dimensions shall have preference over scale and shall be verified in the field. The Architect shall be notified of dimensional errors or conflicts with existing conditions, for corrections before proceeding with the work.

- B. In no case shall working dimensions be scaled from construction documents. If a required dimension is not shown, the Contractor shall contact the Architect for clarification or the specific dimension.
- C. Where a specific detail is not shown, the construction shall be similar to that indicated or noted for similar conditions and cases of construction on the project. References of notes and details to specific conditions and locations shall not limit their applicability.
- D. Any conditions or installations not identified in the construction documents and affecting the work to be performed shall be brought to the attention of the Architect in order that cost and responsibility for any added work may be determined before work is undertaken.
- E. Compliance with all design codes is required. A copy of the Tests and Inspections List shall be available at all times on the jobsite.

#### 1.08 ADJACENT SITE CONDITION SURVEY

- A. Prior to commencement of work, jointly survey the site, paving, plant life, and other items with the Owner's Representative, noting and recording existing damage such as cracks, sags, unhealthy plant life, and other damage. Photos should be taken by the Contractor.
- B. This record shall serve as a basis for determination of subsequent damage to these items due to settlement, movement, or Contractor's operations.
- C. Existing damage observed shall be marked and the official record of existing damage shall be signed by the parties making the survey.
- D. Cracks, sags, and damage to the site, paving, plant life, and other items not noted in the original survey but subsequently observed shall be reported immediately to the District's Representative.

#### 1.09 PROTECTION OF EXISTING UTILITIES

- A. The Drawings may not show all existing above and below grade drainage lines; storm drains; sewers; water, gas, and electrical lines; and other items existing in the area of the work.
- B. Locate these existing installations before proceeding with excavation or other operations which may cause damage, maintain them in service where appropriate, and repair damage caused by the performance of the work, at no increase in the Contract Sum.

- D. Additional compensation or extension of time due to below grade structures not shown or brought to the Contractor's attention, including reasonable action taken to protect, relocate, and repair damage to same, shall be determined as specified in the General Conditions.

**PART 2 – PRODUCTS – Not Used**

**PART 3 – EXECUTION – Not Used**

*[End of Section]*



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division 1 apply to the work of this Section.
- B. Description: This section covers special project procedures pertaining to the work and is supplementary to those mentioned elsewhere in the Contract Documents.
- C. References herein to Division of State Architect (DSA) special project procedures related to deferred approvals, shall be deemed to mean in conformance with DSA Building Code standards, and deferred from the original building permit until all requirements listed herein and/or in the applicable technical section(s) are met, reviewed and approved by the governing authority authorized to issue the applicable permit for the selected scope of work affected by the deferred approval listing.
- D. This Section identifies the Division of State Architect (DSA) / Building Department deferred approval items under this Contract by division, section number and title for the scope of work that is deferred. Deferred approval work covered by this Contract and as indicated by any specific provisions in the General Conditions, Special Conditions, District-Contractor Agreement and/or Contract Documents shall be in conformance with the requirements as specified herein.

1.02 DEFERRED APPROVALS

- A. Installation of all deferred approval items and systems shall not be started until the following procedures have been complied with:
  - 1. Contractor(s)/Sub-Contractor(s) design professional(s) shall prepare detailed plans/drawings and engineering calculations under the supervision of, and signed by a professional Structural Engineer registered in that discipline in the State of California.
  - 2. It shall be the Contractors responsibility and that of his registered professional(s) to present stamped and signed, by both the design professional and the Contractor, shop drawings and calculations to the Architect/Structural Engineer of record for review, approval, signature and stamp prior to Contractors submittal to DSA / Building Department for deferred approval plan check and permit.
  - 3. Obtain and pay for all required permit and other required fees.
- B. Access Related Equipment: Installation of deferred approval items shall not be started until Contractor's drawings, specifications and engineering calculations for the actual systems to be installed have been accepted and signed by the Architect or Structural Engineer and approved by DSA for accessibility.

1.03 REQUIREMENTS

- A. The Architect/Structural Engineer will review and approve the Contractors shop

drawings, calculations and material data that is the DSA submittal prior to submitting to DSA. Contract drawings indicate design intent and shall be used as providing the minimum standards required for fabrication, support and anchorage. The Contractor and the Contractor's design professionals shall be responsible for meeting the minimum requirements indicated.

- B. The Architect/Structural Engineer reserves the right to review and/or modify the design professionals drawings / calculations and specifications to suit any project condition created by the acceptance of deferred approval items. Requested changes or revisions shall be re-engineered and resubmitted for re-review in conformance with Section 01340. If required, Contractor shall resubmit to DSA Building Department as required. Changes resulting from such modifications shall be performed at no extra cost to the District.
- C. Contractor shall pay for the services of the Architect/Structural Engineer for review of Design/Build work for submittal and resubmittal of Contract Drawing changes resulting from approval of deferred approval items by DSA / Building Department. Contractor to also pay for any/all additional plan check and permit fees required resulting from the changes of the original contract documents required by the Design/Build work.

#### 1.04 RELATED REQUIREMENTS

- A. Contractor shall coordinate pertinent related work and modify surrounding work as required to properly integrate the Work affected by each deferred approval item to provide that each is complete and fully integrated into the project / construction required by contract documents and in full conformance with agency requirements at no additional cost to District.
- B. Include as part of each deferred approval item miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation, whether or not mentioned or detailed as part of the required approval.

#### 1.05 DEFERRED APPROVAL ITEMS

- A. The following list of items and/or equipment require a deferred approval of the details and substantiating calculations for their support and seismic anchorage due to the fact that they are identified in the plans and specifications as having more than one acceptable manufacturer and/or model number.
  - 1. Section 08410 – Aluminum Storefront and Window Wall System; inclusive of Section 08800 – Glass and Glazing.
  - 2. Section 14240 – Hydraulic Passenger Elevators; including elevator guide rails and support brackets, plates and anchorage.

#### 1.06 SUBSTITUTIONS

- A. Comply with requirements of Section 01630 - Substitutions and Product Options.
- B. Where "or equal(s)" are accepted which are different from record and DSA approved contract drawings or documents, it is to be noted that 'Architect of Record' is required to revise contract documents of such changes which will also need to be re-reviewed and approved by DSA, / Building Department to their

satisfaction. Contractor shall include all such anticipated costs for Architects services required for the revision of such Contract Documents. This provision also applies to all deferred DSA / Building Department approvals.

2.00 PRODUCTS – Not Used

3.00 EXECUTION – Not Used

END OF SECTION



**SECTION 01290  
PAYMENT PROCEDURES**

**PART 1 - GENERAL**

1.01 APPLICATIONS FOR PAYMENT

- A. General: Submit notarized Applications for Payment to the Construction Manager / Architect in accordance with the schedule established by the General Conditions and the Agreement between the District and Contractor.
  
- B. Format and Data Required: Submit itemized applications typed on AIA Document G702, "Application and Certificate for Payment," and Continuation Sheet G703 or other form furnished by the District's Representative.
  - 1. Line items and dollar values shall be from the schedule of values accepted by the Construction Manager /Architect.
  - 2. Include names, categories of work, and amounts for Subcontractors.
  - 3. General Conditions and profit shall each be a line item each month for the Contractor on their G703 sheets.
  
- C. Preparation of Application for Each Progress Payment:
  - 1. Application Form:
    - a. Fill in required information, including that for Change Orders executed prior to the date submittal of application.
    - b. Fill in summary of dollar values to agree with the respective totals indicated on the Continuation Sheets.
    - c. Execute certification with the signature of a person authorized to bind the contracting firm in such matters.
    - d. Preliminary Progress Pay Application Review Meeting. Contractor shall submit to the Construction Manager and Project Inspector the preliminary pay application documentation for review, on a monthly basis. The Construction Manager may elect to call for a meeting with the Contractor and any subcontractor to review the plans that would depict the updated monthly progress work for each trade. Contractor and subcontractor shall bring to the meeting the plans for the respective trade, showing color-coded progress work for a given month. Contractor shall update color-coded monthly progress work plans and keep them clean and legible at all times.

- e. Provide signature space for:
  - 1. Architect
  - 2. Construction Manager
  - 3. Director of Facilities, Maintenance & Operations
  - 4. Project Inspector
  - 5. District

2. Continuation Sheets:

- a. Fill in total list of scheduled component items of work, with item number and the schedule dollar value for each item.
- b. Fill in the dollar value in each column for each scheduled line item when work has been performed or products stored on site as approved. Round off values to nearest dollar, unless otherwise specified for the schedule of values.
- c. At the end of the Continuation Sheets list each Change Order executed prior to the date of submission. List by Change Order number, description, and breakdown of costs as for an original component item of work.

D. Substantiating Data for Progress Payments:

- 1. When substantiating data are required, submit suitable information as specified in Section 01300 with a cover letter identifying:
  - a. Project.
  - b. Application number and date.
  - c. Detailed list of enclosures.
  - d. For stored products:
    - 1) Item number and identification as shown on application.
    - 2) Specific description of product.
- 2. Submit one copy of data and cover letter for each copy of application.

E. Preparation of Application for Final Payment: Refer to District/Contractor Agreement.

F. Submittal Procedure:

1. Submit Applications for Payment to the Construction Manager / Architect at the times stipulated in the Agreement.
2. Number: Four Originals of each application.

#### 1.02 CHANGE ORDERS

- A. Backup data submitted with Applications for Payment may be used as basis for approving or rejecting costs submitted in Change Orders.
- B. Submit an estimated cost breakdown for each Change Order request.
- C. Limits of markup for Change Order costs shall be as specified in the Special Conditions (Section 00800), or as otherwise stipulated in the Agreement.

### **PART 2 – PRODUCTS - Not Used**

### **PART 3 – EXECUTION**

#### 3.01 LABOR COMPLIANCE.

- A. Submit pay application including labor compliance documentation per Division “00,”  
Section 00900 “Ventura County Community College District Labor Compliance Program.” Labor Compliance must provide approval for release of payment before payment can be made.

*[End of Section]*





**SECTION 01305  
CONSTRUCTION PHOTOGRAPHS**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. All other sections of Division 1 apply to this section. Provide construction photographs, digital photographs, complete.

**1.02 SUBMITTAL**

- A. Qualifications:
  - 1. Construction personnel should have working knowledge of digital camera.
- B. Prints: Submit digital image of each view directly to the Architect within 5 days of taking photographs. Prints can be submitted electronically upon Architect's acceptance. The Architect will distribute print files as follows:
  - 1. One print to the Contractor shall be retained in the field office at the Project site available at all times for reference.
  - 2. One print to the District as the District's permanent record.
  - 3. One print shall be retained in the Architect's files.
- C. Digital Photographs: Maintain on project files.

**1.03 QUALITY ASSURANCE**

- A. Insure that construction personnel have competency level to properly operate a digital camera and that software is adequate to store and send quality digital images.
- B. Digital Camera Operator: Person with demonstrated photographic skills.

## **PART 2 – PRODUCTS**

### **2.01 DIGITAL PHOTOGRAHS**

- A. Provide daily digital photographs on disk of construction progress, from vantage points as directed by the District. / Architect.
- B. Provide software package capable of sending, editing and storing digital images.

## **PART 3 – EXECUTION**

### **3.01 PRE-CONSTRUCTION PHOTOGRAPHS**

- A. Before starting construction, take photographs of the site and surrounding property from different points of view as selected by the Architect/Contractor. Take photographs in sufficient number to show existing conditions adjacent to the property before starting the work. Take photographs of existing buildings either on or adjoining the property in sufficient detail to record accurately the physical conditions at the start of construction
- B. Vantage Points: Following suggestions by the Architect and the District, the Contractor shall select vantage points. During each of the following construction phases, take not less than 2 of the required shots from the same vantage point each time to create a time-lapse sequence:
  - 1. Commencement of the work.
  - 2. Completion of demolition.
  - 3. Exterior building enclosure.
  - 4. Interior work, monthly through date Substantial Completion.

*[End of Section]*

**SECTION 01310  
PROJECT CONSTRUCTION SCHEDULE**

**PART 1 - GENERAL**

1.01 SUMMARY

- A. Provisions of General Conditions, Special Conditions, and Division One apply to this section, including
- B. Section Includes: The progress Schedule to be prepared by the Contractor shall consist of a network analysis system as described herein. The preparation of this scheduling system of construction is the responsibility of the Contractor. Conventional CPM (I-J) technique must be utilized to satisfy time applications. The principles and definitions of the terms used herein shall be as set forth in the AGC publication "The Use of CPM in Construction," but the provisions of this section shall govern.
- C. Related Work:
  - 1. Documents affecting work of this section include but are not limited to, General Conditions and all Supplementary Conditions.
  - 2. Submittals and substitutions.

**PART 2 - PRODUCTS**

2.01 NETWORK SYSTEM FORMAT

- A. The system shall consist of network diagrams and accompanying mathematical analyses. Activities with discrete completion dates shall be identified by separate subnetworks interconnected with the basic diagram or specially coded.

2.02 DIAGRAMS

- A. Shall show the order and interdependence of activities and the sequence in which the work is to be accomplished as planned by the Contractor. The basic concept of a network analysis diagram will be followed to show how the start of a given activity is dependent on the completion of preceding activities and how its completion restricts the start of following activities. Detailed network activities shall include, in addition to construction activities, the submittal and acceptance of materials, samples and shop drawings, the procurement of critical materials and equipment, fabrication of special material and equipment, and their installation and testing. All activities of the District that affect progress and contract-required dates for completion of all or part of the work will be shown. Activities with duration time in excess of 15 days shall be kept to a Minimum to facilitate monthly progress evaluation. Activities with durations in excess of 15days shall be allowed only if such an activity is not logically capable of further subdivision. The network shall contain a minimum of 200 activities with not more than 25 percent of the total number of activities being on the critical path. The selection and number of activities shall be subject to the District's acceptance. Detailed networks need not be time

scaled but shall be drafted to show a continuous flow from left to right with no arrows from right to left. The following information shall be shown on the diagrams for each activity duration. Numbering shall be assigned so that preceding event numbers are smaller numerically than the following event numbers. Skip numbering shall be used on the network to allow addition of subsequent activities for change order and logic changes. The critical path on the schedule will be delineated from all other activities.

## 2.03 MATHEMATICAL ANALYSIS

A. The network diagram mathematical analysis shall include a tabulation of each activity shown on the detailed network diagrams. The following information will be furnished as a minimum for each activity.

1. Preceding and following event numbers
2. Activity description
3. Estimated duration
4. Earliest start date (by calendar date)
5. Earliest finish date (by calendar date)
6. Actual start date (by calendar date)
7. Actual finish date (by calendar date)
8. Latest start date (by calendar date)
9. Latest finish date (by calendar date)
10. Total float
11. Percentage of activity completed
13. Manpower required

B. The program or means used in making the mathematical computation shall be capable of compiling the total value of completed and partially completed activities. The program shall also be capable of accepting revised completion dates as modified by accepted time extensions and re-computation of all tabulation dates and float accordingly.

## 2.04 REQUIRED SORTS

The analysis shall list the activities in sorts or groups as follows:

- A. By the preceding event number from lowest to highest and then in the order of the following event number.

- B. By the amount of total float, from lowest to highest and then in order of preceding event number.
- C. By latest allowable start dates, then in order of preceding event numbers, and then in order of succeeding event numbers.
- D. By latest allowable finish dates, then in order of preceding event numbers, and then in order of succeeding event numbers.
- E. Contractor's monthly payment request.
- F. Listing of all revised input data, which generates this report.

## **PART 3 - EXECUTION**

### **3.01 SUBMISSION AND ACCEPTANCE**

- A. **Completed Network:** The complete network analysis, consisting of the network mathematical analysis and network diagrams, shall be submitted as specified herein.
- B. **Review and Evaluation:** The Contractor shall participate in a review and evaluation of the proposed network diagrams and analysis by the District. Any revisions necessary as a result of this review, shall be resubmitted for acceptance by the District within 10 calendar days after the conference. The accepted schedule shall then be the schedule to be used by the Contractor for planning, organizing, and directing the work, reporting progress, and requesting payment for work accomplished. If the Contractor thereafter desires to make changes in the method of operating and scheduling, the District shall be notified in writing stating the reasons for the change. If the District considers these changes to be of a major nature, the Contractor may be required to revise and submit for acceptance, without additional cost to the District, all of the affected portions of the network diagrams and mathematical analysis. A change may be considered of a major nature if the actual time required is varied from the original plan to a degree that it effects the contract completion date.

### **3.02 MONTHLY REPORTS**

- A. The contractor shall submit at monthly intervals a report of the actual construction progress by updating the mathematical analysis. Project status shall be evaluated on the basis of float on the critical path at the time of updating, with negative float indicating the project is behind schedule and positive float indicating status ahead of schedule. Entering of updated information into the mathematical analysis will be subject to the acceptance of the District. The report will state the percentage of the work actually completed and schedule as of the report date and the progress along the critical path in terms of days ahead or behind the allowable dates. If the project is behind schedule, progress along other paths with negative float shall also be reported. The Contractor shall also submit a narrative report with the updated analysis which shall include, but not be limited to, a description of the problem areas, current and anticipated, delaying factors and their impact, and an explanation of corrective actions taken or proposed.

### 3.03 PAYMENTS

- A. The monthly report shall show the activities or portions of activities completed during the reporting period as basis for the Contractor's periodic request for payment. Payment will be based on the total value of such activities completed or partially completed after verification by the District.

### 3.04 SUBMISSION REQUIREMENTS

- A. Sheet size of network diagrams shall be 30 by 42 inches or otherwise agreed upon size by the District and Architect.. Updated diagrams shall show the date of the latest revision. Network diagrams and complete revisions shall be submitted in two copies, 1 for District and 1 for Architect along with a Disk in PDF and Primavera format. Monthly reports shall be submitted in two copies with distribution as stated above.

### 3.05 CHANGES

- A. When changes in the work are necessary, the Contractor will submit revisions to The network of all activities affected by the change. If settlement has not been reached on the time of the change order or the contractor has failed to submit revisions to the network logic, the District has the option of providing suggested logic and/or duration time changes which the Contractor will include in all subsequent updating reports until such time that the change order has been settled or until the logic and durations are superseded. If the Contractor has any objections to the data furnished by the District, he shall advise the District promptly , in writing, of such objections fully supported by his own counterplan, however, he will continue to use the revisions suggested by the District for all updating reports until such time as the District may accept alternate data.
- B. If the contractor fails to submit, in writing, his objections to the revisions, along with supporting data and counterplan, within 20 days after the date such suggested revisions were furnished by the District, the Contractor will be deemed to have concurred in the District's suggested logic/duration time changes, which changes then will be the basis for equitable adjustment of the time for performance of the work

*[End of Section]*

**SECTION 01320  
PROJECT MEETINGS**

**PART 1 - GENERAL**

1.01 DESCRIPTION

- A. This Section covers the general requirements for the project meetings.

**PART 2 - PRODUCTS - NOT USED**

**PART 3 - EXECUTION**

3.01 PROJECT MEETINGS

- A. Attendees: Unless otherwise specified or required by the District, meetings shall be attended by the District, Project Inspector, Architect, Contractor, and the Contractor's Superintendent, Contractor's Project Manager and Construction Manager. Subcontractors may attend the meetings when involved in matters to be discussed or resolved, **but** only when requested by the District or Architect. Should Contractor request attendance of a subcontractor at a meeting, Contractor must inform District / Architect of attendance and obtain acceptance for subcontractor to attend. Contractor will submit an agenda for the meeting with the subcontractor at least 24 hours prior to the meeting.
- B. Meeting Schedule: Dates, times, and locations for various meetings shall be agreed upon and recorded at pre-construction meeting. Thereafter, changes to the meeting schedule shall be agreed between the District and the Contractor, with appropriate written notice to all parties involved.
- C. Meeting Records: The Construction Manager shall record minutes of each meeting and furnish copies within a reasonable time thereafter to the District, Inspector, Contractor and other attendees. Unless written objection to contents of the meeting minutes is received by the Construction Manager within Forty-Eight (48) hours after presentation, it shall be understood and agreed that the minutes are a true and complete record of the meeting

3.02 PRE-CONSTRUCTION MEETING

- A. General: A pre-construction meeting shall be held at the location, date, and time designated by District. In addition to attendees named herein, this meeting shall be attended by representatives of the regulatory agencies having jurisdiction, if required, and such other persons the District may designate.
- B. Agenda: The matters to be discussed or resolved and the instructions and information to be furnished to or given by the Contractor at the preconstruction conference include:
1. Schedule of progress meetings.

2. Progress schedule and schedule of values submitted by Contractor.
3. Communication procedures between the parties.
4. Names and titles of all persons authorized by Contractor to represent and execute documents for Contractor, with samples of all authorized signatures.
5. The names, addresses, and telephone numbers of all those authorized to act for the Contractor in emergencies.
6. Construction permit requirements, procedures, and posting.
7. Public notice of starting Work.
8. Forms and procedures for Contractor's submittals and Request for Information.
9. Change Order forms and procedures.
10. Payment application forms and procedures and revised progress schedule reports to accompany the applications.
11. Contractor's designation of his organization's accident prevention member and his qualifications if other than the Superintendent.
12. Contractor's provisions for barricades, traffic control, utilities, sanitary facilities, and temporary facilities and controls.
13. Consultants and professionals employed by District and their duties.
14. Construction surveyor and initiation of surveying services.
15. Testing Laboratory or Agency, and testing procedures.
16. Procedures for payroll and labor cost reporting by the Contractor.
17. Review of Labor Compliance Program, for Contractor and Subcontractors.
18. Procedures to ensure nondiscrimination in employment.
19. Warranties and guarantees.
20. Other administrative and general matters as needed.

### 3.03 CONSTRUCTION PROGRESS MEETINGS

- A. Progress meetings shall be held according to the agreed schedule. All matters bearing on progress and performance of the Work since preceding progress meeting shall be discussed and resolved including, without limitation, any previously unresolved matters, deficiencies in the work or methods being employed for the work, and problems, difficulties, or delays which may be encountered.



### 3.04 SPECIAL MEETINGS

After notice to other parties, special meetings may be called by the District, Architect or Contractor. Special meetings shall be held where and when designated by the District. Other special meetings, such as the pre-roofing conference, shall be conducted as specified in the various sections of the specifications.

### 3.05 POST-CONSTRUCTION MEETING

- A. This meeting shall be held prior to the final inspection of the work to discuss and resolve all unsettled matters. Bonds and insurance to remain in force, and the other documents required to be submitted by the Contractor will be reviewed and any deficiencies determined. Schedule and procedures for the final inspection and for final correction of defects and deficiencies shall be agreed.

### 4.0 COORDINATION AND DETAILING MEETING

- A. During the course of construction, coordination and detailing meetings shall be held to discuss and coordinate the locations of utilities and building elements, problems of fit, trade interferences and construct-ability.
- B. Location: As designated by District's representative
- C. Attending shall be:
  - 1. District's representative
  - 2. District
  - 3. District's consultants, as appropriate
  - 4. Contractor
  - 5. Subcontractors, as appropriate
  - 6. Others, as appropriate

### 5.0 QUALITY ASSURANCE & CONTROL MEETING

- A. During the course of construction, meetings shall be held for the quality control plan, coordinate and mutual understanding, and weekly quality control.
- B. Location: As designated by District's representative
- C. Attending shall be:
  - 1. District's representative
  - 2. District
  - 3. District's consultants, as appropriate
  - 4. Contractor
  - 5. Subcontractors, as appropriate
  - 6. Others, as appropriate

*[End of Section]*



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions Special Conditions and Division 1 apply to the work of this Section.
- B. The work includes submitting all construction schedules, shop drawings, certification, product data, installation data, warranties, samples, brochures, calculations, test reports, catalogs, material and equipment lists and all other similar required items.

1.02 GENERAL REQUIREMENTS

- A. Contractor shall prepare a Schedule of Submittals in coordination with the Work Project Schedule for the Architects review. Contractor shall not submit any submittal related to Divisions 2-16 until Architect has reviewed the Submittal Schedule.
- B. Accompany each submittal with a Letter of Transmittal identifying each submittal referenced to the submittal number from the Schedule of Submittals. Refer to description hereinafter.
- C. Coordination:
  - 1. Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
  - 2. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that requires sequential activity and coordination.
  - 3. Coordinate transmittal of different types of submittals for related elements of the work so processing by all parties will not be delayed by the need to review submittals concurrently for overall coordination of related objects.
  - 4. The Architect reserves the right to withhold action on any submittal requiring coordination with other related submittals not yet received.
  - 5. Submittals received directly from subcontractors will be rejected.
  - 6. Contractor(s) shall clearly indicate on shop drawing submittals where sleeve locations are required through concrete beams and girders for review of types, sizes and details by the Architect. Requests shall be in accordance with the criteria indicated on the structural drawings.
- D. Each submittal shall have a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block. Provide a minimum 3" x 8" blank space for the review stamps for each of the consultants reviewing the submittal.
- E. Construction Data: Shop drawings, samples, brochures, calculations, test reports, catalogs, equipment lists and all other similar required items are referred to as Construction data.

- F. Where samples, shop drawings, certificates of compliance, certificates of training for applicators, warranties and other construction data are requested and/or inter-related, submit all data in one package. Incomplete submittals will not be reviewed and will be held at the Contractor time and expense.
- G. Submit all data and printed literature to the Architect in one package. Submit only literature pertinent to the work or highlight pertinent information crossing out all non-pertinent information.
- H. Contractor is responsible for proper coordination of all parts of the project under his Contract to extent shown, specified and required. Contractor shall furnish to each subcontractor copies of shop drawings and other construction data supplied by other subcontractors as are needed for coordination of related work.
- I. Contractor is responsible for any delays in the work due to failure to submit product data, shop drawings, samples, etc. promptly at the start of the project. Contract completion time will not be extended on account of this type of delay.
- J. The Architect will review submittals only for conformance with the design concept and compliance with intent of the Contract Documents. The Architect's review of one or more separate item(s) shall not indicate review of an entire assembly in which the item functions or is a part of.
- K. The Contractor shall make corrections required by the Architect and shall resubmit the required number of corrected copies of shop drawings, data sheets, new samples, warranty rewrites, etc. until accepted. The Contractor shall direct specific attention in writing or on resubmitted shop drawings to any additional revisions other than the corrections requested by the Architect on previous submissions.
- L. The Architect's review of any submittal shall not relieve the Contractor of responsibility for deviation from the requirements of the Contract Documents. Contractor shall inform the Architect in writing of such deviation at the time of submittal. The Architect's written concurrence or lack of written concurrence to the specific deviation shall not relieve the Contractor from responsibility for errors and omissions in the shop drawings or other submittals. Architect's review of a submittal that deviates from the contract document requirements that is not specifically noted on a transmittal, on the drawings nor inclusive of a letter from the contractor articulating the deviation / change shall not be considered acceptance by the Architect's review if not specifically addressed.
- M. No portion of the work requiring a shop drawing or sample submittal shall be commenced until the submittals been reviewed by the Architect. All portions of the work shall be in accordance with reviewed submittal, shop drawing, sample, etc.
- N. When an alternate, substitution or a deviation from the Contract Documents is proposed for a material, product, finishes, installation detail, etc, it is to be clearly indicated on the Letter of Transmittal as well as on the shop drawing, data sheets, etc. Indicate with the words "ALTERNATE," "DEVIATION," or "SUBSTITUTION", so that it can be easily noted as a proposed change for review.
- O. Unless Contractor has notified Architect in writing of variations, deviations, omissions, substitutions, alternates, etc. and received Architect's formal

concurrency. Contractor will be required at its sole expense to repair, replace or furnish whatever materials/quantities are required. Contractor shall perform all work, including adjacent work of other trades affected thereby and necessary to rectify such deviations, variations, etc., all as required by Architect at time such variations and/or omissions are discovered by Architect. This requirement shall extend even though this does not occur until after said submittals or shop drawings have been reviewed and work in question has been completed. Replacement and repair will be mandatory in such instances and shall be performed at no cost to District.

- P. Shop drawings, schedules, legends, etc shall be drawn, reduced or enlarged as necessary to a scale where the graphics of the diagrams, drawings or details, the numeration of dimensions and the clarity of lettering and written text is clearly legible to convey the information necessary for review in a manner that is without difficulty. Generate documents that are reproduced to a size or scale that maintains a minimum text / font size of not less than 11 point. Non-conforming submittals will be returned without review.

### 1.03 SUBMITTALS

- A. Contractor Approval: All construction data and shop drawings must be reviewed and approved (stamped and signed), by Contractor in conformance with requirements of General Conditions, Division I, and balance of Contract Documents, prior to submitting same to Architect for review. Drawings/Data so submitted shall be stamped and signed by Contractor stating that:

Job Name: _____
Submittal No. _____ Specification Section # _____
Contractor represents that he has reviewed this submittal and that the information contained therein has been totally coordinated with related work, based on his knowledge of all trades, quality control, and construction sequencing, and is fully coordinated and complies with the requirements of the Work.
Approved By: _____ Date: _____
(Name of Contractor)

1. Failure to comply with this requirement with the understanding of its full intent will result in immediate return of submittal with no action taken by Architect. Any delays to the project shall be the Contractors responsibility. Contractor shall find and red mark all errors, omissions, inconsistencies and coordination issues that effect the work of this project, prior to sending the submittal to the Architect.
  2. Submittals that are poorly executed by the subcontractor shall be returned for rework prior to Contractors re-review and forwarding to the Architect. In the interest of construction scheduling on long-lead orders / fabrication, Contractor shall call the Architect to explain the nature of the inconsistencies discovered, the possible impact on schedule and whether it warrants Architects review consideration, prior to returning.
- B. Submittal Schedule: Within 30 days after "Notice to Proceed", Contractor shall submit a progress schedule, including all subcontractors, manufacturers and suppliers showing dates for submittal of construction data and shop drawings. Coordinate the preparation, processing and schedule to allow for lead time,

including lead time required by subcontractors and for material and equipment of manufacturers, fabricators, and suppliers; delivery of affected materials and equipment in time for installation without delaying any portion of the work; and in sufficient time for Architect's review, and/or re-review, when necessary of all construction data required for the Project. Coordinate each separate submittal with other submittals and related activities such as testing, purchasing, fabrication, delivery and similar activities that require sequential activity.

- C. Shop Drawing Log: Prepare, update and submit on a regular basis, a shop drawing, sample and product data log on a form approved by the Architect, listing all required submittals by reference to specification section number, number of submittal or re-submittal and their submittal date coordinated with the construction schedule.
- D. Letters of Transmittal:
1. Construction data submittals must be accompanied by Contractor's letter of transmittal addressed to attention of Architect's Construction Administrator. Letters of transmittal shall contain all information necessary for identification including a listing of construction data transmitted; Name of project, Contractor, subcontractors and manufacturers and fabricators names; Architect's job identification number; applicable contract drawings number and specifications section and paragraph; reference specifications, etc., and other "standard" type specification; and such additional information as required to identify the submittal. Submittals and re-submittals shall be numbered and renumbered consecutively by the Contractor. 'Letters of Transmittal', shall bear both the consecutive number identifying the submittal or re-submittal and the consecutive numbering with relation to the specification section, as appropriate. If the item is a re-submittal, indicate the previous dates submitted with a revision dash number following the original submittal number.
  2. On the transmittal or separate sheet, record deviations from the Contract Document requirements, including minor variations and limitations and clearly identify and call to the Architect's attention such deviation. Include Contractor's certification that information complies with Contract Document requirements.
- E. Time for Submittals including Requests for Information (RFI's): Architect must receive submittals in time to permit sufficient number of working days for proper review. If a submittal or RFI is not received in time to allow sufficient time for Architect's review without delaying construction, Contractor shall reimburse Owner for Architect's costs incurred by checking on an accelerated basis. The Architect's and District's responsibility for time consumed in review of shop drawings and construction data and any claim made by Contractor (including subcontractor and supplier) that such time is excessive and has caused or will cause delay in completion of the work will only be considered as starting from the time drawings, samples and other construction data are correct in all respects and so submitted and signed as approved by Contractor. Preliminary, partial and incomplete or incorrect submittals of drawings and samples shall not be considered as official review time.
1. Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for re-submittals. Review periods are in addition to time for Contractors review

prior to submittal to the Architect, time in transit and time for preparation and revision of submittals and re-submittals.

2. "Sufficient Time" as used herein for Architect's review shall mean a minimum of 15 working days, and/or what is considered reasonable by the Architect based on the numbers of reviews required by project consultants and the number of submittal given to the Architect at any given time.
- F. Method of Delivery: All submittals shall be mailed to or hand carried to Architect's office.
- G. Number of Copies Required:
1. Shop Drawings: The Contractor shall submit a minimum of five (5) prints each for review. Notations and corrections will be indicated on the prints. Architect shall retain one (1) copy of the reviewed / approved prints for reference. Two (2) copies of the reviewed prints will be returned to the Contractor for distribution. Reproductions shall be legible and of good quality and made of numbers required, including one copy for District.
  2. Brochures, Catalogs and Similar Data: Contractor shall submit a minimum of five (5) copies each.
  3. Samples: Five (5) samples of each material proposed.
- H. The Contractor shall print and distribute all submittals that have been released by the Architect for project use. Furnish copies to subcontractors, suppliers, fabricators, manufacturers', governing authorities and others as required for proper performance of the work covered by the shop drawings.

#### 1.04 SHOP DRAWINGS

- A. Before submitting shop drawings to the Architect, Contractor shall check drawings and any project specific as-built conditions with subcontractor generated drawings for dimension, connections to adjacent surfaces and for accuracy in fabrication. Verify that work contiguous with and having bearing upon work indicated on shop drawings is accurately illustrated and complies with project requirements, contract drawings and applicable specifications and related work as required for complete and proper installation.
- B. Shop drawings shall be Contractor, subcontractor or vendor generated and reflect project requirements using standard shop drawing and fabrication practices to Architect's satisfaction. Project contract documents generated by the Architect or any project consultant shall not be used in any way for contractor, sub-contractor or fabricator required shop drawing purposes and submittals as required under this or any other section. In no instance shall the contract drawings be reproduced for shop drawing submittals.
- C. Shop drawings shall be complete in every respect and include all components if part of a fabrication, system or related by subsequent installation or attachment by work of another trade or section. Incomplete submittals not containing everything required for a complete and thorough review will be rejected and returned to Contractor unchecked at the option of the Architect. Submittals shall be dated and shall clearly delineate following:
1. Architect's name.
  2. Project name, address and Architect's job number.

3. Drawing title, number, date of submission and dates of previous submissions and scale (number drawings consecutively).
  4. Names and addresses of Contractor, subcontractor, supplier, manufacturer and fabricator.
  5. Working and erection dimensions, field dimensions, clearances required, thickness, assembly, attachments, relation to adjoining work and other pertinent data and information.
  6. Reference to applicable plans, elevations, sections and details on Contract Drawing and specification section(s) to which shop drawings or portion thereof apply.
  7. Arrangement and sectional views.
  8. Fabrication and erection details, layout and setting diagrams, including complete information for making connections with work of other trades, anchoring, supports, reinforcements, etc.
  9. Identification of materials, products and finishes.
  10. Manufacturer's standard drawings, descriptive literature, product catalogues, brochures, performance and test data, calculations, wiring and control diagrams, material certifications, etc.
  11. Show descriptive names of materials and equipment and locations that materials or equipment are to be installed in the work. Use same reference identifications as shown on Contract Drawings.
  12. Performance characteristics and capacities.
  13. Number and title of appropriate specification section.
  14. Drawing number and detail reference, as appropriate.
  15. Consecutive submittal log number and re-submittal log number as applicable.
- D. Do not resubmit shop drawings unless Architect so directs on the "Construction Data Review Stamp". If shop drawings are resubmitted without Architect's instructions to do so, they will be returned to Contractor without being rechecked and re-stamped by Architect.
- E. Cost of changes in construction due to improper checking and coordination by Contractor shall be borne by Contractor. Contractor shall be responsible for and pay all additional costs, including for coordination and supervision, at no additional cost to the District.
- F. If shop drawings submittals show variations from contract requirements because of standard shop practice or for any other reason, make specific mention of variations in transmittal letter to Architect as well as encircle variations on shop drawings to identify and call them to Architect's attention.
- G. Architect's review of shop drawings will be general, for design arrangement and appearance only and shall not relieve the Contractor of responsibility for accuracy of shop drawings, dimensions, proper fitting of work, providing materials required by the Contract Documents even though such materials and their installation are not indicated on shop drawings. Architect's review of shop drawings shall not construe approval of any departure from contract requirements or as acceptance of any responsibility by District or Architect for any errors, omissions or discrepancies shown thereon.
- H. Manufacturer's submitted shop drawings indicating methods of installation is



subject to conformance with applicable codes and regulations, and when reviewed by the Architect, will become the basis for inspecting, accepting or rejecting actual installation methods used on job.

- I. Do not allow shop drawings without an appropriate final "reviewed" marking by the Architect to be used in connection with the Work. "Rejected" shop drawings are not allowed on the job site at anytime.
- J. Coordination Drawings:
  - 1. Provide special shop drawings showing the relationship of construction elements that require coordination during fabrication and installation to fit in the space available and to function as intended.
  - 2. Refer to Section 01040 – Coordination, for preparation of coordination drawings. Include all components previously shown in detail on shop drawings and/or product data.
  - 3. Coordination drawings are the responsibility of the Contractor. These drawings may be prepared by the General Contractor, subcontractor, an entity responsible for one of the elements involved, or by an entity engaged by the Contractor for that purpose. However, all vendors, sub-contractors and suppliers must participate in providing information for the preparation of coordination drawings even if they are not preparing the drawings directly.
  - 4. Identify conflict areas, conflict resolution, coordination, documentation, composite coordination drawings of all systems and submittals.

#### 1.05 PRODUCT DATA

- A. Collect product data into a single submittal for each element of construction or system. Product data includes printed information such as manufacturer's installation instructions, catalog cuts, color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves. Where product data must be specially prepared because standard printed data is not suitable for use, submit as "Shop Drawings".
- B. Mark each copy to show applicable choices and options. Where printed product data includes information on several products, some of which are not required, mark copies to indicate the applicable information. Include the following information:
  - 1. Manufacturers printed recommendations
  - 2. Compliance with recognized trade association standards.
  - 3. Compliance with recognized testing agency standards.
  - 4. Application of testing agency labels and seals.
  - 5. Notation of dimensions verified by field measurement.
  - 6. Notation of coordination requirements.
- C. Product data shall be complete in every respect and shall include all components if part of a fabrication or system; incomplete submittals will be rejected and returned to Contractor unchecked at the option of the Architect.
- D. Product data sheets that are submitted with extraneous information not deleted and/or modified will be returned without review for re-submittal.

## 1.06 SAMPLES

- A. Provide samples physically identical with the proposed materials or products to be incorporated in the Work. Materials and equipment furnished shall conform to samples reviewed by Architect. Written confirmation of sample review and selection is required. Architect shall review samples for color, pattern, texture or quality of workmanship and for a final check of the coordination of these characteristics with other related elements of the work. Samples will also be used for comparison of these characteristics between the final sample submittal and the actual work as it is delivered and installed.
1. Provide full scale, fully fabricated samples cured and finished in the manner specified.
  2. Where variations are inherent in the material or product represented by the samples. Submit multiple units of the sample (not less than 4) which show the approximate limits of variations.
  3. Where samples are specified for the Architect's selection of color, texture or pattern, submit a full set of available choices for the material or product.
- B. Failure of samples to conform to the specified requirement(s) may at Architect's option, constitute a bar against submittal of other samples by same manufacturer, vendor or supplier.
- C. Review or acceptance of samples will not preclude rejection, prior to final acceptance of complete work of any material upon discovery of defect in material which said sample failed to represent, even though such material or equipment has been installed or erected in place.
- D. After material has been reviewed, no change in brand or make will be permitted unless satisfactory written evidence is presented to, and accepted by the Architect that manufacturer cannot make scheduled delivery of reviewed material; that material delivered has been rejected and substitution of suitable material is an urgent necessity; that other conditions are apparent which indicate acceptance of such substitute materials to be in best interest of District.
- E. Refer to individual specification sections for additional sample requirements intended for examination or testing of additional characteristics. All samples of materials requiring laboratory tests shall be tested sufficiently in advance of the time they are required to be delivered to the jobsite for:
1. Testing;
  2. Architect's review of test results;
  3. Retesting and re-submittals as necessary to obtain Architect's review
  4. Manufacture / shop fabricate, and;
  5. Delivery to jobsite without delaying the scheduled progress of the work.
- F. Each sample shall have physically attached to it, in a manner not easily removable, a label bearing the following information:
1. Contractor and subcontractor's identification.
  2. Sample identification including full information as to manufacturer, model, catalog number, finish numbers and other required information.
  3. Spaces for approval stamp of Architect, 4" x 4" minimum size.
- G. Samples rejected by the Architect shall be submitted with new samples

immediately after notification of rejection and marked "Resubmitted Sample", in addition to other information required.

- H. The District retains the right to require submittal of samples of any material or any material lists, whether or not particularly mentioned in specifications at no additional cost.
- I. Maintain the final submittal sets of samples, properly protected, as returned by the Architect at the project site and readily available for comparison throughout the course of performing the Work. Prepare and distribute additional samples as required for proper performance of the Work.

#### 1.07 WARRANTIES

- A. Provide the requested warranty(s) of each technical section as part of the required complete submittal package for review and approval. Neither Contractor nor manufacturer shall limit coverage / exposure by exclusion of either installation or materials. Districts right is for joint and several (labor / materials) for the repair and / or replacement of rejected work demonstrating failure.
- B. Warranty submittal, review and acceptance by the Architect is a requirement for acceptance / review of the specified material. Failure to include the warranty within the submittal will be grounds for rejection and Contractors responsibility related to costs and delay.

#### 1.08 CONTRACTORS RESPONSIBILITIES

- A. Before making submittals to the Architect, review that each submission is complete as required. Make changes or notations as necessary to conform to the Contract Documents. Identify such review with review stamp with recommendations for shop drawing acceptance based on total knowledge of all trades, coordination, quality control and construction scheduling. Forward reviewed and signed submittals to the Architect for review. Submittals not meeting these contract requirements or containing specific comments shall be returned to the subcontractor for rework. Do not forward such submittals to the Architect.
- B. Verify field measurements and product catalog numbers or similar data.
- C. Notify the Architect in writing at time of submission of submittal deviations from the requirements of the Contract Documents.
- D. After the Architects review, distribute copies of submittals back to the point of origin (contractor, subcontractor, distributor or fabricator) with one copy withheld and maintained at the project site for reference use.
- E. Submittal Log: Contractor shall maintain a log of all required submittals recording the dates on which each item is received from the subcontractor or vendor reviewed and final approval by the Contractor, transmittal to the Architect, received back from the Architect following review, re-submittal dates (if required by the Architect) and final distribution to the submitting party. Log shall be available for distribution and/or review at each project meeting or if not indicated as a minimum for Architects review upon request.

- F. Coordinate the submittal log and sequence of submittals with related fabrication, purchasing, testing criteria, delivery, other submittals and construction activities to avoid delay.
- G. Do not begin work that requires submittals until return of submittals with the Architects stamp and initials indicating review.
- H. The Contractor's responsibility for errors and omissions in submittals is not relieved by the Architect's review of the submittals.
- I. The Contractor's responsibility for deviations in submittals from requirements of Contract Documents is not relieved by the Architect's review of submittals unless the Architect gives written acceptance of specific deviations.

#### 1.09 THE ARCHITECTS RESPONSIBILITIES

- A. The Architect shall review submittals with reasonable promptness, checking only for conformance with the design concept of the Project and compliance with information given in the Contract Documents.
- B. The Architect will return without review any submittals not bearing the Contractor's review stamp recommending acceptance.
- C. The Architect will make changes or notations directly on the submittal identify such review with his review stamp, obtain and record the Architect and the District's file copies and return the submittal to the Contractor.
- D. The Architect shall not be responsible for red-marking every print of the shop drawing submittal received. Architect shall as a minimum red mark his own review check set for future reference and record copy and any additional required copies needed for project consultants coordination of related work. In addition the Architect will also transfer those same marks / comments to the required reproducible copy for return to the Contractor. Contractor shall use that reproducible to make the required number of copies of the Architects review comments for distribution to applicable parties responsible for coordination, fabrication and/or installation of submitted or related work. Architect is not responsible to transfer red marks and comments to each / every print received and for Contractors convenience and cost savings. Contractor is responsible for the printing and distribution of all reviewed submittals based on the General Conditions of the Contract.

#### 1.10 DESIGN / BUILD WORK – DEFERRED APPROVAL (DSA)

- A. In connection with 'Design/Build' work and/or 'Deferred Approval' work as indicated in Section 01100 – Project Special Procedures. Contractor shall submit complete list of drawings, structural calculations, lists of materials, material data sheets and other required information as listed under respective sections of these specifications within 30 days after receipt of "Notice to Proceed".
  - 1. Drawings and calculations shall be prepared under the supervision of, and signed by a professional registered in that discipline in the State of California. It shall be the Contractors responsibility and that of his registered professionals to present the plans to the Division of State

- Architect / Building Department for plan check review and obtain and pay for all permits and fees.
2. All shop drawings and related submittals shall be the responsibility of the Contractor, stamped and signed approved by the Contractor and the Contractor's design professionals and submitted to the Architect / Engineer of record for their review.
  3. The District's consultants will review the shop drawings and material data for consistency with the design intent only. The review does not relieve the Contractor, Contractor's subcontractors or design professionals of their responsibilities.
  4. Drawings and calculations shall be engineered in conformance with 2010 California Building Code.

2.00 PRODUCTS – Not Used

3.00 EXECUTION – Not Used

END OF SECTION



**SECTION 01350  
DEFINITIONS AND STANDARDS**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Provisions of General Conditions, Special Conditions, and Division One apply to this section.
- B. This Section specifies administrative requirements for compliance with governing regulation, codes and standards.
  - 1. Requirements include obtaining permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with regulations, codes and standards.
  - 2. Refer to General Conditions for requirements for compliance with governing regulations.

**1.02 DEFINITIONS**

- A. General. Definitions contained in this article are not necessarily complete, but are general to the extent that they are not defined more explicitly elsewhere in the contract documents.
- B. Indicated. Refers to graphic representations, notes or schedules on the drawings, or other paragraphs or schedules in specifications, and similar requirements in the contract documents. Where terms such as "shown", "noted", "scheduled", and "specified" are used, it is to help locate the reference; no limitation on location is intended except as specifically noted.
- C. Requested. Terms such as "requested", "authorized", "selected", "accepted", "required", and "permitted" mean "requested by the Architect", and similar phrases. However, no implied meaning shall be interpreted to extend the Architect's responsibility into the Contractor's area of construction supervision.
- D. Approval: The words "approved", "approval", "acceptable", "acceptance", and words of similar meaning shall mean that approval or acceptance of Architect, or similar meaning, is intended unless stated otherwise.
- E. Review: The word "review" and words of similar meaning shall mean the review and observation of the Architect is intended unless stated otherwise.
- F. Accept. The term "accepted" where used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the responsibilities and duties of the Architect stated in General Conditions. Such agreement shall not release the Contractor from responsibility to fulfill contract document requirements, unless otherwise provided in the contract documents.
- G. Regulation. The term "regulations" includes laws, statutes, ordinances and lawful orders issued by authorities having jurisdiction, as well as rules, conventions and agreements within the construction industry that control performance of the work, whether they are lawfully imposed by authorities having jurisdiction or not.

- H. Furnish. The term "furnish" is used to mean "supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, and similar operations."
- I. Install. The term "install" is used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations."
- J. Provide. The term "provide" means "to furnish and install, complete and ready for the intended use."
- K. Installer. An "Installer" is an entity engaged by the Contractor either as an employee, subcontractor or sub-subcontractor for performance of a particular activity, including installation, erection, application and similar operations. Installers shall to be experienced in the operations they are engaged to perform.
  - 1. The term "experienced" when used with the term "Installer" means having a minimum of 5 previous projects similar in size and scope to this project, familiar with the precautions required, and has complied with requirements of the authority having jurisdiction.
- L. Project Site. "Project site" is the space available to the Contractor for performance of the work, either exclusively or in conjunction with others performing other construction as part of the project. The extent of the project site is shown on the drawings, and may or may not be identical with the description of the land upon which the project is to be built.
- M. Testing Laboratories. A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the project site or elsewhere, and to report on, and, if required, to interpret results of those inspections or tests.
- N. Days. Days shall mean calendar days.

### 1.03 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. This article is provided to help the user of these specifications understand the format, language, implied requirements, and similar conventions. None of the explanations shall be interpreted to modify the substance of contract requirements.
- B. Specified Format. These specifications are organized into divisions, sections or trade heading based on the CSI Master Format division and section numbering system.
- C. Specified Content. This specification has been produced employing conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:
  - 1. Language used in the specifications and other contract documents is the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and where the full context of the contract documents so indicates.
  - 2. Imperative language is used generally in the specifications. Requirements expressed



imperatively are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities, which must be fulfilled indirectly by the Contractor or by others when so noted.

- D. Assignment of Specialists. The Specification requires that certain specific construction activities shall be performed by specialists who are recognized experts in the operations to be performed. The specialists shall be engaged for those activities, and the assignments are requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.
  - 1. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.
  - 2. Trades. Use of titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter". It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

#### 1.04 DRAWING SYMBOLS

- A. Graphic Symbols: Graphic symbols used on drawings are those recognized in the construction industry for purpose indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., Seventh Edition.
- B. Mechanical and Electrical Drawings. Graphic symbols used on mechanical and electrical drawings are generally aligned with symbols recommended by ASHRAE. Where appropriate, they are supplemented by more specific symbols recommended by technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Architect for clarification before proceeding.

#### 1.05 INDUSTRY STANDARDS

- A. Applicability of Standards. Except where contract documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into contract documents by reference. Individual sections indicate which codes and standards the Contractor must keep available at the project site for reference.
  - 1. Referenced standards take precedence over standards that are not referenced but recognized in the construction industry as applicable.
  - 2. Standards represent the minimum quality acceptable, and govern where details of materials and workmanship are not specified. Wherever requirements of this specification exceeds the requirements of referenced standards, the requirements of this specification shall govern.
  - 3. Unreferenced standards are not directly applicable to the work, except as a general requirement of whether the work complies with recognized construction industry standards.
  - 4. Unreferenced Standards. Except as otherwise limited by the contract documents, standards not referenced but recognized in the industry as

applicable will be informed for performance of the work. The Architect will decide whether a code or standard is applicable, or which of several are applicable.

- B. **Publication Dates.** Where compliance with an industry standard is required, comply with standard in effect as of date of contract documents.
- C. **Conflicting Requirements.** Where compliance with two or more standards is specified, and they establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the contract documents indicate otherwise. refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent to the Architect for a decision before proceeding.
  - 1. **Minimum Quantities or Quality Levels.** In every instance the quantity or quality level shown or specified shall be the minimum to be provided or performed. The actual installation may comply exactly, within specified tolerances, with the minimum quantity or quality specified, or it may exceed that minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum values, as noted, or appropriate for the context of the requirements. Refer instances of uncertainty to the Architect for decision before proceeding.
- D. **Copies of Standards.** Each entity engaged in construction on the project is required to be familiar with industry standards applicable to that entities' construction activity. Copies of applicable standards are not bound with the contract documents.
  - 1. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.
  - 2. Although copies of standards needed for enforcement of requirements may be part of required submittals, the Architect reserves the right to require the Contractor to submit additional copies as necessary for enforcement of requirements.

#### 1.06 GOVERNING REGULATIONS / AUTHORITIES

- A. The Architect has contacted authorities having jurisdiction where necessary to obtain information necessary for the preparation of the contract documents; that information may or may not be of significance to the Contractor. Contact authorities having jurisdiction directly for information and decisions having a bearing on the work. It is the responsibility of the Contractor to contact any additional governing authorities, and obtain all permits and any additional approvals necessary for the work.

## 1.07 SUBMITTALS

- A. Permits, Licenses, and Certificates. For the District records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the work.

### **PART 2 – PRODUCTS - Not Used**

### **PART 3 – EXECUTION - Not Used**

[End of Section]



**SECTION 01360  
CUTTING AND PATCHING**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. Provisions of General Conditions, Special Conditions, and Division One apply to this section.
- B. Section includes Cutting and patching. Execute cutting (including excavating), fitting or patching of work, required to:
  - 1. Make several parts fit properly.
  - 2. Uncover work to provide for installation of ill-timed work.
  - 3. Remove and replace work not conforming to requirements of contract documents.
  - 4. Remove and replace defective work.
  - 5. Remove samples of installed work as specified for testing.
  - 6. Install specified work in existing construction.
- C. In addition to specified requirements, upon written instruction of District:
  - 1. Uncover work to provide for District, Inspector and Architect's observation of covered work. Remove samples of installed materials for testing.
- D. Do not endanger any work by cutting or altering work or any part of it.
- E. Do not cut or alter work of another contractor without written consent of District.

**1.02 QUALITY ASSURANCE:**

- A. Comply with the requirements of CBC and California Fire Code, Articles 49 and 79.

**1.03 SUBMITTALS**

- A. Prior to cutting which affects the structural safety of project, submit written notice to Architect, requesting consent to proceed with cutting.
- B. Prior to cutting done on instruction of District, submit cost estimate.
- C. If conditions of work, or schedule, indicate change of materials or methods, submit written recommendation to District and Architect, including:
  - 1. Conditions indicating change.
  - 2. Recommendations for alternative materials or methods.
  - 2. Submittals as required for substitutions.
- D. Submit written notice to District and Architect, designating time work will be uncovered,

to allow for observation by the District, Inspector and Architect.

#### 1.04 MATERIALS

- A. Materials for Replacement of Work Removed: Comply with specifications for type of work to be done, match existing adjacent surfaces.

#### 1.05 EXAMINATION

- A. Examine existing conditions of work, including elements subject to movement or damage during cutting and patching, and excavating and backfilling.
- B. After uncovering work, examine conditions affecting installation of new products.

#### 1.06 PREPARATION

- A. Prior to cutting, provide required protection including, but not necessarily limited to, shoring, bracing and support to maintain structural integrity of the work.
- B. Provide protection for other portions of project. Provide protection from elements.
- C. Locate all utilities prior to any cutting or excavation.

#### 1.07 PERFORMANCE

- A. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances and finishes.
- B. Execute cutting and removal to the extent necessary.
- C. Restore work which has been cut or removed; install new products to provide completed work in accord with requirements of contract documents.
- D. Refinish entire surfaces as necessary to provide an even finish.
  - 1. Continuous Surfaces: To nearest intersections.
  - 2. Assembly: Entire refinishing.

**PART 2 - PRODUCTS - Not Used.**

**PART 3 – EXECUTION - Not Used.**

[End of Section]

**SECTION 01370**  
**REQUESTS FOR INFORMATION**

**PART 1 - GENERAL**

**1.01 DESCRIPTION**

- A. All other sections of Division 1 apply to this Section. This Section covers the general requirements for Contractor's Requests for Information, and pertains to all portions of the contract documents.

**1.02 DEFINITION**

- A. Request for Information: A document submitted by the Contractor requesting clarification of a portion of the contract documents, hereinafter referred to as RFI. The Construction Manger at its own discretion may at any time create an RFI.

**1.03 CONTRACTOR'S REQUESTS FOR INFORMATION**

- A. When the Contractor is unable to determine from the contract documents, or by review with the Project Inspector, the exact material, process or system to be installed, the Architect shall be requested to make a clarification of the indeterminate item. Wherever possible, such clarification shall be requested at the next appropriate project meeting. When clarification at the meeting is not possible, either because of the urgency of the need, or the complexity of the item, Contractor shall prepare and submit an RFI to the Architect via email with a copy to all those selected to be included in distribution during the pre-construction meeting. All RFIs shall be transmitted via email.
- B. Contractor shall endeavor to keep the number of RFI's to a minimum. In the event that the process becomes unwieldy, in the opinion of the Architect, because of the number and frequency of RFI's submitted, the Architect may require the Contractor to abandon the process and submit all requests as either submittals, or requests for change.
- C. RFI's shall be submitted on a form provided by, or approved by, the Architect. Forms shall be completely filled in, and if prepared by hand, shall be fully legible after copying by xerographic process. Each page of attachments to RFI's shall bear the RFI number.
- D. RFI's from subcontractors or material suppliers shall be submitted through, reviewed by, and signed by the Contractor prior to submittal to the Architect via email, with a copy to the Construction manager, Project Inspector and Campus. (via email).
- E. Contractor shall carefully study the contract documents to assure that the requested information is not available therein. RFI's which request information available in the contract documents will not be answered by the Architect via email, with a copy to the Construction Manager, Project Inspector and Campus..
- F. In all cases where RFI's are issued to request clarification of coordination issues, for example, pipe and duct routing, clearances, specific locations of work shown diagrammatically, and similar items, the Contractor shall fully lay out a suggested solution using drawings or sketches drawn to scale, and submit same with the RFI. RFI's which fail to include a suggested solution will not be answered. Coordination must be review in CDA process prior to issuance of a RFI.

- G. RFI's shall not be used for the following purposes:
1. To request approval of submittals
  2. To request approval of substitutions,
  3. To request changes which entail additional cost or credit.
  4. To request different methods of performing work than those drawn and specified.
- H. In the event the Contractor believes that a clarification by the Architect results in additional cost, Contractor shall not proceed with the work indicated by the RFI until a change order is prepared and approved. Answered RFI's shall not be construed as approval to perform extra work.
- I. Unanswered RFI's will be returned with a stamp or notation: Not Reviewed.
- J. Contractor shall prepare and maintain a log of RFI's, and at any time requested by the Architect or Construction Manager, Contractor shall furnish copies of the log, at each weekly construction progress meeting, showing all outstanding RFI's, date in which the RFI was created and (a column for) the date in which it was received by the Architect. Contractor shall note all unanswered RFI's in the log. RFI shall be created in Excel format or similar spread sheet document compatible with Microsoft software. Each RFI shall have a Subject Title and proper number ID and Revision number when appropriate.
- K. Contractor shall allow Fifteen (15) working days (M-F), for review and response time for RFI's.
- L. In the event a Contractor determines that some portion of the Contract Documents requires clarification or interpretation by the Architect, the Contractor shall submit a Request for Information (RFI) in writing to the Architect. Requests for information may only be submitted by the Contractor and shall only be submitted on the request for Information Forms furnished or approved by the Architect. The Contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed from the Architect. In the RFI, set forth an interpretation or understanding of the requirement along with reasons why such an understanding was reached.
- M. The Architect will review RFI's to determine whether they are RFI's within the meaning of this term. If the Architect determines that the document is not an RFI request, it will be returned to the Contractor, un-reviewed as to content, for re-submittal on the proper form and in the proper manner.
- N. Responses from the Architect will not change any requirement of the Contract Documents. In the event the Contractor believes that a response to a RFI will cause a change to the requirements of the Contract Documents, the Contractor shall immediately give written notice to the Architect stating that the Contractor considers the response to be a Change Order. Failure to give such written notice within five (5)



days, shall waive the Contractor's right to seek additional time or cost under the Changes article of the General Conditions.

O. The following definitions pertain to RFI's:

1. **Drawing/Plan Clarification:** An answer from the Architect in response to an inquiry from the Contractor, intended to make some requirement(s) of the drawings clearly understood. Drawing/plan clarifications may be sketches, drawings, or in narrative form and will not change any requirements of the drawings.
2. **Non-Conformance Notice:** A notice issued by the Architect or the Construction Manager documenting that the work or some portion thereof has not been performed in accordance with the requirements of the Contract Documents. Payment will not be made on any portion of the work for which a Non-Conformance Notice has been issued and the work not corrected to the Satisfaction of the Architect. Upon receipt of a Non-Conformance Notice, the Contractor shall provide a written response within 5 working days after receipt, noting why they believe the work was performed in accordance with the Contract Documents or what corrective action they intend to take to correct the non-conforming work. Written responses from the Contractor are not considered to be RFI's.
3. **Project Communications:** Routine written communications between the Architect and Contractor shall be in writing, field memo, e-mail, or FAX. Such communications shall not be identified as RFI's.
4. **Requests for Information:** A request from the Contractor seeking an interpretation or a clarification of some requirement of the Contract Documents. The Contractor shall clearly and concisely set forth the issue for which it seeks clarification or interpretation and why a response is needed. Include in the request interpretation or understanding of the contract's requirements along with documentation for the interpretation or understanding. Responses from the Architect will not change any requirements of the Contract Documents.

**PART 2 - PRODUCTS - Not Used.**

**PART 3 - EXECUTION - Not Used.**

[End of Section]



**SECTION 01350  
DEFINITIONS AND STANDARDS**

**PART 1 - GENERAL**

1.01 SUMMARY

- A. Provisions of General Conditions, Special Conditions, and Division One apply to this section.
- B. This Section specifies administrative requirements for compliance with governing regulation, codes and standards.
  - 1. Requirements include obtaining permits, licenses, inspections, releases and similar documentation, as well as payments, statements and similar requirements associated with regulations, codes and standards.
  - 2. Refer to General Conditions for requirements for compliance with governing regulations.

1.02 DEFINITIONS

- A. General. Definitions contained in this article are not necessarily complete, but are general to the extent that they are not defined more explicitly elsewhere in the contract documents.
- B. Indicated. Refers to graphic representations, notes or schedules on the drawings, or other paragraphs or schedules in specifications, and similar requirements in the contract documents. Where terms such as "shown", "noted", "scheduled", and "specified" are used, it is to help locate the reference; no limitation on location is intended except as specifically noted.
- C. Requested. Terms such as "requested", "authorized", "selected", "accepted", "required", and "permitted" mean "requested by the Architect", and similar phrases. However, no implied meaning shall be interpreted to extend the Architect's responsibility into the Contractor's area of construction supervision.
- D. Approval: The words "approved", "approval", "acceptable", "acceptance", and words of similar meaning shall mean that acceptance of Architect, or similar meaning, is intended unless stated otherwise.
- E. Review: The word "review" and words of similar meaning shall mean the review and observation of the Architect is intended unless stated otherwise.
- F. Accept. The term "accepted" where used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the responsibilities and duties of the Architect stated in General Conditions. Such agreement shall not release the Contractor from responsibility to fulfill contract document requirements, unless otherwise provided in the contract documents.

- G. Regulation. The term "regulations" includes laws, statutes, ordinances and lawful orders issued by authorities having jurisdiction, as well as rules, conventions and agreements within the construction industry that control performance of the work, whether they are lawfully imposed by authorities having jurisdiction or not.
- H. Furnish. The term "furnish" is used to mean "supply and deliver to the project site, ready for unloading, unpacking, assembly, installation, and similar operations."
- I. Install. The term "install" is used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations."
- J. Provide. The term "provide" means "to furnish and install, complete and ready for the intended use."
- K. Installer. An "Installer" is an entity engaged by the Contractor either as an employee, subcontractor or sub-subcontractor for performance of a particular activity, including installation, erection, application and similar operations. Installers shall to be experienced in the operations they are engaged to perform.
  - 1. The term "experienced" when used with the term "Installer" means having a minimum of 5 previous projects similar in size and scope to this project, familiar with the precautions required, and has complied with requirements of the authority having jurisdiction.
- L. Project Site. "Project site" is the space available to the Contractor for performance of the work, either exclusively or in conjunction with others performing other construction as part of the project. The extent of the project site is shown on the drawings, and may or may not be identical with the description of the land upon which the project is to be built.
- M. Testing Laboratories. A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the project site or elsewhere, and to report on, and, if required, to interpret results of those inspections or tests.
- N. Days. Days shall mean calendar days.

### 1.03 SPECIFICATION FORMAT AND CONTENT EXPLANATION

- A. This article is provided to help the user of these specifications understand the format, language, implied requirements, and similar conventions. None of the explanations shall be interpreted to modify the substance of contract requirements.
- B. Specified Format. These specifications are organized into divisions, sections or trade heading based on the CSI Master Format division and section numbering system.

- C. Specified Content. This specification has been produced employing conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:
1. Language used in the specifications and other contract documents is the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and where the full context of the contract documents so indicates.
  2. Imperative language is used generally in the specifications. Requirements expressed imperatively are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities, which must be fulfilled indirectly by the Contractor or by others when so noted.
- D. Assignment of Specialists. The Specification requires that certain specific construction activities shall be performed by specialists who are recognized experts in the operations to be performed. The specialists shall be engaged for those activities, and the assignments are requirements over which the Contractor has no choice or option. Nevertheless, the ultimate responsibility for fulfilling contract requirements remains with the Contractor.
1. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.
  2. Trades. Use of titles such as "carpentry" is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter". It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

#### 1.04 DRAWING SYMBOLS

- A. Graphic Symbols: Graphic symbols used on drawings are those recognized in the construction industry for purpose indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards", published by John Wiley & Sons, Inc., Seventh Edition.
- B. Mechanical and Electrical Drawings. Graphic symbols used on mechanical and electrical drawings are generally aligned with symbols recommended by ASHRAE. Where appropriate, they are supplemented by more specific symbols recommended by technical associations including ASME, ASPE, IEEE and similar organizations. Refer instances of uncertainty to the Architect for clarification before proceeding.

## 1.05 INDUSTRY STANDARDS

- A. Applicability of Standards. Except where contract documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into contract documents by reference. Individual sections indicate which codes and standards the Contractor must keep available at the project site for reference.
1. Referenced standards take precedence over standards that are not referenced but recognized in the construction industry as applicable.
  2. Standards represent the minimum quality acceptable, and govern where details of materials and workmanship are not specified. Wherever requirements of this specification exceeds the requirements of referenced standards, the requirements of this specification shall govern.
  3. Unreferenced standards are not directly applicable to the work, except as a general requirement of whether the work complies with recognized construction industry standards.
  4. Unreferenced Standards. Except as otherwise limited by the contract documents, standards not referenced but recognized in the industry as applicable will be informed for performance of the work. The Architect will decide whether a code or standard is applicable, or which of several are applicable.
- B. Publication Dates. Where compliance with an industry standard is required, comply with standard in effect as of date of contract documents.
- C. Conflicting Requirements. Where compliance with two or more standards is specified, and they establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the contract documents indicate otherwise. refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent to the Architect for a decision before proceeding.
1. Minimum Quantities or Quality Levels. In every instance the quantity or quality level shown or specified shall be the minimum to be provided or performed. The actual installation may comply exactly, within specified tolerances, with the minimum quantity or quality specified, or it may exceed that minimum within reasonable limits. In complying with these requirements, indicated numeric values are minimum or maximum values, as noted, or appropriate for the context of the requirements. Refer instances of uncertainty to the Architect for decision before proceeding.
- D. Copies of Standards. Each entity engaged in construction on the project is Required to be familiar with industry standards applicable to that entities' construction activity. Copies of applicable standards are not bound with the contract documents.
1. Where copies of standards are needed for performance of a required construction activity, the Contractor shall obtain copies directly from the publication source.

2. Although copies of standards needed for enforcement of requirements may be part of required submittals, the Architect reserves the right to require the Contractor to submit additional copies as necessary for enforcement of requirements.

#### 1.06 GOVERNING REGULATIONS / AUTHORITIES

- A. The Architect has contacted authorities having jurisdiction where necessary to obtain information necessary for the preparation of the contract documents; that information may or may not be of significance to the Contractor. Contact authorities having jurisdiction directly for information and decisions having a bearing on the work. It is the responsibility of the Contractor to contact any additional governing authorities, and obtain all permits and any additional approvals necessary for the work.

#### 1.07 SUBMITTALS

- A. Permits, Licenses, and Certificates. For the District records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the work.

### **PART 2 – PRODUCTS - Not Used**

### **PART 3 – EXECUTION - Not Used**

*[End of Section]*





**SECTION 01360  
CUTTING AND PATCHING**

**PART 1 - GENERAL**

1.01 SUMMARY

- A. Provisions of General Conditions, Special Conditions, and Division One apply to this section.
- B. Section includes Cutting and patching. Execute cutting (including excavating), fitting or patching of work, required to:
  - 1. Make several parts fit properly.
  - 2. Uncover work to provide for installation of ill-timed work.
  - 3. Remove and replace work not conforming to requirements of contract documents.
  - 4. Remove and replace defective work.
  - 5. Remove samples of installed work as specified for testing.
  - 6. Install specified work in existing construction.
- C. In addition to specified requirements, upon written instruction of District:
  - 1. Uncover work to provide for District, Inspector and Architect's observation of covered work. Remove samples of installed materials for testing.
- D. Do not endanger any work by cutting or altering work or any part of it.
- E. Do not cut or alter work of another contractor without written consent of District.

1.02 QUALITY ASSURANCE:

- A. Comply with the requirements of CBC and California Fire Code, Articles 49 and 79.

1.03 SUBMITTALS

- A. Prior to cutting which affects the structural safety of project, submit written notice to Architect and Construction Manager, requesting consent to proceed with cutting.
- B. Prior to cutting done on instruction of District, submit cost estimate.
- C. If conditions of work, or schedule, indicate change of materials or methods, submit written recommendation to District and Architect, including:
  - 1. Conditions indicating change.
  - 2. Recommendations for alternative materials or methods.
  - 2. Submittals as required for substitutions.

- D. Submit written notice to District and Architect, designating time work will be uncovered, to allow for observation by the District, Inspector and Architect.

#### 1.04 MATERIALS

- A. Materials for Replacement of Work Removed: Comply with specifications for type of work to be done, match existing adjacent surfaces.

#### 1.05 EXAMINATION

- A. Examine existing conditions of work, including elements subject to movement or damage during cutting and patching, and excavating and backfilling.
- B. After uncovering work, examine conditions affecting installation of new products.

#### 1.06 PREPARATION

- A. Prior to cutting, provide required protection including, but not necessarily limited to, shoring, bracing and support to maintain structural integrity of the work.
- B. Provide protection for other portions of project. Provide protection from elements.
- C. Locate all utilities prior to any cutting or excavation.

#### 1.07 PERFORMANCE

- A. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances and finishes.
- B. Execute cutting and removal to the extent necessary.
- C. Restore work which has been cut or removed; install new products to provide completed work in accord with requirements of contract documents.
- D. Refinish entire surfaces as necessary to provide an even finish.
  - 1. Continuous Surfaces: To nearest intersections.
  - 2. Assembly: Entire refinishing.

### **PART 2 - PRODUCTS - Not Used.**

### **PART 3 – EXECUTION - Not Used.**

*[End of Section]*

**SECTION 01370  
REQUESTS FOR INFORMATION**

**PART 1 - GENERAL**

1.01 DESCRIPTION

- A. All other sections of General Conditions and Division 1 apply to this Section. This Section covers the general requirements for Contractor's Requests for Information, and pertains to all portions of the contract documents.

1.02 DEFINITION

- A. Request for Information: A document submitted by the Contractor requesting clarification of a portion of the contract documents, hereinafter referred to as RFI. The Construction Manager and or Project Inspector at its own discretion may at any time create an RFI.

1.03 CONTRACTOR'S REQUESTS FOR INFORMATION

- A. When the Contractor is unable to determine from the contract documents, or by review with the Project Inspector, the exact material, process or system to be installed, the Architect shall be requested to make a clarification of the indeterminate item. Wherever possible, such clarification shall be requested at the next appropriate project meeting. When clarification at the meeting is not possible, either because of the urgency of the need, or the complexity of the item, Contractor shall prepare and submit an RFI to the Architect via email with a copy to all those selected to be included in distribution during the pre-construction meeting. All RFIs shall be transmitted via email.
- B. Contractor shall endeavor to keep the number of RFI's to a minimum. In the event that the process becomes unwieldy, in the opinion of the Architect, because of the number and frequency of RFI's submitted, the Architect may require the Contractor to abandon the process and submit all requests as either submittals, or requests for change.
- C. RFI's shall be submitted on a form provided by, or approved by, the Architect. Forms shall be completely filled in, and if prepared by hand, shall be fully legible after copying. Each page of attachments to RFI's shall bear the RFI number.
- D. RFI's from subcontractors or material suppliers shall be submitted through, reviewed by, and signed by the Contractor prior to submittal to the Architect via email, with a copy to the Construction manager, Project Inspector and District. (via email).
- E. Contractor shall carefully study the contract documents to assure that the requested information is not available therein. RFI's which request information available in the contract documents will not be answered by the Architect via email, with a copy to the Construction Manager, Project Inspector and District.

- F. In all cases where RFI's are issued to request clarification of coordination issues, for example, pipe and duct routing, clearances, specific locations of work shown diagrammatically, and similar items, the Contractor shall fully lay out a suggested solution using drawings or sketches drawn to scale, and submit same with the RFI. RFI's which fail to include a suggested solution will not be answered. Coordination must be reviewed in CDA process prior to issuance of a RFI.
- G. RFI's shall not be used for the following purposes:
1. To request approval of submittals
  2. To request approval of substitutions,
  3. To request changes which entail additional cost or credit.
  4. To request different methods of performing work than those drawn and specified.
- H. In the event the Contractor believes that a clarification by the Architect results in additional cost, Contractor shall not proceed with the work indicated by the RFI until a written acceptance by the Construction Manager. Answered RFI's shall not be construed as approval to perform extra work.
- I. Unanswered RFI's will be returned with a stamp or notation: Not Reviewed.
- J. Contractor shall prepare and maintain a log of RFI's, and at any time requested by the Architect or Construction Manager, Contractor shall furnish copies of the log, at each weekly construction progress meeting, showing all outstanding RFI's, date in which the RFI was created and (a column for) the date in which it was received by the Architect. Contractor shall note all unanswered RFI's in the log. RFI shall be created in Excel format or similar spread sheet document compatible with Microsoft software. Each RFI shall have a Subject Title and proper number ID and Revision number when appropriate.
- K. Contractor shall allow a minimum of Fifteen (15) working days (M-F), for review and response time for RFI's. RFI's which require Architect and Consultant review may require more than the above minimum days for review and response.
- L. In the event a Contractor determines that some portion of the Contract Documents requires clarification or interpretation by the Architect, the Contractor shall submit a Request for Information (RFI) in writing to the Architect. Requests for information may only be submitted by the Contractor and shall only be submitted on the request for Information Forms furnished or accepted by the Architect. The Contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed from the Architect. In the RFI, set forth an interpretation or understanding of the requirement along with reasons why such an understanding was reached.
- M. The Architect will review RFI's to determine whether they are RFI's within the meaning of this term. If the Architect determines that the document is not an RFI request, it will be returned to the Contractor, un-reviewed as to content, for re-submittal on the proper form and in the proper manner.

- N. Responses from the Architect will not change any requirement of the Contract Documents. In the event the Contractor believes that a response to a RFI will cause a change to the requirements of the Contract Documents, the Contractor shall immediately give written notice to the Architect stating that the Contractor considers the response to be a Change Order. Failure to give such written notice within five (5) calendar days, shall waive the Contractor's right to seek additional time or cost under the Changes article of the General Conditions.
- O. The following definitions pertain to RFI's:
1. Drawing/Plan Clarification: An answer from the Architect in response to an inquiry from the Contractor, intended to make some requirement(s) of the drawings clearly understood. Drawing/plan clarifications may be sketches, drawings, or in narrative form and will not change any requirements of the drawings.
  2. Non-Conformance Notice: A notice issued by the Architect, Project Inspector or the Construction Manager documenting that the work or some portion thereof has not been performed in accordance with the requirements of the Contract Documents. Payment will not be made on any portion of the work for which a Non-Conformance Notice has been issued and the work not corrected to the Satisfaction of the Architect or Project Inspector. Upon receipt of a Non-Conformance Notice, the Contractor shall provide a written response within 5 calendar days after receipt, noting why they believe the work was performed in accordance with the Contract Documents or what corrective action they intend to take to correct the non-conforming work. Written responses from the Contractor are not considered to be RFI's.
  3. Project Communications: Routine written communications between the Architect and Contractor shall be in writing, field memo, e-mail, or FAX. Such communications shall not be identified as RFI's.
  4. Requests for Information: A request from the Contractor seeking an interpretation or a clarification of some requirement of the Contract Documents. The Contractor shall clearly and concisely set forth the issue for which it seeks clarification or interpretation and why a response is needed. Include in the request interpretation or understanding of the contract's requirements along with documentation for the interpretation or understanding. Responses from the Architect will not change any requirements of the Contract Documents.

**PART 2 - PRODUCTS - Not Used.**

**PART 3 - EXECUTION - Not Used.**

*[End of Section]*



**SECTION 01400**  
**QUALITY ASSURANCE AND CONTROL**

**PART 1 - GENERAL**

1.01 DESCRIPTION OF WORK

- A. Establish and maintain a Quality Assurance and Control (QC) Program as described in this Section. The QC Program shall cover construction operations on site and off site and shall be keyed to the proposed construction sequence.
- B. As a minimum, the QC Program as specified in this section shall include oversight, accountability and regular reporting for related tasks included in all contract documents whether referenced specifically to this Section or not.
- C. The responsibilities of this Section shall include (but may not be limited to) enforcement of and coordination with the requirements of Sections 01041,01060, 01320, 01340, 01360, 01410, 01430, 01500, 01600, 01620, 01630, 01720, 01730, 01780, 01788, and 01789.
- D. All other Sections of Division 1 apply to this Section. The Contractor is responsible for implementing a Quality Control program that will ensure the timely and cost effective completion of this project.

1.02 SECTION INCLUDES

- A. QC Program requirements consist of a QC organization, a QC plan, attending QC meetings, enforcing the QC requirements, preparing QC reports, ensuring testing is performed and preparing QC certification and documentation necessary to provide materials, equipment, workmanship, fabrication, construction and operations which comply with the requirements of the contract documents.

1.03 DEFINITIONS

- A. **Quality Assurance:** The procedures for guarding against defects and deficiencies before and during execution of the work includes enforcement of related specification provisions including but not limited to shop drawings, product data and samples, testing, inspection, reports, commissioning, quality assurance, as-built documents, warranties and related requirements.
- B. **Quality Control:** The procedure for evaluation of completed activities and elements of the work for conformance with the Contract requirements, including testing and inspection.

#### 1.04 QUALITY ASSURANCE / CONTROL ON INSTALLATION

- A. Monitoring: Monitor, track progress and regularly document the status of quality assurance over subcontractors, equipment supplier, manufacturers, products, service, site conditions and workmanship to produce work of the quality specified.
- B. Compliance: Assure full compliance with manufacturer's instructions, including each step in sequence.
- C. Conflicts: Should manufacturer's instructions conflict with the Contract Documents or if portions of Contract Documents conflict with one another, ten requests clarification from Project Manager before proceeding and incurring additional costs. The fact that the Contract Documents may establish higher or more costly requirements than the manufacturer's instructions shall not constitute a conflict.
- D. Coordination: Assure coordination requirements among construction trades are performed as required to assure compliance with design intent.
- E. Standards: Comply with specified standards as a minimum quality for the work except when more stringent tolerances, code, or specified requirements indicate higher standards or more precise workmanship.

#### 1.05 PROJECT INSPECTOR

- A. Refer to Section 01420, Inspection of Work.

#### 1.06 VERIFICATION OF CONDITIONS

- A. Prior to installing any portion of the work, Contractor shall inspect the work already in place to receive the work to be installed and arrange for correction of defects in the existing workmanship, material or conditions that may adversely affect work to be installed. Such inspections shall include test applications of the materials to be installed as required to establish the correct condition of surfaces involved. Where the specifications require material to be installed under the supervision or inspection of the material manufacturer or its representative, Contractor shall ensure that the manufacturer or its representative also inspect the work in place and issues a letter of approved to Project Manager.

#### B. TOLERANCES NOMENCLATURE

- 1. Tolerances of Numbers: Unless other tolerances are indicated or specified elsewhere, specified numbers such as gauges, weights, temperatures, and similar references, but specifically not including dimensions and time, will be acceptable if within formally



established, written and recognized commercial tolerances established for the affected trade. In the absence of formally written and recognized commercial tolerances, plus or minus 1 percent will be acceptable. If a specified number cannot be obtained, the number shall be interpreted as the next larger, provided it meets other requirements of the contract documents including sufficient space being available as indicated on the drawings.

2. Tolerances of Specified Words: Unless otherwise specified, the following words shall have the following meanings. Construction executed within these tolerances will be considered acceptable.
  - a. "Straight": Allowed deviations from an absolutely straight line of sight shall be plus or minus 1/16" in one foot, plus or minus 1/8" in 10 feet, and plus or minus 1/4" for the entire length of a particular construction. These deviations shall be non-accumulative. Straight lines or planes on drawings shall conform to these tolerances.
  - b. "Flat": Allowed deviations from an absolutely flat plane shall be plus or minus 1/1000 inch in one square inch, within plus or minus 1/16 inch in one square foot, within plus or minus 1/8 inch in an area ten feet by ten feet, and within plus or minus 1/4 inch for the entire area of a particular construction item. Flat planes on drawings shall conform to these tolerances.
  - c. "Level": Allowed deviation from an absolutely horizontal plane shall be 1/2 degree of angle. Horizontal lines or planes on drawings shall conform to this tolerance.
  - d. "Plumb": Allowed deviation from an absolutely vertical plane of plus or minus 1/2 degree of angle. Vertical lines or planes on drawings shall conform to this tolerance.

## 1.07 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. See Section 01060, Regulatory Requirements, for additional requirements.
  1. ASTM A 8801989: Criteria for use in evaluation of testing laboratories and organizations for examination and inspection of steel, stainless steel and related alloys.
  2. ASTM C 10771990: Laboratories testing concrete and concrete aggregates for use in construction and criteria for laboratory evaluation.

3. ASTM D 36661990 (Rev. A): Evaluating and qualifying agencies testing and inspecting bituminous paving materials.
  4. ASTM D 37401988: Evaluation of agencies engaged in the testing and/or inspection of soil and rock as used in engineering design and construction.
  5. ASTM D 3291990: Evaluation of testing and inspection agencies as used in construction.
  6. ASTM E (Rev. A): Determining the qualification of non-destructive testing agencies.
- B. QC Library: Maintain a library at one location on the project site of the references indicated in Paragraph 1.7.A above. Section 01060 Regulatory Requirements, and all other references indicated in the Contract Documents for use by the entire project team, including Project Manager. Library shall be on-site and complete forty-five (45) days after receipt of Notice to Proceed.

#### 1.08 SUBMITTALS

- A. Submit the following in accordance with Section 01340, Shop Drawings, Product Data and Samples.
1. Records
    - a. Quality control (QC) plan: Submit a QC plan as defined in paragraph 1.10 above within thirty (30) days after receipt of Notice to Proceed.

#### 1.09 QC ORGANIZATION

- A. Duties: Designate a QC Designate at the project site to manage and implement the QC program. The duties and responsibilities of the QC Designate shall include managing and implementing the QC program. The QC Designate is required to attend the QC plan meetings., coordination and mutual understanding meeting, conduct the QC meetings, perform submittal review, ensure testing is performed and prepare QC certifications and documentation required in this Contract. No work or testing may be performed unless the QC Designate or the designated alternate QC Designate is on the project site.
- B. Submittal Review Duties and Qualifications: Provide submittal Assistance at the project site until 95 percent of the submittals have been approved.

## 1.10 QC PLAN

- A. Requirements: Provide for approval by Project Manager a QC plan that covers both on-site and off-site work and includes the following:
1. A chart showing the QC organizational structure and its relationship to the production side of the organization.
  2. Names, duties, responsibilities, authorities and qualifications, in resume format, for each person in the QC organization, including any QC specialists.
  3. Documentation procedure including proposed report formats for all reports required herein.
  4. Procedures for reviewing, approving and managing submittals. Provide the name(s) of the person(s) in the QC organization authorized to review and certify submittals prior to approval.
  5. Testing laboratory information requirements.
  6. A testing plan and log that includes the tests required, referenced by the specification paragraph number requiring the test, test procedures, the frequency schedule activity number and the person responsible for each test.
  7. Procedures to identify, record, track and complete rework items, including schedule activity numbers.
  8. A listing of outside organizations such as architectural and consulting engineering firms that will be employed by Contractor and a description of the services and resumes of personnel these firms will provide.
  9. A listing or table of quality assurance requirements specified for each definable feature of work.
  10. Procedures for above ceiling installations coordination.
  11. Report Forms: The following forms shall be submitted and used throughout the project as specified herein.
    - a. Contractor Daily Report
    - b. Contractor Quality Control Report and Separate Continuation Sheets

- c. Testing Plan and Log
  - d. Rework Items List
  - e. Construction Methods Form
  - f. QC Designate's Preparatory Phase Check Off Report
- B. Preliminary Work Authorized Prior to Approval: The only work that is authorized to proceed prior to the approval of the QC Plan is mobilization of storage and office trailers and surveying. Contractor shall not proceed on other activities without written approval from Project Manager.
- C. Approval: Approval of the QC Plan is required before the start of construction. Project Manager reserves the right to require changes in the QC Plan and operations as necessary to ensure the specified quality of work.

#### 1.11 QC PLAN MEETING

- A. Prior to submission of the QC Plan, meet with Project Manager to discuss the QC Plan requirements of this Contract. The purpose of this meeting is to develop a mutual understanding of the QC Plan requirements prior to plan development and submission.

#### 1.12 COORDINATION AND MUTUAL UNDERSTANDING MEETING

- A. After submission of the QC Plan, but prior to the start of construction, meet with Project Manager to discuss the QC program required by this Contract. The purpose of this meeting is to develop a mutual understanding of the QC details, including forms to be used for documentation, administration for on-site and off-site work, and the coordination of Contractor's management, production and QC personnel with Project Manager, PI, and Owner's design professional. As a minimum, Contractor's personnel required to attend shall include the Project Manager, Project Superintendent, QC designate and Minutes of the meeting shall be prepared by the QC designate and signed by both Contractor and Project Manager.

#### 1.13 QC MEETINGS

- A. After the start of construction, the QC designate shall conduct weekly QC meetings at the project site with the project superintendent (not "superintendent staff"). The QC designate shall prepare the minutes of the meeting and provide a copy to Project Manager's within two working days after the meeting. Project Manager and Owner's inspectors may attend these meetings. The QC designate shall notify Project Manager at least two (2)

working days in advance of each meeting. As a minimum, the following shall be accomplished at each meeting:

1. Review the minutes of the previous meeting
2. Review the schedule and the status of work
  - a. Work for testing accomplished since last meeting
  - b. Rework items identified since last meeting
  - c. Rework items completed since last meeting
3. Review the status of submittals
  - a. Submittals reviewed and approved since last meeting
  - b. Submittals required in the near future
4. Review the work to be accomplished in the next fourteen (14) days and documentation required. Schedule the three phases of control and testing:
  - a. Establish completion dates for rework items
  - b. Preparatory phases required
  - c. Initial phases required
  - d. Follow-up phases required
  - e. Testing required
  - f. Status of off-site work or testing
  - g. Documentation required
5. Resolve QC and production problems
6. Address items that may require revising the QC plan
  - a. Changes in QC organization personnel
  - b. Changes in procedures

#### 1.14 THREE PHASES OF CONTROL

- A. The QC designate shall perform three phases of control to ensure that work complies with Contract requirements. The three phases of control shall adequately cover both

on-site and off-site work and shall include the following for each definable feature of work: A definable feature of work is a task which is separate and distinct from other tasks and requires separate control requirements as defined in Paragraph 1.12.A herein.

1. Preparatory Phase: Notify Project Manager at least two (2) working days in advance of each preparatory phase meeting. Conduct a preparatory phase meeting with the superintendent, subcontractor and the foreman responsible for the definable feature. The preparatory phase meeting shall be conducted a minimum of five (5) working days and a maximum of ten (10) working days prior to the scheduled start of work for the definable feature. Project Manager may attend these meetings. The QC designate shall prepare minutes of the preparatory phase meeting and provide a copy to Project Manager within two (2) working days after each meeting. Document the results of preparatory phase actions in the daily Contractor Quality Control Report. Perform the following tasks and submit a completed preparatory phase check off report to Project Manager within two (2) working days prior to beginning work on each definable feature of work.
  - a. Review each paragraph of the applicable specification sections.
  - b. Review the contract document drawings.
  - c. Verify that appropriate shop drawings and submittals for materials and equipment have been submitted and approved. Verify receipt of approved factory test results, when required.
  - d. Review the testing plan and testing schedule and ensure that provisions have been made to provide the required QC testing.
  - e. Examine the work area to ensure that the required preliminary work has been completed.
  - f. Examine the required materials, equipment and sample work to ensure that they are on hand and conform to the approved shop drawings and submitted data.
  - g. Review the safety plan and appropriate activity hazard analysis to ensure that applicable safety requirements are met and that required Material Safety Data Sheets (MSDS) are submitted.
  - h. Prepare and discuss Contractor's written construction methods and construction methods form.

- i. Confirm above ceiling coordination is completed and that the intended systems installation will be accessible for servicing. Provide written documentation that this coordination has, in fact, been completed prior to any installation taking place in the specific area concerned.
2. Initial Phase: Notify Project Manager at least two (2) working days in advance of each initial phase. When construction crews are ready to start work on a definable feature of work, conduct the initial phase with the superintendent, and the foreman responsible for that definable feature of work. Observe the initial segment of the definable feature of work to ensure that the work complies with contract requirements. Document the result of the initial phase in the daily Contractor Quality Control Report. Repeat the initial phase for each new crew to work on-site, or when quality falls below specified acceptable levels. Perform the following for each definable feature of work.
  - a. Confirm the quality of workmanship required.
  - b. Resolve potential conflicts.
  - c. Review the safety plan and the appropriate activity hazard analysis to ensure that applicable safety requirements are met.
  - d. Ensure that testing is performed by the approved laboratory.
3. Follow-Up Phase: Perform the following for ongoing work daily, or more frequently as necessary until the completion of each definable feature of work and document in the daily Contractor Quality Control Report.
  - a. Ensure the work is in compliance with Contract Documents.
  - b. Verify the quality of workmanship required.
  - c. Ensure that testing is performed by the approved laboratory.
  - d. Ensure that rework items are being corrected.
  - e. Verify the qualification of the workers as required in the specifications sections.
4. Notification of three phases of control for off-site work: Notify Project Manager at least fourteen (14) days prior to the start of the preparatory and initial phases.

## 1.15 SUBMITTAL REVIEW

- A. Procedures for submittals are as described in Section 01340, Shop Drawings, Product Data and Samples.

## 1.16 SPECIAL TESTING PROVIDED BY CONTRACTOR

- A. Perform sampling and special testing as indicated to be by Contractor within the contract documents.
  - 1. Testing Laboratory Requirements: Provide an independent testing laboratory or laboratories qualified to perform the required sampling and tests. Submit for approval detailed information on testing laboratory, including facilities, test equipment and personnel.
  - 2. Accredited Laboratories: Acceptable accreditation programs are the National Institute of Standards and Technology (NIST) National Voluntary Laboratory Accreditation Program (NVLAP), the American Association of State Highway and Transportation Officials (ASSHTO) program, and the American Association for Laboratory Accreditation (AZLA) program. Furnish to Project Manager a copy of the certificate of accreditation, scope of accreditation and latest directory of the accrediting organization for accredited laboratories. The scope of the laboratory's accreditation shall include the test methods required by the Contract Documents.
  - 3. Inspection of Testing Laboratories: Prior to approval of a laboratory, the proposed testing laboratory facilities and their records shall be subject to inspection by Project Manager, Owner's design professional, and Owner's inspector. Records subject to inspection include equipment inventory, equipment calibration dates and procedures, library of test procedures, audit and inspection reports by agencies conducting laboratory evaluations and certifications, testing and management personnel qualifications, test report forms, and the internal QC procedures.
  - 4. Capability Check: Project Manager retains the right to check laboratory equipment in the proposed laboratory and the laboratory technician's testing procedures, techniques, and other items pertinent to testing, for compliance with the standards set forth in the Contract Documents.
  - 5. Test Results: Cite applicable contract requirements, tests or analytical procedures used. Provide actual results and include a statement that



the item tested or analyzed conforms or fails to conform to specified requirements. Conspicuously stamp the cover sheet for each report in large red letters “CONFORMS” and “DOES NOT CONFORM” to the Contract Documents, whichever is applicable. Test results shall be signed by a testing laboratory representative authorized to sign certified test reports. Furnish the signed reports, certifications, and other documentation to Project Manager via the QC Designate. Furnish a summary report of field tests and an exception report listing all items which do not conform and have not been corrected at the end of each month. Attach a copy of the summary report to the last daily Contractor Quality Control Report of each month.

#### 1.17 QC CERTIFICATION

- A. Contractor Quality Control Report Certification: Each Contractor Quality Control Report shall contain the following statement: “On behalf of contractor, I certify that this report is complete and correct and equipment and material used and work performed during this reporting period is in compliance with the Contract Documents to the best of my knowledge, except as noted in this report.” Each Contractor Quality Control Report shall be signed and dated by the QC Designate.
- B. Application for Payment Certification: Furnish a certificate to Project Manager with each payment request, signed by the QC Designate, attesting that record drawings are current and attesting that the work for which payment is requested, including stored material, is in compliance with contract requirements.
- C. Completion Certification: Upon completion of all or a designated portion of the work, furnish a certificate to Project Manager, signed by the QC Designate, attesting that “the work has been completed, inspected, tested and is in compliance with the Contract Documents.”

#### 1.18 DOCUMENTATION

- A. Maintain current and complete records of on-site and off-site QC program operations and activities.
  - 1. Contractor Daily Report: Reports are required for each day that work is performed and shall be attached to Contractor Quality Control Report prepared for the same day. Account for each day throughout the life of the contract. The reporting of work shall be identified by terminology (activity number and description) consistent with the construction schedule. Contractor Daily Reports shall be prepared, signed and dated by contractor’s project superintendent and shall include the following information.

- a. Date of report, name of contractor, title and location of contract work and superintendent present.
- b. Weather conditions in the morning and in the afternoon including maximum and minimum temperatures.
- c. A list of contractor and subcontractor personnel on the project site, their trades, employer, work location, description of work performed (keyed to schedule activity numbers) and hours worked.
- d. A list of job safety actions taken and safety inspections conducted. Indicate that safety requirements have been met including the results on the following:
  - (1) Was a job safety meeting held? (If yes, attach a copy of the meeting minutes).
  - (2) Were there any lost time accidents? (If yes, attach a copy of the completed OSHA report.)
  - (3) Was trenching/scaffolding/high voltage electrical/high work done? (If yes, attach a statement or check list showing inspection performed.)
  - (4) Was hazardous material/waste released into the environment? (If yes, attach report of actions taken.)
  - (5) Meetings held.
- e. A list of equipment/material received each day that is incorporated into the project.
- f. A list of construction and plant equipment on the project site including the number of hours used, idle and down for repair.
- g. Include a “remarks” section in this report which shall contain pertinent information including directions received, problems encountered during construction and delays, conflicts or errors in the drawings, specifications or coordinated drawings, field changes, safety hazards encountered, instructions given and corrective actions taken, delays encountered and a records of visitors to the project site.

2. Contractor Quality Control Report: Reports are required for each day that work is performed and for every seven (7) consecutive days of no work and on the last day of a no work period. Account for each day throughout the life of the contract. The reporting of work shall be identified by terminology and activity codes consistent with the construction schedule. Contractor Quality Control Reports shall be prepared, signed, and dated by the QC Designate and shall contain the following information.
  - a. Identify the control phase (preparatory, initial, follow-up) and the definable feature of work.
  - b. Results of the Preparatory Phase meetings held including the location of the definable feature of work and a list of personnel present at the meeting. Indicate in the report that for this definable feature of work, the drawings and specifications have been reviewed, submittals have been approved, materials comply with approved submittals, materials are stored properly, preliminary work was done correctly, the testing plan has been reviewed, and work methods and schedule have been discussed.
  - c. Results of the initial phase meetings held including the location of the definable feature of work and a list of personnel present at the meeting. Indicate in the report that for this definable feature of work the preliminary work was done correctly. Samples have been prepared and approved, the workmanship is satisfactory, test results are acceptable, work is in compliance with the contract requirements, and the required testing has been performed and include a list of who performed the tests.
  - d. Results of the follow-up phase inspections held including the location of the definable feature of work. Indicate if the report for this definable feature of work that the work complies with the contract requirements as approved in the initial phase, and that required testing has been performed and include a list of who performed the tests.
  - e. Results of the three phases of control for off-site work, if applicable, including actions taken.
  - f. List the rework items identified, but not corrected by close of business.
  - g. List the rework items corrected from the rework items list along with the corrective action taken.

- h. Include a “remarks” section in this report which shall contain pertinent information including directions received, quality control problem areas, deviations from the QC plan, construction deficiencies encountered, QC meetings held, acknowledgment that as-built drawings have been updated, corrective direction given by the QC organization and corrective action taken by Contractor.
    - i. Contractor Quality Control Report certification.
3. Testing Plan and Log: As tests are performed, the QC Designate shall record on the “Testing Plan and Log” the date the test was conducted, the date the test results were forwarded to the Project Manager, remarks and acknowledgment that an accredited or approved testing laboratory was used. Attach a current updated copy of the “Testing Plan and Log” to the last daily Contractor Quality Control Report of each month.
4. Rework Items List: The QC Designate shall maintain a list of work that does not comply with the Contract Documents, identifying what items need to be reworked, the date the item was originally discovered, and the date the item was corrected. Attach the current copy of the ‘Contractor Rework Items List’ to the last daily Contractor Quality Control Report of each month. Contractor shall be responsible for including on this list items needing reword including those identified by Project Manager or Owner’s inspectors.
6. As-Built Drawings: The QC Designate is required to review the as-built drawings required by Section 01720, Contractor’s As-Built Documents, to ensure that as-built drawings are kept current on a daily basis and marked to show precise locations of items or any deviations which have been made from the Contract Document drawings. the QC Designate, or QC specialist assigned to an area of responsibility, shall initial each deviation and each revision. Upon completion of work, the Designate shall furnish a certificate attesting to the accuracy of the as-built drawings prior to submission to Project Manager.
7. Contractor shall comply with and keep records of each and all documentation required under this section and any other referenced and related article(s) in conformance with the contract documents; record documents shall be available to Project Manager upon request at any time. The fact that the Project Manager may not request any documentation as stated in this section, contractor shall not be relieved of complying with all the requirements of the QC Program, including but not limited to record keeping of: logs, resume(s), certifications, test(s), warranties, etc. as stated in the Contract Documents.

- B. Delivery documentation to Project Manager as follows:
1. Contractor Quality Control Report: Original and one copy by 9:00 a.m. the next working day after each day that work is performed.
  2. Testing Plan and Log: One copy at the end of each month.
  3. QC Meeting Minutes: One copy within two days of the meeting.
  4. Rework Items List: One copy at the end of each month.
  5. QC Certifications: As required in Paragraph 1.17 herein.

#### 1.19 RESPONSIBILITIES OF CONTRACTOR

- A. Coordinate work of all subcontractors and of separate contracts, if any, assigned to this Contract.
- B. Cooperate with other contractors, if any, performing work on the site under separate contracts.
- C. Cooperate with the District in accommodating District-furnished material, furnishings, equipment and their installation.
- D. Establish on-site lines of authority and communication.
1. Schedule and conduct progress meetings with District's representatives and the Architect.
  2. Utilize sequentially numbered and dated forms to document requests for information and clarification.
- E. Provide and maintain a competent staff of experienced construction, administrative and supervisory personnel in sufficient numbers to meet the contract completion date.
- F. Furnish detailed time schedule of operations for all work on the project. Monitor schedule as work progresses, and revise schedule at appropriate intervals to reflect actual progress.
- G. Furnish detailed breakdown of total contract amount organized by construction activity or Table of Contents shown in the specifications.
- H. Verify that applications for permits, inspections, temporary facilities and permanent utilities are processed in a timely manner.

- I. Unless otherwise indicated or specified, perform the following items of work:
  - 1. Locate, identify, protect and maintain existing water, gas, sewer, irrigation and storm drain lines; lighting, power and telephone conduits and wires; and all other existing surface or subsurface structures.
  - 2. Do not disturb, disconnect or damage utilities during the progress of the work.
  - 3. Maintain all existing plants and trees which are to remain.
  - 4. Repair or replace to satisfaction of Architect and District, all damage to existing improvements and to adjacent public or private property and rights-of-way, resulting directly or indirectly from operations under the contract.
- J. Coordinate furnishing and placing of embedded items, sleeves and blockouts with formwork and reinforcing steel.
- K. Resolve conflicts that may develop among subcontractors and vendors over access to, and utilization of, the restricted spaces available for construction activities, materials and equipment.

[End of Section]

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## 1.00 GENERAL

### 1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. The work includes testing laboratory and inspection services required during the course of construction as required by code and as specified herein.

### 1.02 TESTING LABORATORY

- A. The District will select an independent testing laboratory to conduct the tests required by the requirements of CBC Chapter 17A. In addition to the project inspector required by Title 24, Part 1, Section 4-333 the school district shall employ one or more special inspectors who shall provide inspection during construction on the types of work listed under Section 1704A. The project inspectors and all special inspectors shall be qualified persons who shall demonstrate competence, to the satisfaction of the enforcement agency, for inspection of the particular type of construction or operation, for conformance with the approved design drawings and specifications and the applicable workmanship provisions of this code.
- B. Selection of the material to be tested shall be by the laboratory's project inspector or the District's representative and not by the Contractor.
- C. The Contractor shall notify the District's representative a sufficient time in advance of the manufacturer of material to be supplied by him under the Contract Documents, which must by terms of the Contract be tested, in order that the District may arrange for the testing of same at the source of supply.
- D. Any material shipped by the Contractor from the source of supply prior to having satisfactorily passed such testing and inspection or prior to the receipt of notice from said representative that such testing and inspection will not be incorporated in the job.
- E. The District will select and pay for testing laboratory costs for all tests and inspections, but may be reimbursed by the Contractor for such costs under the Contract documents.
- F. Test reports by the Districts testing laboratory shall be stamped / signed by a licensed Civil or Structural Engineer registered in the State of California, unless otherwise specified.

### 1.03 APPROVED OR CERTIFIED FABRICATORS

Special structural tests and inspections required by Chapter 17A, Section 1704A and elsewhere in this code are required where work is done off-site on the premises of a fabricator. Coordinate during work on the particular types of construction or operation

requiring special inspection required by the project inspector and the Districts special inspector in accordance with Title 24, Part 1 Section 4-333.

#### 1.04 PAYMENTS

- A. Initial testing and inspection costs shall be paid by the District provided testing and inspection indicates compliance with contract documents. Initial testing and inspection is defined as the first tests and inspections required. Costs associated with testing and inspection required outside of a 100-mile radius from the project site shall be borne by the Contractor.
- B. In the event a test or inspection indicates failure of a material or procedure to meet the requirements of the contract documents, the costs for retesting and re-inspection shall be paid by the District and back charged to the Contractor.
- C. Additional tests and inspections not herein specified but requested by the District or Architect will be paid by the District unless the results of such tests and inspections are found to be in non-compliance with contract documents. The District will pay all costs associated for the retesting and re-inspection of non-compliant work and back charge the Contractor.
- D. Costs for additional tests or inspections required because of change in materials being provided or change in source of supply shall be paid directly to the testing laboratory by the Contractor.
- E. Cost of testing and inspection by the District's testing lab for work performed off-site by the Contractors uncertified fabricator will be paid by the Contractor.
- F. Costs for work that is required to correct deficiencies in compliance shall be borne by the Contractor. Testing or re-testing required for items that failed due to negligence or oversight by the Contractor will be back charged to the Contractor. Example: A pull out test on wedge anchor that was indicated as and should have been cast-in-place; or the costs for welding inspection required due to problems associated with Contractor error.
- G. Costs for testing that is performed solely for the convenience of the Contractor to increase scheduling and performance of the work shall be borne by the Contractor, with associated costs invoiced directly to the Contractor.
- H. The testing laboratory shall separate and clearly identify on all invoices the costs for all re-testing and re-inspections and those required for increasing schedule, that are to be back charged to the Contractor, as specified above.
- I. The testing laboratory shall furnish to the District an itemized cost breakdown for providing all of the initial tests and inspections required by the contract documents. Proposal shall include the total number of each test required, total man-hours required for tests, total number of each of the field and plant inspections, travel time and associated costs, etc.

#### 1.05 AVAILABILITY OF SAMPLES



- A. Contractor shall make materials required for testing available to Laboratory on-site and at source of supply and assist in acquiring these materials. Samples shall be taken under the immediate direction and supervision of the testing laboratory. The costs of materials for testing shall be included as part of Contractor's project cost.
- B. If work that is required to be tested or inspected is covered up without prior notice or approval such work may be required to be uncovered at the discretion of Architect at Contractor's sole expense.
- C. Unless otherwise specified, Contractor shall notify Testing Laboratory a minimum of ten (10) working days in advance of all required tests and a minimum of two (2) working days in advance of all required inspections. Extra work required that is resulting from failure to notify the laboratory are to be paid solely by the Contractor:
- D. Contractor shall give sufficient advance notice to testing laboratory in the event of cancellation or time extension of a scheduled test or inspection. Charges billed due to insufficient advance notice of cancellations or time extensions are to be paid solely by the Contractor.
- E. Materials shipped by the Contractor from source of supply that not be incorporated into the project until testing and inspection has been performed.

1.06 TEST AND INSPECTION REPORTS

- A. The project inspector and the special inspector shall submit inspection reports to the enforcing agency and other designated persons as required by Title 24, Part 1, Section 4-336 and 4-342. All discrepancies shall be brought to the immediate attention of the Contractor for correction in accordance with code requirements.
- B. The Districts testing agency shall forward one copy of all test reports to DSA. Reports shall include a list of all the tests made regardless of the test results. Samples taken but not tested shall also be reported. The report shall indicate that the material(s) were sampled and tested in accordance with the specified reference requirements of Title 24, Part 2 CCR with building code amendments and with the requirements of the stamped specifications / contract documents. Test reports shall indicate the specified result that is to be achieved, design strength(s) as applicable, and whether or not the material(s) tested complies with the specified requirements. The Architect shall not be responsible to perform exhaustive search of the reports to verify the specified requirements against the reported test results and the outcome of the findings in terms of compliance or non-compliance. Testing lab shall clearly underline and bold the results of the tests for easy review.
- C. The Testing Laboratory will distribute all test and inspection reports as follows:
 

Architect	- 1
Structural Engineer	- 1
Contractor	- 1
District's Project Manager	- 1
Division of State Architect (DSA)	- 1
Project / Special Inspector	- 1

#### 1.07 VERIFICATION OF TEST REPORTS

Each testing agency shall submit to DSA, a verified report in duplicate covering all the tests that are required to be made by that agency during the progress of the project. Such report shall be furnished each time that work on the project is suspended, covering the tests up to that time, and at the completion of the project, covering all tests. One (1) copy shall be submitted to District & Architect.

#### 1.08 REPORTING TEST FAILURES

Immediately upon testing laboratory determination of a test failure or non-compliance, the testing laboratory shall telephone the test results and nature of non-compliance to the Architect and Project Inspector. Written test results shall be mailed the same day to those named on above distribution list.

#### 1.09 INSPECTION BY THE DISTRICT

- A. The District and the Districts representative shall at all times have access for the purpose of inspection of all parts of the work and to fabricators shops where work is being performed. Contractor shall at all times maintain the necessary facilities and provide safe access for inspection of the work.
- B. The District shall have the right to reject materials and workmanship that are defective, or to require their correction. Rejected workmanship shall be satisfactorily corrected and rejected materials shall be removed from the premises without charge to the District. If the Contractor does not correct such rejected work within a reasonable time, fixed by written notice, the District may correct and charge the expense to the Contractor.
- C. Should it be considered necessary or advisable by the District at any time before final acceptance of the entire work to make an examination of the work already completed by removing or tearing out the same, the Contractor shall on request promptly furnish all necessary facilities, labor and materials. If such work is found to be defective in any respect due to the fault of the Contractor or his subcontractor, he shall defray all expenses of such examinations and of satisfactory reconstruction. If, however, such work is found to meet the requirements of the Contract, the additional cost of labor and material necessarily involved in the examination and replacement shall be allowed the Contractor.
- D. Contractor shall make materials required for testing available to the Districts testing laboratory and assist in acquiring the material samples required. Samples shall be taken under the immediate direction and supervision of the testing laboratory representative. Costs for materials to be tested shall be included in the Contractor's project cost.
- E. Unless otherwise specified, Contractor shall notify Testing Laboratory a minimum of ten (10) working days in advance of all required tests, and a minimum of two (2) working days (48 hours) in advance of all required inspections in writing. Extra work resulting from failure to notify the Laboratory shall be borne the Contractor.

- F. Contractor shall give sufficient advance notice to Testing Laboratory in the event of cancellation or time extension of a scheduled test or inspection. Charges due to insufficient advance notice of cancellations or time extension shall be borne by the Contractor.

#### 1.10 INSPECTOR - DISTRICT'S

- A. A special inspector employed by the District and approved by DSA in accordance with the requirements of the California Code of Regulations, Title 24, Part I, Sec. 4-342, shall provide continuous inspection of project site and continuous or periodic special inspection, in conformance with the requirements of continuous inspection as approved by DSA
- B. The work of construction in all stages of progress shall be subject to the personal continuous observation of the Inspector. He shall have free access to any or all parts of the work at any time. The Contractor shall furnish the Inspector reasonable facilities for obtaining such information as may be necessary to keep him fully informed respecting the progress and manner of the work and the character of the materials. Inspection of the work shall not relieve the Contractor from any obligation to fulfill this Contract.

#### 1.11 INSPECTOR - DISTRICT- FIELD OFFICE

The Contractor shall provide the District's special inspector a temporary office to be located and maintained by the contractor until project completion or authorization by the District. For requirements refer to Section 01500.

#### 1.12 SPECIAL PROVISIONS

The Architect reserves the right to request additional tests or inspections of any material to insure compliance with building codes, project specifications and design intent. Architect may reject any material found defective or in noncompliance and may request replacement. This applies to unidentified materials or materials substituted from those previously approved. The costs of these tests and retests are to be paid by the Contractor.

#### 1.13 REMOVAL OF MATERIALS

Unless otherwise directed, materials not conforming to the requirements of Contract Documents shall be marked with an "X" and shall be promptly removed from the job site.

#### 1.14 ANCHORAGE TO CONCRETE REQUIREMENTS

- A. Power Driven Shot Pins – Low Velocity:
  - 1. Powder-activated fasteners / anchors may not be shot or drilled into post tensioned concrete slabs and beams without the prior written permission by the Architect/Structural Engineer, as to type and location, unless indicated otherwise on the drawings. Operators shall be certified in accordance with California Industrial Safety Orders.
  - 2. Shot pins may be used for shear loads and they may be used in tension to support loads less than 100 pounds for minor loads like acoustical ceilings, duct work, conduit, etc. Any shot anchors must have ICC

approval for the type of concrete used on the job. Shot pins may not be used in concrete curbs.

3. The allowable loads shall be 100 pounds or 80% of ICC approved values, whichever is less. Qualification for use of all power-actuated tools must meet ANSI A10.3 standard as required by the manufacturer and all OSHA requirements.

## 2.00 PRODUCTS (Not Applicable)

## 3.00 EXECUTION

### 3.01 TESTS AND INSPECTION FOR THE FOLLOWING WILL BE REQUIRED PER California Code of Regulations, CCR, Title 24, Part 2 – California Building Code (CBC).

#### I. CONCRETE - STATE CHAPTER 19A

##### A. MATERIALS

1. Portland Cement Tests - 1903A.2, 1929A.1
2. Concrete Aggregates - 1903A.3
3. Reinforcing Bars - 1903A.5, 1929A.2
4. Pre-stressing Steel & Anchorage - 1903A.5, 1929A.3

##### B. CONCRETE QUALITY

1. Proportions of Concrete - 1904A, 1905A.1, A.2, A.3, A.4
2. Strength Tests of Concrete - 1905A.6
3. Splitting Tensile Tests - 1905A.1.4, A.1.5
4. Composite Construction Cores - 1929A.8

##### C. CONCRETE INSPECTION

1. Job Site Inspection - 1905A.7
2. Batch Plant or Weigh-master - 1929A.4
3. Waiver of Batch Plant - 1929A.5, A.6
4. Pre-stressed Concrete - 1929A.9
5. Reinforcing Bar Welding - 1929A.12
6. Project Inspector and Districts Testing Laboratory shall be present at all times during placing of structural, reinforced, and post-tensioned cast-in-place concrete. Prior to placing concrete he will inspect accuracy of formwork and placement of all reinforcing steel and post-tensioning tendons and hardware. Placing of concrete shall not proceed until rebar/PT placement has been reviewed by Inspectors and cleared for concreting.
7. Contractor shall provide and pay all costs for mix designs and changes in mix designs.

#### II. MASONRY - STATE CHAPTER 21A

##### A. MATERIALS

1. Masonry Units - 2102A.2 (4,5,6)
2. Portland Cement, Lime - 2102A.2 (2,3), 2103A.2
3. Mortar & Grout Aggregates - 2102A.2 (1), 2103A.3, A.4
4. Reinforcing Bars - 2102A.2 (10)

##### B. MASONRY QUALITY

1. Portland Cement Tests - 1903A, ACI 318 Section 3.2
2. Mortar & Grout Tests - 2105A.2.2.1.4
3. Masonry Prism Tests - 2105A.2.2.2
4. Masonry Core Tests - 2105A.4
5. Masonry Unit Tests - 2105A.2.2.1
6. Reinforcing Bar Tests - 1916A.2

C. MASONRY INSPECTION

1. Reinforced Masonry - 1704A.5
2. Reinforcing Bar Welding - 1704A.3.1.4

III. STEEL - STATE CHAPTER 22A

A. MATERIALS

1. Structural Steel, Cold Formed Steel & AIS1 Sect. A2 - AISC 360 Sect. A3,
2. Material Identification - 2203A

B. QUALITY / TESTING

1. Structural and Cold Formed Steel Tests - 2212A
2. High Strength Bolts, Nuts and Washer Tests - 2212A.1
3. End Welded Stud Tests - 2212A.2
4. Non-Destructive Weld Tests - 1704A.3.1

C. INSPECTION OF STRUCTURAL STEEL

1. Shop Fabrication Inspection - 1704A.2
2. Welding Inspection - 1704A.3.1
3. Nelson Stud Welding Inspection - 1704A.3.1
4. High Strength Bolt Installation Inspection - 1704A.3.3

IV. LIGHTWEIGHT METALS - STATE CHAPTER 20A

A. MATERIALS

1. Alloys - 2002A.1
2. Identification - 2002A.1

B. INSPECTION

1. Welding - 2003A.1

V. EXPANSION BOLTS AND CHEMICAL ANCHORS - STATE CHAPTER 19A

A. MATERIALS

1. Bolts and Headed Stud Anchors - 1912A

B. TESTING

1. Tension and Shear Testing - 1916A.7

\*\*\* Anchorage to Concrete: Use bolts and studs anchors or powder driven shot pins (low velocity) only in conformance with Article 1.12 and the requirements in 3.10 specified hereafter.

VI. EXCAVATIONS, FOUNDATIONS & RETAINING WALLS - STATE CHAPTER 18A

- A. Earth Fill Compaction - 3301A.1
- B. Inspection
  - 1. Excavation & Fills for Foundation - 3301A.1

VII. SITE WORK, DEMOLITION & CONSTRUCTION - STATE CHAPTER 33A

- A. INSPECTION
  - 1. Excavation and Fills - 1704A.7

3.02 EARTHWORK

- A. The District's Soils Engineer will provide continuous inspection of fill and backfill and will field test fill and backfill as compacted, and inspect excavations and sub-grade before concrete is placed and provide inspection of open excavations, embankments, and other cuts and vertical surfaces of earth. The Geotechnical Engineer will submit a report indicating observance and testing of fills and placement of fill in accordance with the project specifications.
- B. Soils Engineer may require Contractor to remove unsatisfactory materials, re-roll, adjust moisture, place new materials, deepen footings, or perform additional compaction in conformance with ASTM D1557 and in accordance with Section 02225 - Earthwork for Structures.
- C. Soils Test and Inspection Procedure:
  - 1. Allow sufficient time for testing, and evaluation of results for materials needed. The Geotechnical Engineer shall be sole and final judge of suitability of all materials. Fill material must be tested and approved by the Geotechnical Engineer prior to importing.
  - 2. Perform Plasticity Index test on fill material prior to use to determine compliance with the Contract Documents. (ASTM D4318)
  - 3. Perform one in place density test in conformance with ASTM D1556 or D2167 or by such other means acceptable to the Engineer on select fill for each 2,000 square feet of area or fraction thereof placed in anyone day for each lift in place. Specified densities referenced relate to maximum dry densities obtained per ASTM D1557. If another method is used, degree of compaction must be comparable to those specified according to these methods.
  - 4. Subject to the approval of the Engineer, field in-place density tests may also be performed by the nuclear method according to ASTM D2922, provided that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D1556 or D2167, as applicable. With each density calibration check, check the calibration curves furnished with the moisture gages according to ASTM D3017. When field in-place density tests are performed using nuclear methods, make calibration checks of both density and moisture gages at beginning of work, on each different type of material encountered and at intervals as directed by the Engineer.
  - 5. Inspect each footing excavation to determine that proper bearing stratum is obtained and utilized for bearing and that excavations are properly clean and dry before concrete is placed.

6. In each compacted backfill layer, perform at least one field in-place density test for each 100 feet or less of wall length, but no fewer than two tests along a wall surface.
7. In each initial and final backfill layer, perform at least one field in-place density test for each 150 feet or less of trench, but no fewer than two tests.
8. The physical number of tests shall be as determined by the Geotechnical Engineer. Materials in question may not be used pending test results.
9. Excavation and embankment inspection procedure: Geotechnical Engineer will visually examine areas for bearing value.
10. Geotechnical Engineer on site shall have final decision over recommendations and directions as referenced in the "Geotechnical Investigation" report(s) as made a part of this specification.
11. When the project is under the continuous inspection of the 'Geotechnical Engineer of Record', or their representative, the testing limits of the in-place compaction density tests of 2,000 square feet of area for each 100 feet or less of wall length or for each 150 feet or less of trench may be revised by the project geotechnical engineer based on their experience with the soils at the site and scope of work to be performed.

### 3.03 REINFORCING STEEL

#### A. Materials

1. Reinforcing steel shall be inspected, sampled and tested for compliance with requirements of ASTM A615, Grade 60 and A706 Grade 60. Samples are to be taken from identified bundles at the place of distribution prior to shipment. Place of distribution shall mean the mill for non-fabricated (straight) bars and fabrication shop for bent bars.
2. Material Testing: Testing laboratory shall provide materials tests as indicated on the structural drawings and as required by Division of State Architect (DSA) District's laboratory shall submit their independent test data results accompanied by the certified mill analysis data.
  - a. Unidentified steel is not to be used on this project. Provide mill certificates for each heat and bar size to be used.
  - b. Make one tensile test and one bending test from specimens of each 10 tons, or fraction thereof in conformance with CBC requirements from each size, type or grade of reinforcing steel required.
  - c. Samples shall be taken by the testing laboratory representative consisting of not fewer than two pieces each 18" long of each size, type and grade of reinforcing steel.

#### B. Inspections

1. Deputy inspector to provide continuous inspection of pre-qualification welding and field welding for conformance to AWS D1.4 and CBC Section 1701A. Verify use of low-hydrogen electrodes, bars to be welded (ASTM A706), preparation including preheat and inter-pass temperatures, types of welds, fusion and cooling process.
2. Provide nondestructive radiographic or ultrasonic testing on 25% of all welds, and if any welds fail, test all welds.
3. Inspect the placement of all reinforcing steel where concrete design strengths exceed  $f'_c$  2500psi. Verify conformance with approved plans for

accuracy of placement, spacing and splices prior to closing of forms of delivery of concrete.

### 3.04 CONCRETE PLANT INSPECTION

- A. Inspector will be required to visit each batch plant prior to commencement of concrete work and thereafter only if directed by Architect to perform the following:
1. Inspection of batch plant operation and equipment (i.e., truck mixer, scales, bunker loading, stock-piles, admixture dispensers, etc.).
  2. Visual inspection of aggregates to determine uniformity of grading, cleanliness, moisture variation, etc.
  3. Check size of batch for rated capacity of truck.
  4. Check of proportioning and adjustment of mix for "free" moisture of variation in gradation.
  5. Visual inspection of batched loads after reasonable mixing time to determine the consistency and workability before releasing concrete for delivery.
  6. Inspection of conveying system to help prevent segregation.
- B. Concrete batch plant manufacturer shall deliver to testing laboratory inspector a certificate with each mixer truck in accordance with ASTM C 94 with the addition of type and brand of cement, cement content and admixtures, source, identification, testing results, sieve analysis of aggregates, and water content. Certificates shall be from a certified Public Weight Master. Inspector will not accept concrete that is not accompanied by and identified by the above certificate.

### 3.05 TESTING OF AGGREGATE

Testing agency will test at least one sample for every 200 cubic yards (150 cubic meters) of aggregate. Aggregates from a known source of supply that have actual service and are able to produce concrete of the required quality will be tested only for gradation and deleterious substances.

### 3.06 TESTING OF CONCRETE

- A. Test Cylinders: Perform sampling for test cylinders as the concrete is delivered from the mixer to the concrete pump hopper, unless required at the point of discharge by, code or agency of jurisdiction, testing laboratory or structural engineer. Make from full size batches of concrete taken from each pour or day's operation so as to represent 100 cubic yards of concrete. Each sample for test to consist of a set of four cylinders sampled in conformance with ASTM C172, 'Sampling Freshly Mixed Concrete' and made and cured in accordance with ASTM C 31, "Curing Test Specimens in the Field". Place in protected area and moist cure as required. Provide test cylinders, number, and indicate point from which sample was taken, and project location for where mix was placed. Indicate slump test results of sample, air content, if any, temperature of air and concrete at project site.
- B. Test Cylinders for compressive strength, in accordance with ASTM C 39. One cylinder to be tested at seven (7) days, one to permit tendon stressing within a maximum of 72 hours, and two tested at 28-days. One cylinder shall be kept as a spare and is to be tested if previous cylinders fail to meet design strength



requirements. Make frequent slump tests in the field to control consistency of concrete, minimum one slump test at beginning of placement and at the same time test cylinders are made. Conform to ASTM C 143 for slump test methods.

- C. The Contractor may obtain and test additional cylinders at his expense for other than above stated purposes.
- D. If minimum strengths of test cylinders fall below those specified, Architect may require Contractor to take test cores from hardened concrete to be tested or perform other tests as deemed appropriate to verify strength. Each core test taken shall consist of three (3) cores. Costs of such cores and tests shall be borne by the Contractor. Cores shall be taken in accordance with ASTM C42 from locations selected by Engineer. Contractor shall repair core holes with dry-pack or a non-shrinking mortar finished to match adjoining concrete.

### 3.07 ADDITIONAL TESTS BY DISTRICT'S TESTING LABORATORY

- A. Before starting work make a reasonable number of tests as hereinafter specified. Make tests for the following in accordance with ASTM Standards:
  - 1. Reactivity of Aggregate: C289
  - 2. Organic Impurities: C40
  - 3. Fineness Tests: C117
  - 4. Soundness of Aggregates: C131
  - 5. Weight, Air Content: C138
  - 6. Air Entrainment: C233
  - 7. Bond Test: C234
  - 8. Shrinkage Tests: C157
- B. Concrete Shrinkages Tests:
  - 1. Before placing any concrete deck slabs, prepare a trial batch of the mix design, using the same aggregates, cement and admixtures (if any) proposed for use on the Project. Prepare at least 3 specimens for determining the "drying shrinkage" of the mix design.
  - 2. The "drying shrinkage" specimens shall be 4" x 4" x 11" prisms, made, cured, dried and measured as specified in ASTM C157. Measure and report separately for 7, 14, and 28 days of drying, after 7 days of moist curing. The effective gauge length of the specimens shall be 10".
  - 3. Take "drying shrinkage" specimens of each class of concrete (elevated slabs and slabs on grade) during construction to insure continued compliance with these Specifications. Take at least one set of 3 specimens from each 500 cubic yards of concrete placed. Take "drying shrinkage" specimens from the same concrete used for preparing compression test specimens.
  - 4. The average "drying shrinkage" of the test specimens at 35 days of drying shall not exceed 0.045% for hard-rock (normal-weight) concrete.

### 3.08 CONCRETE INSPECTIONS

- A. Project inspector will be required on project site to perform inspection for all concrete, to verify placing techniques to determine that concrete deposited is uniform, vertical drop is not excessive, check depth of layers and for proper steel

reinforcing placement and coverage and that placement techniques do not displace reinforcing.

- B. An authorized inspector of the testing laboratory shall be present at all times during placing of structural, reinforced cast-in-place and post-tensioned concrete. Prior to placing concrete Inspector will inspect accuracy of formwork and placement of all reinforcing steel and post-tensioning tendons and hardware. Placing of concrete shall not proceed until rebar/PT placement has been reviewed by Inspector and cleared for concreting.
- C. The testing laboratory inspector will make periodic quality inspections of materials, if so directed by Architect.

### 3.09 INSPECTION / TESTING REPORTS

Services of the testing laboratory include test samples and for continuous special inspection of the depositing of structural concrete and anchor assemblies required by DSA indicated hereafter. Five (5) copies of reports of all testing and inspection of concrete placing shall be furnished by District's testing lab and kept by the Architect, Contractor, Engineer, District and DSA. Make all log entries available at all times.

### 3.10 POST-TENSIONING

- A. Provide continuous inspection by a qualified person experienced in this type of work. Exercise close check and rigid control of all inspection of all operations necessary for full compliance with all governing requirements and in conformance with Post-Tensioning Institute (PTI) Manual Standards. Work is to include testing of materials and inspection of jacking operations.
- B. Material Testing: Prior to delivery of post tensioning materials to the jobsite, testing laboratory shall provide materials tests as indicated on the structural drawings, in Section 03365 – Post Tensioned Concrete and as required by DSA.
  - 1. Pre-stressing steel shall be tested for modulus of elasticity and tensile strength, elongation at rupture, and relaxation unless otherwise directed by Architect/Engineer. One test shall be made for each heat, and shall be tagged for identification purposes. Each size of strand to be shipped to the site shall be assigned an individual lot number and shall be tagged accordingly.
  - 2. Both pieces of each broken sample shall be fastened together and tagged with the job name, heat number, coil number, date tested, ultimate load, and shall be retained by the testing laboratory and made available for inspection at any time until after all tendons have been stressed.
- C. Inspection: Testing laboratory inspector shall review the placement of the tendons in the forms prior to concrete casting, verify that tendon drapes conform to the controlling points as shown on the Drawings, positioning and anchoring devices to prevent displacement, corrosion preventative coating and protective sheathing.
- D. Verify that the concrete cylinders have reached the required minimum compressive strength prior to start of operations. Review hydraulic stressing ram gauge calibrations or gauge certifications to verify accuracy. Continuously inspect stressing / tensioning work for each strand to verify approved procedure, record

elongation measurements, seating of grippers, re-stressing, cutting of tendon tails and waterproofing of P.T. anchorage prior to grouting of pockets.

- E. Perform continuous inspection throughout stressing operations. Record elongation and anchor force at each tendon.

### 3.11 CONCRETE MASONRY UNIT

- A. Concrete Masonry Units: Testing Laboratory shall sample and test units in accordance with ASTM C140 to comply with requirements of ASTM C90 and contract documents. This test is to be performed if Contractor fails to submit manufacturers recent material test reports and certificates of compliance. Sampling and testing of masonry units is to be performed at the Contractor's expense.
- B. Provide minimum of two (2) samples and testing of mortar cylinders and grout prisms, tested for conformance per CBC Section 2105A.
  - 1. Mortar composition and properties will be evaluated per ASTM C780.
  - 2. Masonry prisms will be tested per ASTM E447, Method B. Prepare one set of prisms for testing at 7 days and one set for testing at 28 days.
- C. Core Tests: Required only for questionable workmanship or materials. Sample and test not less than two cores. Diameter and length per code requirements.
- D. Continuous inspection is required on all structural work.
- E. From the beginning of masonry construction and continuously during construction of masonry, verify the following are in compliance:
  - 1. Proportions of site-mixed mortar and grout
  - 2. Placing of masonry units and construction of mortar joints
  - 3. Placement of reinforcement and connectors
  - 4. Grout space prior to grouting
  - 5. Placement of grout
  - 6. Observe preparation of grout specimens, mortar specimens and/or prisms

### 3.12 MISCELLANEOUS STEEL AND METAL DECKING

- A. Refer to Sections 05300 and 05500.
- B. Identified steel stock must be accompanied by mill test reports and must be certified for compliance by the testing laboratory. Testing of unidentified steel shall be arranged and paid for by the Contractor.
- C. Continuous inspection of all connections and welding shall be provided to determine quality size and compliance with approved erection drawings.
- D. Testing laboratory will inspect finished steel welds and bolted connections. Inspector to field-test any welds showing deviations from acceptable standards. Report in writing any conditions that prevent or interfere with correct installation of work of this section.

- E. All welders are to be properly certified for the type of work involved in compliance with all applicable code requirements and AWS D1.1 standards. In the absence of code requirements pertaining to certification, welders shall be certified by the testing agency.
- F. Continuous inspection of welding shall be provided. Test ten (10%) of all shop and field welds selected randomly by the laboratory by non-destructive methods. Where the quality of a weld is in question the Architect will be advised. The Contractor may then be required to remove and re-weld the connection.
  - 1. Shop Welding Inspections: Required to be made by a qualified laboratory inspector approved by DSA. Single pass welds may be inspected after completion of welding, before painting. Continuously inspect multiple pass welds and groove welds where required.
  - 2. Field Welding: Perform field-welding inspection by an AWS-certified laboratory inspector and as approved by DSA. All partial and full penetration groove welds require ultrasonic inspection per AWS D1.1.
- G. The testing laboratory must inspect field-bolted connections in accordance with the specifications of the American Institute of Steel Construction.

### 3.13 ANCHORAGE TO CONCRETE

- A. Bolts and Studs Anchors:
  - 1. All bolts and headed stud anchors shall be accurately and securely set prior to placement of concrete, except as indicated in Section 1916A.7.1. The strength of headed bolts and headed studs solidly cast in concrete shall be taken as the average of 10 tests approved by DSA, for each concrete strength and anchor size.
  - 2. Drilled-in expansion bolts or chemical-type anchors:
    - a. When used in lieu of cast-in place bolts, the allowable shear and tension values and test loads shall be acceptable to DSA.
    - b. For sill plate applications, 10 percent of the anchors shall be tension tested.
    - c. All expansion anchors used for structural application shall be tension tested.
    - d. Expansion anchors shall not be used as hold-down bolts.
    - e. Expansion bolts used for non-structural applications, such as equipment anchorage, 50 percent or alternate bolts in a group, including at least one-half the anchors in each group, shall be tension tested.
    - f. Tension testing shall be performed by the Districts special inspector in the presence of the project inspector and a report of the test results submitted to DSA. If any anchor shall fail the tension testing requirements, the additional testing requirements shall be acceptable to DSA. These requirements shall also apply to bolts or anchors set in concrete with chemical if the long term durability and stability of the chemical material and its resistance to loss of strength and chemical change at elevated temperatures are established to the satisfaction of DSA.
- B. Powder Driven Shot Pins – Low Velocity:
  - 1. The operator, tool and fastener shall be pre-qualified by the DSA project inspector. Inspector shall observe the testing of the first 10 fastener

installations. A test "pull-out" load of not less twice the design load shall be applied to the pin in such a manner as not to resist the spalling tendency of the concrete surrounding the pin. Thereafter, random tests under the project inspector's supervision shall be made of approximately 1 in 10 pins.

2. If any pin fails testing, test all pins of the same category not previously tested until twenty (20) consecutive pass, then resume the initial testing frequency.

### 3.14 REPAIR AND PROTECTION

- A. On completion of testing, inspection, sample taking and similar services, repair damaged construction and restore substrates and finishes.
- B. Protect construction exposed by or for quality control service activities.
- C. Repair and protection are Contractor's responsibility regardless of the assignment of responsibility for quality control service.

END OF SECTION



FORM **DSA-103** rev 1/12

# Statement of Structural Tests and Special Inspections

2010 CBC

INCREMENT #



DSA File No.:

56-C1

Application No.:

03-114024

Date Submitted: 7/11/2012

Revised:

Revised:

School Name	Moorpark College	District	Ventura County
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**IMPORTANT:** This form is only a summary list of structural tests and special inspections required for the project. The actual tests and inspections must be performed as detailed on the DSA approved documents. The project inspector is responsible for providing inspection of all facets of construction, including but not limited to, special inspections not listed on this form such as structural wood framing, high-load wood diaphragms, cold-formed steel framing, anchorage of non-structural components, etc., per Title 24, Part 2, Chapter 17A.

**NOTE:** This form is also available for projects submitted for review under the 2007 CBC.

**INSTRUCTIONS:** Click a plus sign (+) before any category or subcategory to reveal additional tests and special inspections. An "X" before a listed test or inspection indicates it is a mandatory requirement. A shaded box indicates a test or special inspection that may be required, depending on the scope of the construction and other issues. A shaded box can be clicked indicating your selection of that test. Note: A minus (-) on a category or subcategory heading indicates that it can be collapsed. However, any selections you may have made will be cleared. Click on the "COMPILE" button to show only the tests finally selected. For more information on use of this form, see DSA-103.INSTR.

Note: All references to the California Building Code (CBC) are to the 2010 edition.

REQUIRED	TEST OR SPECIAL INSPECTION	TYPE 1	PERFORMED BY 2	CODE REFERENCE AND NOTES
-	<b>SOILS</b>			
	<b>1. GENERAL:</b>	Table 1704A.7		
X	a. Verify that: • site has been prepared properly prior to placement of controlled fill and/or excavations for foundations, • foundation excavations are extended to proper depth and have reached proper material, and • materials below footings are adequate to achieve the design bearing capacity.	Periodic	GE*	* By geotechnical engineer or his or her qualified representative.
	<b>2. COMPACTED FILLS:</b>	Table 1704A.7		
X	a. Perform qualification testing of fill materials.	Test	Lab*	* Under the supervision of the geotechnical engineer.
X	b. Verify use of proper materials and inspect lift thicknesses, placement, and compaction during placement of fill.	Continuous	GE*	* By geotechnical engineer or his or her qualified representative.
X	c. Test compaction of fill.	Test	Lab*	* Under the supervision of the geotechnical engineer.
	<b>5. RETAINING WALLS:</b>			
X	a. Placement of soil reinforcement, drainage devices, and backfill.	Continuous	GE*	* Placement, compaction and inspection of backfill per Section 1704A.7.1 for fills supporting foundations (see Section 2 above).
X	c. Concrete retaining walls.	Provide tests and inspections per CONCRETE section below.		
	<b>CONCRETE</b>	Table 1704A.4		
	<b>7. CAST IN PLACE CONCRETE</b>			
	<b>Material Verification and Testing:</b>			
X	a. Verify use of required design mix.	Periodic	SI & PI*	* To be performed by batch-plant special inspector and project inspector.
X	b. Test reinforcing steel.	Test	Lab	1916A.2 (1916.1.6*). ASTM A370. See IR 17-10
X	c. Perform slump, temperature, and (where required) air content tests.	Test	Lab	ASTM C172, ASTM C31.
X	d. Test concrete (compression).	Test	Lab	1905A.6 (1905.6*). ASTM C39.
	<b>Inspection:</b>			
X	e. Inspect batching of concrete.	Continuous	SI	1704A.4.2; (see 1704A.4.3, option 2 for waiver based on design parameters).
X	f. Inspect placement of formwork, reinforcing steel, embedded items and concrete. Inspect curing and form removal.	Continuous	PI*	* May be performed by a special inspector when specifically approved by DSA.
	<b>8. PRESTRESSED CONCRETE (In addition to Cast in Place Concrete tests and inspections):</b>			
X	a. Test prestressing tendons and anchorages.	Test	Lab	1916A.3 (1916.1.7*). ASTM A370.
X	b. Inspect placement of prestressing tendons.	Periodic	SI	
X	c. Verify in-situ concrete strength prior to stressing of tendons.	N/A	SI	Special inspector to verify concrete strength test reports prior to the stressing of post tensioned tendons.
	<b>11. POST-INSTALLED ANCHORS:</b>			
X	a. Inspect installation of post-installed anchors	Continuous	PI	Table 1704A.4
X	b. Test post-installed anchors.	Test	Lab	1916A.7 (1916.1.11*)
	<b>MASONRY</b>	Table 1704A.5.3		
	<b>13. STRUCTURAL MASONRY:</b>	Enter $f_m$	1500	
	<b>Material Verification and testing:</b>			
X	a. Test reinforcing steel.	Test	Lab	2103A.13 (2103.13*). ASTM A370.
X	b. Test masonry units, mortar and grout (unit strength method).	Test	Lab	1708A.1.4 and 2105A.2.2.1 (or 1708A.1.4, 2105.2.2.1* and 2114.9.1*). ASTM C140, C1586 & C1019.
X	c. Test masonry prisms (prism test method).	Test	Lab	2105A.2.2.2 (2105.2.2.2* and 2114.9.2*). ASTM C1314.
X	d. Verify proportions of site-prepared, premixed or preblended mortar and grout.	Periodic	SI	ASTM C780.
X	e. Test core-drilled samples.	Test	Lab	2105A.4 (2114.9.3*).
	<b>Inspection:</b>			
X	f. Inspect preparation of prisms.	Continuous	SI	ASTM C1314.
X	g. Verify size, location and condition of all dowels, construction supporting masonry, etc.	Periodic	SI	
X	h. Verify specified size, grade, and type of reinforcement.	Periodic	SI	
X	j. Inspect placement of reinforcement, connectors, masonry units and construction of mortar joints.	Periodic	SI	
X	k. Verify protection of masonry during cold weather (temperature below 40° F) or hot weather (temperature above 90°).	Periodic	SI	2104A.3 and 2104A.4 (2104.3* and 2104.4*).



Division of the  
**State Architect**  
CALIFORNIA DEPARTMENT OF GENERAL SERVICES

FORM **DSA-103** rev 1/12

**Statement of Structural Tests  
and Special Inspections**  
2010 CBC

INCREMENT #

03-114024

DSA File No.:

56-C1

Application No.:

03-114024

Date Submitted:

7/11/2012

Revised:

Revised:

X	i. Inspect type, size, and location of anchors and all other items to be embedded in masonry including other details of anchorage of masonry to structural members, frames and other construction.	Continuous	SI	
X	m. Inspect grout space prior to grouting and placement of grout.	Continuous	SI	
-	<b>15. POST-INSTALLED ANCHORS IN MASONRY:</b>			
X	a. Inspect installation of post-installed anchors	Continuous	PI	Table 1704A.5.3
X	b. Test post-installed anchors.	Test	Lab	1916A.7 (1916.1.11*). ASTM E488.
-	<b>STEEL</b> Table 1704A.3			
-	<b>17. STRUCTURAL STEEL AND COLD-FORMED STEEL USED FOR STRUCTURAL PURPOSES</b>			
<b>Material Verification:</b>				
X	a. Verify that all materials are appropriately marked and that: • Mill certificates indicate material properties that comply with requirements, • Material sizes, types and grades comply with requirements.	Periodic	*	* By special inspector when performed off-site; by project inspector for steel shipped directly to project site without welding or fabrication.
X	b. Test unidentified materials	Test	Lab	2203A.1 (2203.1*). ASTM A370.
X	c. Examine seam welds of structural tubes and pipes	Periodic	SI*	* See DSA IR 17-3.
<b>Inspection:</b>				
X	d. Verify member locations, bracing and all details constructed in the field.	Continuous	PI	
X	e. Verify stiffener locations, connection tab locations and all construction details fabricated in the shop.	Periodic	SI	
-	<b>18. HIGH STRENGTH BOLTS:</b>			
<b>Material Verification of High-Strength Bolts, Nuts, and Washers:</b>				
X	a. Verify identification markings and manufacturer's certificates of compliance conform to ASTM standards specified in the DSA approved documents.	Periodic	SI	See DSA IR 17-9
X	b. Test high-strength bolts, nuts and washers.	Test	Lab	2212A.1 (2211.5.1*). ASTM F606, A370. DSA IR 17-8
<b>Inspection of High-Strength Bolt Installation:</b>				
X	c. Bearing-type ("snug tight") connections.	Periodic	SI*	See DSA IR 17-9
-	<b>19. WELDING:</b> DSA IR 17-3, AWS D1.1 and AWS D1.8 (AWS D1.3 for cold formed steel).			
<b>Verification of Materials, Equipment, Welders, etc:</b>				
X	a. Verify weld filler material identification markings per AWS designation listed on the DSA approved documents and the WPS.	Periodic	SI	
X	b. Verify weld filler material manufacturer's certificate of compliance.	Periodic	SI	
X	c. Verify WPS, welder qualifications and equipment.	Periodic	SI	See DSA IR 17-3.
-	<b>19.1 SHOP WELDING:</b>			
X	a. Inspect groove, multi-pass, and fillet welds > 5/16"	Continuous	SI	Per AISC 360 (and AISC 341 as applicable). See DSA IR 17-3.
X	b. Inspect single-pass fillet welds ≤ 5/16"	Periodic	SI	Per AISC 360 (and AISC 341 as applicable). See DSA IR 17-3.
X	c. Inspect welding of stairs and railing systems.	Periodic	SI	1704A.3.1 Per AISC 360 (and AISC 341 as applicable). See DSA IR 17-3.
-	<b>19.2 FIELD WELDING:</b>			
X	a. Inspect groove, multi-pass, and fillet welds > 5/16"	Continuous	SI	Per AISC 360 (and AISC 341 as applicable). See DSA IR 17-3.
X	d. Inspect floor and roof deck welds	Periodic	SI	Per AISC 360 (and AISC 341 as applicable). See DSA IR 17-3.
X	e. Inspect welding of structural cold-formed steel	Periodic	SI*	* May be performed by the project inspector when approved by DSA. See DSA IR 17-3. 1704A.3.1.2 and 1704A.3.1.4
-	<b>20. NONDESTRUCTIVE TESTING:</b>			
X	a. Ultrasonic	Test	Lab	AISC 341, App. Q 5.2. AWS D1.1, D1.8.- ANSI/ASNT CP-189, SNT-TC-1A. - ASTM E543, E1212 - DSA IR 17-2.
X	b. Magnetic Particle	Test	Lab	
-	<b>22. SPRAY APPLIED FIRE-PROOFING:</b>			
X	a. Examine structural steel surface conditions, inspect application, take samples, measure thickness, and verify compliance of all aspects of application with DSA approved documents.	Continuous	SI	1704A.12. ASTM E605.
X	b. Test bond strength.	Test	Lab	1704A.12.6. ASTM E736.
X	c. Test density.	Test	Lab	1704A.12.5. ASTM E605.
+	<b>WOOD</b>			
+	<b>OTHER</b> Section 1704A.15			



FORM **DSA-103** rev 1/12

**Statement of Structural Tests and Special Inspections**  
2010 CBC

INCREMENT #

[ ]

DSA File No.:

56-C1

Application No.:

03-114024

Date Submitted:

7/11/2012

Revised:

Revised:

**Summary of Verified Reports Required:**

Note: Project Inspector, contractor, architect and engineer verified reports are always required (Form DSA-6 or DSA-6A/E as applicable).

- 1 Soils testing and Inspection: Geotechnical Verified Report - Form DSA-293
- 2 All Structural Testing: Laboratory Verified Report - Form DSA-291
- 3 Concrete Batch Plant Inspection: Special Inspection Verified Report - Form DSA-292
- 4 Prestressed Concrete Inspection: Special Inspection Verified Report - Form DSA-292
- 5 Masonry Inspection: Special Inspection Verified Report - Form DSA-292
- 6 Shop Welding Inspection: Special Inspection Verified Report - Form DSA-292
- 7 Field Welding Inspection: Special Inspection Verified Report - Form DSA-292
- 8 HS Bolt Installation Inspection: Special Inspection Verified Report - Form DSA-292
- 9 Fire-Proofing Application Inspection: Special Inspection Verified Report - Form DSA-292

KEY to Columns	
1 Type -	2 Performed By -
<b>Continuous</b> – Indicates that a continuous special inspection is required	<b>GE</b> – Indicates that the special inspection is to be performed by a registered geotechnical engineer or his or her authorized representative
<b>Periodic</b> – Indicates that a periodic special inspection is required	<b>Lab</b> – Indicates that the test is to be performed by a testing laboratory accepted in the DSA laboratory Evaluation and Acceptance (LEA) Program
<b>Test</b> – Indicates that a test is required	<b>PI</b> – Indicates that the special inspection is to be performed by the project inspector
	<b>SI</b> – Indicates that the special inspection is to be performed by a special inspector
(Note: The difference between "tests" and "special inspections" is addressed in IR 17-4)	(Note that reassignment of responsibility is permitted only with the written approval of DSA)

**COMPILE**

**PRINT**

**Edward Y. C. Tan**

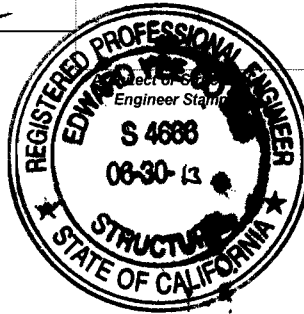
Name of Architect or Engineer in general responsible charge

Name of Structural Engineer (When structural design has been delegated)

Signature of Architect or Structural Engineer

07/18/12  
date

IDENTIFICATION STAMP  
DIV OF THE STATE ARCHITECT  
APP. # 03-114024  
AC N/A F/LS N/A SS TB  
DATE 7/18/12





## **SECTION 01430 MOCK-UPS**

### **PART 1 – GENERAL**

#### 1.01 DESCRIPTION

- A. All other sections of Division 1 apply to this Section. This Section covers the general requirements for construction of mock-ups, as specified herein and in other applicable sections of the specifications.

#### 1.02 MOCK-UP

- A. Provide composite construction mock-up, at location indicated. Mock-up shall be 4 feet x 4 feet minimum in size unless noted otherwise , and shall include:
- Slanted window sill and EIFs on the south elevation of the Police Station. (See 17 @ A5.09)
  - 
  - Partial Decorative Fin including reveals and weep screed and flashing (See 18 @ A5.11)
  - 
  - Entrance Screen with attached college logo (4’x4’ mock-up of center area- See 3 @ A7.04)

#### 1.03 CRITERION

- A. When accepted, the mock-up will used as the criterion for acceptance of the work. This includes, without limitation, tolerances, quality of workmanship, colors, textures, patterns, and performance criteria of materials and of the assembly.

### **PART 2 – PRODUCTS**

#### 2.01 MATERIALS

- A. Materials for mock-up shall conform to requirements specified for the appropriate work. Where practical, materials shall be taken from same production run, quarry run, dye lots, etc., as will be provided for the work.

### **PART 3 – EXECUTION**

#### 3.01 WORKMANSHIP

- A. Workmanship for mock-up shall conform to requirements specified for the appropriate work. Workmanship shall exhibit quality and degree of finish as will be performed in the finished work.

#### 3.02 MAINTENANCE

- A. The mock-up shall be maintained in clean, undamaged condition for the duration of the project, and until acceptance of all materials and systems represented in the mock-up have been obtained.

### 3.03 REMOVAL

- A. When directed, and after acceptance of materials and systems represented in the mock-up, the mock-up shall be dismantled and removed from the site. The site of the mock-up shall be cleaned and finished to match adjacent areas.

*[End of Section]*

**SECTION 01500  
TEMPORARY FACILITIES AND CONTROLS**

**PART 1 – GENERAL**

Provisions of General Conditions, Special Conditions, and Division One apply to this section.

**1.01 DESCRIPTION**

- A. Furnish, install, and maintain temporary utilities as required to perform the work.
- B. Materials, installation, and maintenance of temporary utilities shall be in compliance with applicable regulatory requirements.
- C. Remove temporary utilities, including associated materials and equipment when no longer required. Restore and recondition areas of the site damaged or disturbed by temporary utilities or their installation. Remove and properly dispose of debris resulting from removal and reconditioning operations.

**1.02 TEMPORARY UTILITIES**

- A. Temporary Electricity:
  - 1. Connect to Campus's existing power service where possible. Install a secondary meter to monitor monthly usage. Power consumption shall not disrupt Campus's need for continuous service. Where required, provide new temporary power pole and meter. Contractor will be charged for power usage at same rate as paid by the District to Southern California Edison.
  - 2. Provide temporary electric feeder from existing electrical service at locations as directed.
  - 3. Contractor will pay for cost of energy used. Exercise measures to conserve energy.
  - 4. Provide power outlets for construction operations with branch wiring and distribution boxes. Provide flexible power cords as required.
  - 5. Provide adequate distribution equipment, wiring, and outlets to provide single-phase branch circuits for power and lighting.
- B. Temporary Heat:
  - 1. Provide and pay for heat devices and heat as required to maintain specified conditions for construction operations.
  - 2. The permanent heating system may be used as a source of temporary heat after system is placed in operation and tested, provided Owner's Representative has approved, in writing, use of permanent system for temporary heat.
  - 3. Make arrangements for service, provide fuel and operators as required, pay

costs in connection therewith, and maintain system until acceptance of the Project.

C. Temporary Ventilation:

1. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
2. Building supply fans shall not be used unless required filters are in place.

D. Temporary Lighting:

1. Provide artificial lighting for work areas when natural light is not adequate to inspect work.
2. Exterior staging and storage areas and pathways shall remain electrically lit after dark.
3. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

E. Temporary Telephone/ Fax/Email:

1. Provide, maintain and pay for telephone, Fax & email service to field office at time of Project mobilization.
2. Contractor is responsible for collecting toll charges for phone calls made by unauthorized personnel.

F. Temporary Water:

1. Connect to existing water source for construction operations with construction meter obtained from Water District and paid for by Contractor..
2. Extend branch piping with outlets located so water is available by hoses with threaded connections.

G. Sanitary Facilities: Provide and maintain required facilities and enclosures. Existing facilities shall not be used.

1.03 CONSTRUCTION AIDS

A. Plant and Equipment:

1. Furnish, operate, and maintain a complete plant for fabricating, handling, conveying, installing, and erecting work and materials required under the Contract. Include hoists and conveyances for transporting workers and transporting and placing materials; debris chutes; and tools, appliances, power equipment, and other required items. Furnish, arrange, and set up the plant to facilitate the proper and timely performance of the work.
2. Maintain plant and equipment in safe operating condition. Repair damages due to the use of defective plant and equipment, at no increase in Contract

Sum.

1.04 BARRIERS AND ENCLOSURES

- A. Provide and maintain suitable temporary barriers as required to prevent public entry; protect the work and existing facilities and persons from damage or injury from construction operations.

1.05 SECURITY

- A. Secure, maintain, and protect the work, stored materials, equipment, and temporary facilities until time of acceptance, or such earlier time as District may choose to assume such responsibility.
- B. Install temporary enclosure of partially completed construction areas to prevent unauthorized entrance, vandalism and theft.
- C. Secure temporary storage areas as required to prevent theft.

1.06 TEMPORARY CONTROLS

- A. Noise and Vibration Control:
  - 1. Comply with applicable regulatory requirements for the operation of powered construction equipment.
  - 2. Equipment and impact tools shall have intake and exhaust mufflers.
  - 3. Secure written permission from Director of Facilities, Maintenance & Operations at least three working days prior to using noisy and vibratory equipment, such as jack-hammers, concrete saws, impact tools, and high frequency electrical equipment.
  - 4. Cooperate with District's Representative if the use of noisy equipment becomes objectionable.
- B. Dust and Dirt Control:
  - 1. Conduct construction operations to prevent windblown dust and dirt from interfering with the progress of the work.
  - 2. Periodically water exterior construction areas as required to minimize the generation of dust and dirt.
  - 3. Hauling equipment and trucks carrying loads of soil and debris shall have their loads sprayed with water or covered with tarpaulins. Contractor is required to obtain and pay for haul permit from City of Moorpark.
  - 4. Prevent dust and dirt from accumulating on walks, roadways, parking areas, and planting, and from washing into sewer and storm drains.
- C. Water Control: Do not permit surface or subsurface water, and other liquids to accumulate on or in areas adjacent to the Project site. Should such conditions be encountered or develop, control the water, or other liquid, and suitably dispose of

by means of temporary pumps, piping, drainage lines, troughs, ditches, dams, or other methods.

D. Pollution Control:

1. No burning of refuse, debris, or other materials will be permitted on or in the vicinity of the Project site.
2. Comply with regulatory requirements and anti-pollution ordinances during the performance of demolition, construction and disposal operations.

1.07 PROJECT IDENTIFICATION AND SIGNS

A. General: Project identification and signs shall be approved by the District's Representative.

B. Provide and maintain a Project identification sign of the size, design, text, and colors designated by the Architect; locate sign as directed by Director of Facilities, Maintenance & Operations..

C. Signs other than the specified Project sign will not be permitted, unless otherwise approved in advance by the District's Representative.

D. Materials:

1. Structure and Framing: Structurally sound, new or used wood or metal; wood shall be nominal 2-inch x 4-inch minimum size.
2. Sign Surface: Minimum 3/4-inch exterior grade plywood.
3. Rough Hardware: Galvanized.

E. Fabrication:

1. Fabricate to provide smooth, even surface for painting.
2. Size: As indicated or directed.
3. Paint exposed surfaces of supports, framing, and surface material with one coat of primer and one coat of finish paint.
4. Text and Graphics: As directed by the Architect.

1.08 FIELD OFFICES AND SHEDS

A. Furnish, install, and maintain field offices and sheds.

B. If required, construct, install, and maintain field offices and sheds in compliance with applicable regulatory requirements.

1. Construction shall be structurally sound, weathertight, with floors raised above the ground, sturdy doors with provisions for locking, temperature transmission resistance compatible with occupancy and storage requirements, and neat appearance maintained throughout duration of work.

2. Portable or mobile buildings complying with the specified requirements may be used.
  3. Obtain Director of Facilities, Maintenance & Operation's approval of locations for field offices and storage sheds prior to commencing site preparation for the structures.
  4. Construct field offices and sheds on proper foundations, and provide connections for utility services. Fill and grade sites for field offices and storage sheds to facilitate surface drainage.
- D. Remove field offices and sheds from the site as soon as the progress of the work permits. Remove foundations, steps, landings, utility services and contents. Grade and restore to original state, portions of the site occupied by the temporary structures.

## **PART 2 - PRODUCTS**

Not Used.

## **PART 3 - EXECUTION**

Not Used.

*[End of Section]*





**SECTION 01532  
TREE PROTECTION**

**PART 1 – GENERAL**

1.01 SUMMARY

- A. Provisions of General Conditions, Special Conditions, and Division One apply to This section.
- B. Section includes: Provide all labor, materials, equipment, services, and miscellaneous and incidental work to provide all Tree Protection as indicated on the drawings and as specified including:
  - 1. Protection and welfare of all existing trees within the Contract limits that are noted to remain, including trimming, cabling, and repair of such trees as necessary.
  - 2. Contractor shall submit tree maintenance plans including temporary irrigation system for District’s Representative’s approval.
  - 3. Completely coordinate all work.
- C. Related Sections:
  - 1. Construction Facilities and Temporary Controls.
  - 2. Selective Demolition.

1.02 DEFINITIONS

- A. “Injury” is defined, without limitation, as any bruising, scarring, tearing, or breaking of roots, branches or trunk.
- B. “Drip Line” is defined as the outermost limits of the tree canopy.

1.03 QUALITY ASSURANCE

- A. General Responsibility: The Contractor shall be directly responsible for protection and welfare of existing trees within the Contract limits, which are noted to remain. This responsibility shall continue throughout the full construction period until the entire project is completed and accepted by the District and through completion of the guarantee period.

- B. Qualifications of Workmen: Trimming shall be performed only by a certified arborist or certified tree worker. Provide at least one person approved by the District who shall be present at all times during tree protection and trimming Operations, who shall be thoroughly familiar with the type of work involved, and who shall direct all protection and trimming work.
  - 1. All tree trimming on this project shall be under the direction of District's Representative.
  - 2. Pruning of mature trees shall be considered as part of this project at the Discretion of the landscape architect and/or District's representative.
- C. Reference Standards: Published specifications, standards, tests, or recommended Methods of trade, industry or governmental organization apply to work of the Section.
  - 1. International Society of Arboriculture (ISA) "Guide for Establishing Values of Tree and Other Plants," prepared by the Council of Tree and Landscape Appraisers (CTLA).
  - 2. "Cabling, Bracing and Guying Standards for Shade Trees," as published by the National Arborist Association (NAA), 174 RT 101, Bedford, New Hampshire 03102.
  - 3. International Society of Arboriculture (ISA) – Tree Pruning Guidelines.

#### 1.04 SUBMITTALS

- A. Refer to Section 01300 for procedure
- B. Pruning
- C. Moving Equipment
- D. Guying materials
- E. Fencing materials
- F. Maintenance plan

## 1.05 JOB CONDITIONS

- A. Prior to performing any work of the Contract, Contractor shall call for a site meeting With the District's Representatives. This meeting shall occur prior to construction of Any nature on site. The purpose of the meeting shall be to establish the conditions of All existing trees to be preserved or relocated upon receipt of the site by the Contractor. Failure to call for said meeting implies acceptance by the Contractor of trees to be Preserved in their existing condition.
- B. Sequencing Schedule: Coordinate and cooperate with other trades to enable work to proceed as rapidly and efficiently as possible.

## 1.06 GUARANTEE

- A. Contractor shall guarantee that all plants covered by the provisions of this Section will be in a healthy and flourishing condition of active growth one year from the date of final acceptance of the project.
- B. During the warranty period, the Contractor shall be liable for damages to all trees Covered by the provisions of this Section and shall pay compensation to the District.
  - 1. Contractor shall reimburse District for loss of trees due to damage or lack Of care (See Section 1.13 – Repair Compensation).
  - 2. For trees injured but not a complete loss to District, the amount of penalty shall be determined by the District's Representative.
- D. Contractor will not be held responsible for failures due to neglect by District, vandalism, etc., during the warranty period. Report such conditions to District's Representative.

## 1.07 TREE PROTECTION FENCING

- A. Tree Protection Fence: Eight (8') foot high cyclone fence, sturdy and capable of acting as a barrier against objects, vehicles, etc., on site during construction process. It shall be constructed and designed so as to allow for relocations as required and shall have gate access to inside for care of trees. It shall be continuously maintained and repaired as necessary. Metal shall be galvanized with posts set in 12" diameter x 24" depth footings with top rails.
- B. Install tree protection fencing around trees to be preserved at their drip line or at a minimum of 15' from the tree's trunk. Stands of trees may be fenced as a group. Fencing shall remain until landscape work has commenced, and it shall then be removed as directed by the District's Representative.

- C. During the course of construction, relocation of the fence may be required to facilitate construction. The Contractor shall do so as directed by the District's Representative at no additional expense to the District and reset if necessary.

#### 1.08 PROTECTION OF TREES

- A. Water: Provide ample water supply of potable quality and sufficient quantity for all operations required under this section.
- B. The existing trees to be preserved presently are in excellent condition. Trees shall not be allowed to deteriorate and shall be maintained in a healthy and vigorous condition during the course of construction and maintenance period.
- C. During the course of construction, the Contractor shall take all necessary precautions, as outlined herein, to protect the existing trees to be preserved from injury or death. Protection shall be given to the roots, trunk, and foliage of all existing trees to remain.
- D. Trees subject to the provisions of this section which have been injured shall be repaired immediately by an approved, certified arborist. Repair may include removal of rough edges and sprung bark and severely injured branches as directed by the District's Representative.
- E. Tree protection fencing shall be installed for the protection of existing trees to be preserved. No construction, demolition, or work of any nature will be allowed within the fenced area without prior written approval by the District's representative.
  - 1. Approval by the District's Representative for work within the fenced area shall not release the Contractor from any of the provisions specified herein for the protection of existing trees to be preserved.
  - 2. During the course of construction of approved work within the fenced area, no roots larger than two (2') inches in diameter shall be cut without prior written approval by the District's Representative.
- F. During construction, the existing site surface drainage patterns shall not be altered within the area of drip line or in compliance with the development plans.
- G. Contractor shall not alter the existing water table within the area of the drip line during rough grading (as directed by District's Representative).
- H. Take necessary measures to maintain healthy living conditions for existing trees to be preserved. Such measures shall include but not be limited to periodic washing of leaves for the removal of dust, etc.

I. Do not permit the following within the drip line of any existing tree to be preserved:

1. Storage or parking of automobiles or other vehicles.
2. Stockpiling of building materials or refuse of excavated materials.
3. Skinning or bruising of bark.
4. Use of trees as support posts, power poles, or signposts, anchorage for ropes, guy wires, or power lines, or other similar functions.
5. Dumping of poisonous materials on or around trees and roots. Such material include but are not limited to paint, petroleum products, dirty water, concrete slurry, or other deleterious materials.
6. Cutting of tree roots by utility trenching, foundation digging, placement of curbs and trenches, and other miscellaneous excavation without prior written approval by District's Representative.
7. Damage to trunk, limbs, or foliage caused by maneuvering vehicles or stacking material or equipment too close to tree.
8. Compaction of the root area by movement of trucks or grading machines; storage equipment, gravel, earth fill, or construction supplies, etc.
9. Excessive water or heat from equipment, utility line construction, or burning of trash under or near shrubs or trees.
10. Damage to root system from flooding, erosion, and excessive wetting and drying resulting from dewatering and other operations.

J. Excavation Around Trees:

1. Excavation or fill within drip lines of trees shall be done only where absolutely necessary and with the direction of the District's Representative.
2. Where trenching for utilities is required within drip lines, it shall be under the supervision and direction of the District's Representative. Trenching within a tree's drip line area may require the use of hand tools.
3. Where excavation for new construction is required within drip line of trees, hand excavation may be required to minimize damage to root system. Damaged roots or roots requiring removal that are larger than 2" diameter shall be cleanly cut by a hand saw. Cuts shall be made back to healthy root tissue.

4. Exposed roots and soil areas shall not be allowed to dry out before permanent backfill is placed. Temporary earth cover or organic mulch shall be provided, or roots shall be packed with wet peat moss or four layers of wet, untreated burlap and temporarily supported and protected from damage until permanently covered with backfill. The cover over the roots shall be wetted to the point of runoff daily. When complete, install broken concrete retaining walls as shown on plan details whenever the grade around a tree to be saved is higher or lower by 6" from the existing grade. See planting plan and details.
5. Pruning may be required to balance loss to root system caused by damage or cutting of root system. Thinning shall not exceed 30 percent of existing foliage and shall be directed by the District's Representative.

#### 1.09 TREE PRUNING

Pruning: Trees which require pruning shall be inspected by District's Representative and the Contractor before starting work. All pruning shall be in accordance with the standards of the International Society of Arboriculture or as directed by the District's Representative. A sample tree shall serve as a guide in the pruning of the remaining trees.

#### 1.10 TREE REMOVAL

Trees designated for removal shall be removed to a point at least 1' (one foot) or more below subgrade. Trees shall not be felled but cut down in sections and lowered to the ground to minimize damage to other trees and planting and protect against injury to anyone in the vicinity.

- A. The District's Representative and the Contractor's arborist will identify limbs and roots which are to be trimmed.
- B. The District's Representative shall direct the removal of branches from trees and large shrubs which are to remain if required to clear for new construction.
- C. Dead and damaged trees that are determined by the District's Representative and arborist to be incapable of restoration to normal growth pattern shall be removed.
- K. Cut evening, using proper tools and skilled workmen, to achieve neat severance with the least possible damage to the tree.
- L. In the case of root cuts, apply wet burlap or other protection, approved as noted herein, to prevent drying out and maintain them in a wet condition as long as necessary for temporary protection.

### 1.11 IRRIGATION SYSTEM

- A. Protect existing irrigation system from damage. Wherever possible leave water source for watering trees and keep ground around all trees to remain in the area sufficiently moist until the end of the project.

### 1.12 REPAIR COMPENSATION

- A. Damage to existing tree crowns or roots over 2 inches in diameter shall be immediately reported to District's Representative in writing and, at the direction of the District's Representative, repaired immediately at the Contractor's expense by an approved, certified arborist.
- B. The District's Representative shall direct repair of trees damaged by construction operations. Repairs shall be made promptly after damage occurs to prevent progressive deterioration of damaged trees.
- C. Any tree to remain which is damaged or destroyed owing to the Contractor's negligence or failure to provide adequate protection shall be compensated for in accordance with "The Guide for Establishing Values of Trees and Other Plants" as produced by the International Society of Arboriculture.
- D. Maintenance including watering, fertilizing, pruning, pest control, and other care to bring the replacement tree to the same general condition of original item shall be the responsibility of the Contractor.
- E. Damaged tree limbs or trees which have died as a result of injury during construction shall remain the property of District and shall remain or be removed by the contractor as directed by District's Representative.

### 1.13 MAINTENANCE

- A. Contractor shall be responsible to perform periodic inspections of existing trees to be preserved and submit written proposals to the District's Representative for additional maintenance work as may be required to ensure the health and general well being of the trees. Contractor shall retain, at the direction of the District's Representative, additional specialists as may be required to perform this work.
- B. Irrigation: During construction the existing trees to be preserved shall, at the direction of the District's Representative, be irrigated to a minimum of 3' depth. quantities and lengths of time are variable and shall depend upon climatic conditions or per the direction of the District's Representative.

*[End of Section]*





**SECTION 01600  
PRODUCT REQUIREMENTS**

**PART 1 - GENERAL**

**1.01 DESCRIPTION**

- A. Material and equipment incorporated in the work shall be:
  - 1. New, unless otherwise specified.
  - 2. In a condition acceptable to the District's Representative and the Architect.
  - 3. Suitable for the intended use.
  - 4. In conformance with EPA codes and regulations and applicable air quality control district.
- B. No material or equipment shall be used for purposes other than that for which designed or specified.
- C. No material shall contain asbestos.
- D. No materials or products shall contain formaldehyde in excess of the amount recommended by applicable department of health, or other regulatory agencies.

**1.02 TRANSPORTATION AND HANDLING**

- A. Deliver manufactured products in the manufacturers' original unbroken containers or packaging, with identifying labels intact and legible.
- B. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and reviewed submittals, and verify that products are properly protected and undamaged.
- C. Handle products and packages in a manner to avoid soiling or damaging.
- D. Promptly remove damaged or defective products from the site, and replace at no increase in Contract Sum.

**1.03 STORAGE**

- A. Store manufactured products in accordance with the manufacturer's instructions, with seals and labels intact and legible.
  - 1. Store products subject to damage by the elements in weathertight enclosures.
  - 2. Maintain temperature and humidity within the ranges specified by the manufacturers.

- B. Exterior Storage:
  - 1. Store fabricated products above the ground, on blocking or skids, to prevent soiling and staining.
  - 2. Cover products subject to deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.
  - 3. Store loose granular material in a well drained area on solid surfaces to prevent mixing with foreign matter.
- C. Arrange storage to facilitate inspection.
- D. Periodically inspect stored products to assure that specified conditions are maintained and the products are free from damage or deterioration.
- E. Protection after Installation:
  - 1. Provide coverings necessary to protect installed products from damage due to traffic or construction operations. Remove coverings when no longer needed.
  - 2. Maintain temperature and humidity conditions for interior equipment and finish products in accordance with the manufacturers' instructions.

## **PART 2 - PRODUCTS**

Not Used.

## **PART 3 - EXECUTION**

Not Used.

*[End of Section]*

**SECTION 01620  
DISTRICT-FURNISHED ITEMS**

**PART 1 - GENERAL**

1.01 DESCRIPTION

- A. This section includes general requirements for District-furnished, Contractor-installed materials and equipment. It also includes description of responsibilities regarding District-furnished, District-installed items.

1.02 DEFINITIONS

- A. District-furnished, District-installed items, are hereinafter referred to as OFOI items.
- B. District-furnished, Contractor-installed items, are hereinafter referred to as OFCI items.

1.03 SUBMITTALS

- A. Obtain all necessary information from District as to manufacturer, model, and type of each OFCI item to be furnished. Submit shop drawings showing dimensioned rough-in diagrams for each OFCI item requiring utility connection, dimensioned locations of backing plates required in walls and partitions, and details of connections to supports of all OFCI items.

1.04 CONDITIONS:

- A. In each case, the Contractor is responsible for correct and properly located installation of the OFCI items in accordance with the various manufacturers' specifications and instructions.
- B. Conflicts: If a conflict occurs between requirements for OFCI items and actual field conditions, Contractor shall not install the affected items until the conflict is resolved. No extra payment will be made to the Contractor for correction of improper installation of OFCI items when reasonably adequate data and instructions for installation were furnished by the District or various OFCI item manufacturers.
- C. Installation: Install OFCI items complete in every detail with each item accurately and correctly placed, connected, adjusted, and tested.
- D. Delivery: OFCI items will be delivered to site. Contractor shall receive and unload the OFCI items, place in covered storage or enclosed building, and be responsible therefor after delivery. OFCI items that are damaged, abused, lost, or stolen while in Contractor's custody and control, or damaged or defaced during installation shall be repaired, replaced, or otherwise made good to the District's satisfaction at the Contractor's expense.
- E. Inspection of Delivered OFCI Items: Within 10 working days after delivery of the OFCI items, Contractor shall open and uncrate the items for inspection. The District's representative and Contractor shall inspect each item and maintain a written record of all damage, missing parts, and other defects disclosed, all of which will be made good by the District. After the inspection, Contractor shall be fully responsible for the equipment and

items as specified above.

- F. Additional Information: Contractor may request and receive from the District all necessary additional information, specifications, templates, and similar items from any of the manufacturers of the OFCI items. The Contractor may request a manufacturer's representative to supervise installation of any OFCI item, but at no additional cost to District.
- G. OFOI Items: The District will provide and install, or have installed by others, certain items, which may or may not be indicated in detail on the drawings. Contractor shall allow the District access to spaces and facilities as required to perform the work. Refer to the General Conditions and Supplementary Conditions for provisions for work under separate contracts.

## **PART 2 - PRODUCTS**

### 2.01 OFCI EQUIPMENT

## **PART 3 - EXECUTION**

### 3.01 INSTALLATION

- A. Conform to each OFCI item manufacturer's specifications, templates, and information including the necessary assembling of components or sub-assemblies.

### 3.02 TESTS

- A. Contractor shall operate and test each operable OFCI item when installed and connected. If malfunctions occur through no fault of the Contractor, the District will make the defect good; otherwise, the Contractor shall effect all necessary corrections so the OFCI item operates properly and as intended, at the Contractor's expense.

*[End of Section]*

**SECTION 01630  
SUBSTITUTIONS AND PRODUCT OPTIONS**

**PART 1 - GENERAL**

1.01 SUMMARY

- A. Division 1 requirements apply to this section.

1.02 SUBSTITUTIONS

- A. Wherever catalog numbers and specific brands or trade names, whether or not followed by the designation "or equal", are used in conjunction with a designated material, product, thing or service mentioned in these specifications, they are used to establish the standards of quality, utility and appearance required.
- B. Substitutions which are equal in quality, utility and appearance to those specified may be considered, subject to the provisions as contained in Section 00200 Instruction for Bidders and as follows:
1. All substitutions must be approved by the Architect in writing.
  2. For this purpose, submit to the Architect within 7-calendar days prior to the scheduled closing time for receipt of the Bid Proposals, a fully executed copy of the Substitution Request form at the end of this section, containing a description of each proposed substitute item or material. Use separate forms for each proposed substitution.
  3. The Architect shall not increase the submittal period beyond 7 calendar days prior to scheduled closing time for receipt of Bid proposals. Substitution will not be permitted after award of contract unless Product is no longer manufactured. Substitution for convenience of the contractor may not be considered.
  4. Append to the form, sufficient data, drawings, samples, literature or other detailed information as will demonstrate to the Architect that the proposed substitute is equal in quality, utility and appearance to the material specified.
  5. The Architect will approve, in writing, such proposed substitutions as are in the Architect's opinion, equal in quality, utility and appearance to the items or material specified.
  6. Such approval shall not relieve the Contractor from complying with the requirements of the drawings and specifications, and the Contractor's own expense for any changes resulting from the Contractor's proposed substitutions which affect other parts of the Contractor's own work or the work of others.
- C. Failure of the Contractor to submit proposed substitutions for approval in the manner described above, and within the time prescribed, shall be sufficient cause for disapproval by the Architect of any substitutions otherwise proposed.

- D. If specified items are listed in the following format or similar format: "First manufacturer and model number, equivalent second manufacturer and model number, or equal" the Contractor wishing to submit any "equivalent named manufacturer" shall do so in accordance with this provision.
- E. Wherever catalog numbers and specific bands or trade names accompanied by the words "No Substitutions" or equivalent language, the products or systems so designated are standard products or systems in use by the District, for proper operation and maintenance of existing system, and no substitution requests will be accepted for these items.

### 1.03 SUBMITTAL REQUIREMENTS

- A. Submit 4 copies of request for substitution. Include in request:
  - 1. Complete data substantiating compliance of proposed substitution with contract documents.
  - 2. For products:
    - a. Product identification: Include manufacturer's name and address.
    - b. Manufacturer's literature: Product description, performance and test data, and reference standards.
  - 3. For samples:
    - a. Name and address of similar projects on which product was used and date of installation.
  - 4. For construction methods:
    - a. Detailed description of proposed method.
    - b. Drawings illustrating methods.
  - 5. Itemized comparison of proposed substitution with product or method specified.
- B. Contractor shall perform the following actions and shall provide certification of such performance with the request for substitution:
  - 1. Investigate the proposed product or method and determine that it is equal or superior in all respects to that specified.
  - 2. Provide the same or better warranty for substitution as for product or method specified.
  - 3. Coordinate installation of accepted substitution into work, making such changes as may be required for work to be complete in all respects at his own expense.
  - 4. Assume all additional costs and time of construction performed by other separate contractors to accommodate the accepted substitution including reimbursement to District for costs of Architect and engineering redesign.

5. Assure that cost data is complete and includes all related costs under its contract, but excludes: Architect's redesign.
- C. Substitutions will not be considered if:
1. Substitutions of materials or work procedure which affect the health, safety, or welfare of the public must have prior approval of the DSA field representative. Where additional DSA review is required for substitution of items beyond standard industry.
  2. In the event the Contractor requests changes or revisions requiring drawings or services of the Architect or his consultants.
  3. Items submitted which require DSA approval.

*DO NOT FAX THIS FORM*

Date \_\_\_\_\_

SR NO. \_\_\_\_\_

**SUBSTITUTION REQUEST (SR)**

Substitution request for

---

in lieu of \_\_\_\_\_

Reference specification section(s):

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Drawing and detail references:

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Attached hereto are the following:

- Manufacturer's data and test reports annotated to indicate compliance with salient specification requirements and that proposed substitute is equal to or superior to the specified product.
- Drawings and details indicating proposed changes from contract drawings.
- Manufacturer's specifications and samples, annotated to indicate exactly all functions, options, and systems proposed in this S R.

Contractor certifies the following:

- That the proposed substitute is equal to or superior to, the specified product or system, in all significant respects, and that all salient changes from the contract documents are clearly indicated in the data attached.
- Additional work necessitated by the use of this product or process in lieu of specified product will be performed by the contractor.
- Warranty provisions required for the specified product will be equal or better if this S R is accepted.
- The product proposed by this SR will fit the space allowed for the original product, will be operative with the utility services and rough-in provided, and is suitable for attachment, anchorage, and surface preparation as originally intended, or will be modified as indicated on attached data.

Requested by \_\_\_\_\_

Architects recommendation

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## **SUBSTITUTION REQUEST INSTRUCTIONS**

1. Substitution requests must be submitted by Contractor. Requests from subcontractors or material suppliers will not be accepted.
2. Incomplete requests will not be reviewed, and will be rejected because of incompleteness. Requests rejected for this reason may not be resubmitted.
3. Data to substantiate equivalence must include the following, as applicable for each type of product:
  - a. Complete certified test reports, clearly annotated to show equivalence or superiority over the specified product.
  - b. Manufacturer's specifications, clearly annotated to indicate equivalences to and differences from, the specified product.
  - c. Drawing details, clearly indicating changes in utility rough-in, anchorage details, clearances, and methods of connection to adjoining surfaces.
  - d. Manufacturer's warranty, including a statement that no restrictions or conditions exist which would modify the warranty, except as enumerated in the data submitted.
  - e. Samples indicating colors, textures, patterns and other finish criteria.
4. Fill out the form completely and check boxes for which supplementary information is attached.
5. Four sets of the form shall be submitted. Attach to each copy one set of all supplementary data, in the order indicated above.
6. Send the submittal by mail or delivery service to the Architect.

*[End of Section]*



**SECTION 01705  
EXECUTION REQUIREMENTS**

**PART 1 - GENERAL**

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Special Conditions and other Division 1 specifications, apply to this section.

1.02 SUMMARY

- A. This section includes general procedural requirements governing execution of the work including, but not limited to, the following:
  - 1. Construction Layout
  - 2. Field Engineering and Surveying
  - 3. General Installation of Products
  - 4. Coordination of District-Installed Products
  - 5. Progress Cleaning
  - 6. Starting and Adjusting
  - 7. Protection of Installed Construction
  - 8. Correction of the work

1.03 SUBMITTALS

- A. Qualification Data: For land surveyor to demonstrate their capabilities and experience. Include lists of complete projects with project names and addresses, names and addresses of architects and Districts, and other information specified.
- B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility licensed to accept hazardous materials for hazardous waste disposal.
- D. Certified Surveys: Submit two copies signed by land surveyor.
- E. Final Property Survey: Submit ten copies showing the work performed and record survey data.
- F. Project Record Documents: Furnish a record of work performed and record survey data as specified in Sections 01705, 01720, 01730 and 01780.

## 1.04 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Engineer: Engage a Professional Engineer of the discipline required, registered in the State of California to perform required engineering services.

## **PART 2 - PRODUCTS - Not Used**

## **PART 3 - EXECUTION**

### 3.01 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the work.
  - 1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the work.
  - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
  - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions with installer or applicator present where indicated for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Written Report: Where a written report listing conditions detrimental to performance of the work is required by other Sections, include the following:
    - a. Description of the work.
    - b. List of detrimental conditions, including substrates.
    - c. List of unacceptable installation tolerances.
    - d. Recommended corrections.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the work indicates acceptance of surfaces and conditions.

### 3.02 PREPARATION

- A. Existing Utility Information: Furnish information to Architect that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by District or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  1. Notify Architect, District and Construction Manager not less than two days in advance of proposed utility interruptions.
  2. Do not proceed with utility interruptions without Director of Facilities, maintenance & Operation's written permission.
  3. Planned water outages shall be coordinated with the Director of Facilities, maintenance & Operation a minimum of one week prior to shut down.
- C. Field Measurements: Take field measurements as required to fit the work properly. Recheck measurements before installing each project. Where portions of the work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the work.
- D. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on drawings.
- E. Review of Contract Documents and Field Conditions. Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

### 3.03 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the work, verify layout information shown on Drawings in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect and District promptly.
- B. General: Engage a land surveyor to lay out the work using accepted surveying practices.
  - 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
  - 2. Establish dimensions within tolerances indicated. Do not scale drawings to obtain required dimensions.
  - 3. Inform installers of lines and levels to which they must comply.
  - 4. Check the location, level and plumb, of every major element as the work progresses.
  - 5. Notify Architect and District's Representative when deviations from required lines and levels exceed allowable tolerances.
  - 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect and District.

### 3.04 FIELD ENGINEERING

- A. Identification: District will identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the work. Preserve and protect permanent benchmarks and control points during construction operations.
  - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.

2. Replace list or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations with horizontal and vertical data on Project Record Documents.
  2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the work.
  3. Remove temporary reference points when no longer needed. Restore marked construction to its original conditions.
- D. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and site work.
- E. Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.
1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.
  2. Recording: At substantial completion, have the final property survey recorded by or with authorities having jurisdiction as the official "property survey".

### 3.05 INSTALLATION

- A. General: Locate the work and components of the work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
  2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
  4. Maintain minimum headroom clearance of 8 feet (2.4 m) in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instruction and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until final project acceptance.

- D. Conduct construction operations so no part of the work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the work.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
  - 2. Allow for building movement, including thermal expansion and contraction.
- G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fill exposed connections together to form hairline joints.
- H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

### 3.06 DISTRICT-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for District's construction forces.
- B. Coordination: Coordinate construction and operations of the work with work performed by District's construction forces.
  - 1. Construction Schedule: Inform District of Contractor's preferred construction schedule for District's portion of the work. Adjust construction schedule based on a mutually agreeable timetable. Notify District if changes to schedule are required due to differences in actual construction progress.
  - 2. Pre-installation Conferences: Include District's construction forces at pre-installation conferences covering portions of the work that are to receive District's work. Attend pre-installation conferences conducted by District's construction forces if portions of the work depend on District's construction

### 3.07 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
  - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2. Do not hold materials more than seven days during normal weather or three days if the temperature is expected to rise above 80° F (27° C).
  - 3.



Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Final project Acceptance..
- G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.
  - 1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.
- H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection
- J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### 3.08 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements".

### 3.09 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed work is without damage or deterioration at time of Final Project Acceptance.
- B. Comply with manufacturer's written instruction for temperature and relative humidity.

### 3.10 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching".
  - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

*[End of Section]*

## **SECTION 01710 CLEANING**

### **PART 1 - GENERAL**

#### **1.01 SUMMARY**

- A. Provisions of General Conditions, Special Conditions, and Division One apply to this section.
- B. Maintain project site, surrounding areas, and public properties free from accumulations of waste, debris, and rubbish caused by operations.
- C. At completion of work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean sight-exposed surfaces; leave project site clean and ready for occupancy.

#### **1.02 GENERAL**

- A. Conduct cleaning and disposal operation in accordance with legal requirements.
  - 1. Do not dump or bury rubbish and waste materials on project site.
  - 2. Do not dispose of volatile wastes in storm or sanitary drains.
- B. Hazards Control:
  - 1. Store volatile wastes and hazard materials (i.e. paint, oils, etc.) in covered metal containers, and remove from premises daily.
  - 2. Prevent accumulation of wastes which create hazardous conditions.
  - 3. Provide adequate ventilation during use of volatile or noxious substances.

#### **1.03 MATERIALS**

- A. Use only cleaning materials recommended by manufacturer of surface to be cleaned.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

#### **1.04 DURING CONSTRUCTION**

- A. Execute cleaning daily to ensure project site, District's premises, adjacent and public properties are maintained free from accumulations of waste materials, debris and rubbish.
- B. Provide on project site dump containers for collection of waste materials, debris and rubbish.
- C. Remove waste materials, debris and rubbish from District's premises and legally dispose of off District's property.
- D. Vacuum clean interior areas when ready to receive finish painting, and continue vacuum cleaning on an as-needed basis until building is ready for substantial completion or occupancy.

- E. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

#### 1.05 FINAL CLEANING

- A. Employ experienced workers or professional cleaners for final cleaning.
- B. In preparation for substantial completion or occupancy, conduct final inspection of sight-exposed interior and exterior surfaces, and of accessible concealed spaces.
- C. Clean glass and surfaces exposed to view; remove temporary labels, stains and foreign substances.
- D. Repair, patch and touch up marred surfaces to specified finish, and to match adjacent surfaces.
- E. Broom clean paved surfaces.
- F. Polish transparent and glossy surfaces.
- G. Vacuum carpeted and soft surfaces.
- H. Wax and polish resilient floor surfaces.
- I. Wash and polish ceramic surfaces.
- J. Clean machinery and equipment.
- K. Clean plumbing fixtures to a sanitary condition. Use non-corrosive, non-abrasive cleaning materials.
- L. Replace filters of operating equipment.
- M. Clean and polish light fixtures.
- N. Clean and polish hardware and metal surfaces.
- O. Clean walls and ceilings of dust, dirt, stains, hand marks, paint spots, plaster drops, and like defects.
- P. Clean construction site; sweep paved areas, rake clean landscaped surfaces.
- Q. Clean out and flush drains from construction debris, flood test prior to occupancy.
- R. Remove waste and surplus materials, rubbish, and construction facilities from the site. Do not use District's waste removal system or any system belonging to Districts of adjacent properties.
- S. Keep project clean until occupied by the District.
- T. Keep street clean and free of debris at all times.
- U. Maintain SWPPP (Storm Water Pollution Prevention Plan) requirements as prescribed on plans as provided by the District.

**PART 2 – PRODUCTS – Not Used**

**PART 3 – EXECUTION – Not Used**

*[End of Section]*



**SECTION 01720  
CONTRACTOR'S AS-BUILT DOCUMENTS**

**PART 1 - GENERAL**

1.01 DESCRIPTION

- A. Store Contractor's as-built documents and samples in Contractor's field office separate from documents used for construction.
- B. Maintain as-built documents in order and in a clean, dry, legible condition.
- C. Do not use as-built documents for construction.
- D. As-Built documents must be current prior to approval for any Application for Payment. Construction Manager / Project Inspector and Architect will review to verify that documents are current before recommendation of approval of Application for Payment.

1.02 AS-BUILT DOCUMENTS

- A. Contractor is to provide a set of reproducible drawings of the original Contract Documents, which shall be used for recording the "as-built" condition of the work.
- B. As-built drawings: Record the following kinds of information on the as-built 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 wiring 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 as-built 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 Construction Manager.

2. They shall be kept up to date during the entire progress of the work and made available to Construction Manager, Project Inspector and Architect 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 all locations of underground work, points of connection, valves, manholes, catch basins, capped stubouts, invert elevations, etc.
6. 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 space in the building near which the work was installed. Project Manager'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.

### 1.03 SUMMARY

A. Provisions of General Conditions, Special Conditions, and Division One apply to this section.

B. Maintain at project site, one copy of:

Complete contract documents (prints and reproducible as noted below)

Specifications and addenda.

Reviewed shop drawings and samples

Modifications: Change orders, and other written amendments to the contract.



#### Field test records

- C. Store record documents in temporary field office, separate from documents used for construction. Replace soiled or illegible documents.
- D. Provide files and racks for storage of documents.
- E. Maintain documents in clean, dry, and legible condition.
- F. Do not use record documents for construction purposes.
- G. Make documents available at all times for inspection by District and Architect.
- H. Drawings shall be same size and format as original construction documents.

#### 1.04 MARKING DEVICES

- A. Provide fine ballpoint colored pens for marking.

#### 1.05 RECORDING

- A. Label each document (on first sheet or page) "RECORD DRAWNGS" in 2 inch high printed letters.
- B. Keep record documents current. Record in concise and neat manner and on a weekly basis all actual revisions to the work.
- C. Do not permanently conceal any work until required information has been recorded.
- D. Drawings. Legibly mark to record actual construction:
  - 1. Measured depths of various elements of foundation in relation to main floor level or survey datum.
  - 2. Measured horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvements. Identify drains and sewers by invert elevation.
  - 3. Measured locations of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of the work. Identify ducts, dampers, valves, access doors and control equipment wiring.
  - 4. Field changes of dimension and detail.
  - 5. Changes made by change orders and other modifications, including all clarification drawings, instruction bulletins, and other construction correspondence.
  - 6. Details not on original drawings.

- E. Specifications and Addenda: Legibly mark and record at each product section description of actual products installed, including the following:
  - 1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment.
  - 2. Authorized product substitutions or alternates utilized.
  - 3. Changes made by change orders and other modifications.
  - 4. Other matters not originally specified.
- F. Shop Drawings and Samples: Maintain as record documents; legibly annotate shop drawings and samples to record changes made after review.
- G. In addition to requirements of this section, comply with supplemental requirements of Divisions 15 and 16.
- H. Record Drawings: The Contractor shall furnish a set of reproducible structural, mechanical, plumbing, electrical and landscape record drawings upon completion of construction, to the requirements noted above. These record drawings shall be in the same size and format as the original drawings.

Structural, mechanical, plumbing, and electrical information shall include circuiting, wiring sizes, equipment/member sizing, etc., drawn in a professional manner similar to that indicated on the construction drawings. The record drawings for each discipline shall represent a complete picture of that entire system, as constructed.

#### 1.06 SUBMITTAL

- A. Obtain Inspector's signed certification that record documents have been fully updated prior to submitting monthly payment requests. Compliance is mandatory before payment will be made.
- B. Submit Inspector's certified documents to Architect with claim for final application for payment. Fully complete record documents are a prerequisite to final payment.
- C. At completion of project, deliver all record documents to Architect. Architect and consultants will review the completed record drawings, and return to the Contractor with required changes annotated.
  - 1. Architect will transfer data from the record drawing prints to the Architect's office originals.
  - 2. Architect to provide to the District upon completion a full set of electronic documents identifying all as-built conditions.
- D. Accompany submittal with transmittal letter containing:

Date

Project title and number

Contractor's name and address

Number and title of each record documents

Certification that each document as submitted is complete and accurate, and signature of Contractor, or his authorized representative.

*[End of Section]*



**SECTION 01730  
OPERATIONS AND MAINTENANCE**

**PART 1 – GENERAL**

1.01 SUMMARY

Division 1 requirements apply to this Section.

1.02 WORK INCLUDED

A. Work includes the following:

1. Compilation of product data and related information appropriate for District's maintenance and operation of products furnished under Contract.
2. Instruction of District's personnel in maintenance of products and in operation of equipment and systems.

1.03 QUALITY ASSURANCE

A. Preparation of data shall be done by Contractor's personnel

1. Trained and experienced in maintenance and operation of described products.
2. Familiar with requirements of this Section.
3. Skilled as a technical writer to the extent required to communicate essential data.
4. Skilled as a draftsman, competent to prepare required drawings.

1.04 SUBMITTALS

- A. Unless otherwise directed, submit three copies of each manual, not less than 30 days prior to substantial completion, compiled in accordance with the provisions of this Section. Make submittals directly to the Architect. Develop and include a Master M&O Closeout Submittal Log using the CSI Division System.
- B. Should the Architect's review indicate required changes in the manual, promptly make such changes and submit three revised copies of the entire manual to the Architect.
- C. All Submittal documentation shall be complete per Contract Document requirements and using the SCI Division System, piece meal documentation submittal will be rejected (i.e. M&O Submittals for Division 15 shall be submitted complete all at once –no piece meal

submitting allowed, etc.). Each individual submittal (within a Division) shall include a copy of the Master M&O Closeout Submittal Log and a copy of the Transmittal Letter.

**PART 2 – PRODUCTS**

**2.01 INSTRUCTION MANUALS**

A. Prepare data in form of an instructional manual for use by District’s personnel.

B. Format

- Size: 8 ½” X 11”
- Paper: White bond, at least 20 lb. weight
- Text: Neatly typewritten, printed and legible, or manufacturer’s printed data.
- Drawings: 11 inches in height preferable; bind in with text, foldout acceptable; larger drawings acceptable, but with fold to fit within the manual and provide a pocket inside rear cover or bind in with the text.
- Flysheets: Separate each portion of the manual with neatly prepared fly sheets describing contents of the ensuing portion. Provide indexed tabs.
- Binding: Use heavy-duty plastic or fiberboard covers with binding mechanism concealed inside the manual; three-ring binders are acceptable; all binding shall be subject to the Architect’s acceptance.
- Measurements: Provide all measurements in U.S. standard units such as inches and pounds.

C. Covers

Provide front and back covers for each manual, using 3 ring binders and tabs-with-title(s) and or numbers, made of durable material and with the following information visible on or through the front cover:

OPERATIONS AND MAINTENANCE INSTRUCTIONS  
 NAME OF PROJECT  
 (-----Equipment or System-----)  
 Manual accepted by:

\_\_\_\_\_

Architect Date

Wet Stamp shall be shown on the Front Page of each M&O Submittal Section. Wet Stamp shall contain information per CSI Division and submittal number on each submittal with the minimum information as follow: CSI Division Number, Submittal number, Revision number (if any), date, Contractor’s name, and initials of the person submitting the document.

## **PART 3 – EXECUTION**

### **3.01 CONTENT OF MANUAL**

- A. Neatly typewritten table of contents for each volume, arranged in systematic order.
  - 1. Contractor, name of responsible principal, address, and telephone number.
  - 2. A list of each product required to be included, indexed to content of the volume.
  - 3. List with each product the name, address, and telephone number of:
    - a. Subcontractor and/or installer
    - b. Maintenance contractor, as appropriate
    - c. Identify the area of responsibility of each
    - d. Local source of supply for parts and replacement
  - 4. Identify each product by product name and other identifying symbols as set forth in the contract documents.

#### **B. Product Data**

- 1. Include only those sheets which are pertinent to the specific product.
- 2. Annotate each sheet to:
  - a. Clearly identify specific product or part installed.
  - b. Clearly identify data applicable to installation.
  - c. Delete references to inappropriate information.

#### **C. Drawings**

- 1. Supplement product data with drawings as necessary to clearly illustrate.
  - a. Relations of component part of equipment and systems.
  - b. Control and flow diagrams.
- 2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.
- 3. Project record drawings shall not be used as maintenance drawings.

#### **D. Instructions**

Written text as required to supplement product data for the particular installations

1. Organize in consistent format under separate headings for different procedures.
2. Complete instructions regarding operation and maintenance of all equipment involved including lubrication, disassembly, and reassembly.
3. Complete nomenclature for all parts of equipment.
4. Complete nomenclature and part number of replacement parts, name and address of nearest vendor, and other data pertinent to procurement procedures.

### 3.02 MANUAL FOR MATERIALS AND FINISHES

#### A. Instructions for care and maintenance.

1. Manufacturer's recommendations for types of cleaning agents and methods.
2. Caution against cleaning agents and methods which are detrimental to the product.
3. Recommended schedule for cleaning and maintenance.

### 3.03 MANUAL FOR EQUIPMENT AND SYSTEMS

#### A. Content for each unit of equipment and system, as appropriate

1. Description of unit and component parts.
  - a. Function, normal operating characteristics, and limiting conditions.
  - b. Performance curves, engineering data and tests.
  - c. Complete nomenclature and serial number of replacement parts.
2. Operating procedures
  - a. Start-up, shut down, break-in, routine and normal operating instructions.
  - b. Regulation control, stopping shut-down and emergency instructions.
  - c. Summer and winter operating instructions.
  - d. Special operating instruction.
3. Maintenance Procedures
  - a. Routine operations
  - b. Guide to trouble shooting
  - c. Alignment, adjusting and checking
4. Servicing and lubrication schedule. List of lubricants required.



5. Manufacturer's printed operating and maintenance instructions.
  6. Description of sequence of operation by control manufacturer.
  7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
    - a. Predicted life of parts subject to wear.
    - b. Items recommended to be stocked as spare parts.
  8. As installed control diagrams by manufacturer of controls.
  9. Each Contractor's coordination Drawings. As-built color coded piping diagrams.
  10. Charts of valve tag numbers with the location and function of each valve.
  11. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
  12. Other data as required under pertinent sections of this specification.
- B. Content for each Electronic System as appropriate.
1. Description of system and component parts.
    - a. Function, normal operating characteristics, and limiting conditions.
    - b. Performance curves, engineering data, and tests.
    - c. Complete nomenclature and serial number of replaceable parts.
  2. Circuit directories of panel boards.
    - a. Electrical service
    - b. Controls
    - c. Communications
  3. As-built color coded wiring diagrams
  4. Operating procedures
    - a. Routine and normal operating instructions
    - b. Sequences required
    - c. Special operating instructions
  5. Maintenance procedures
    - a. Routine operations

- b. Guide – trouble-shooting
  - c. Disassembly, repair and reassembly
  - d. Adjustments and checking
- 6. Manufacturer’s printed operating and maintenance instructions
- 7. List of original manufacturer’s spare parts, manufacturer’s current prices, and recommended quantities to be maintained in storage.
- C. Prepare and include additional data when the need for such data become apparent during instruction of District personnel.

### 3.04 INSTRUCTION OF DISTRICT PERSONNEL

- A. Prior to final inspection or acceptance, fully instruct District’s designated operating and maintenance personnel in operation, adjustment, and maintenance of products, equipment and systems.
  - 1. Provide services of factory trained instructors from the manufacturer of each major item equipment or system.
- B. Operation and maintenance manual shall constitute the basis of instruction.
  - 1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.
    - b. Where further instruction or additional instruction is required to instruct the District designated personnel, the Contractor shall provide such additional instruction to include service of factory trained instructors. The cost for additional instruction will be reviewed on each individual basis by the Architect and District.

*[End of Section]*

**SECTION 01780  
CLOSEOUT SUBMITTALS**

**PART 1 - GENERAL**

**1.01 DESCRIPTION**

- A. This Section describes the requirements for the following items of the Contract Closeout:
  - 1. Project record documents.
  - 2. Operating and maintenance data.
  - 3. Instructions of District's personnel.
  - 4. Service and maintenance contracts.
  - 5. Preparation for final inspection.
  - 6. Damage and restoration.
  - 7. Remedial work.
- B. Comply with the requirements of the General Conditions and Supplementary Conditions, and the individual Specification Sections for administrative procedures for closing out the work.

**1.02 PROJECT RECORD DOCUMENTS**

- A. Maintenance of Documents and Samples:
  - 1. Store Project documents and samples in field office apart from documents used for construction.
  - 2. Maintain Project documents in a clean, dry, legible condition and in good order.
  - 3. Do not use Project record documents for construction.
- B. Recording:
  - 1. Record information carefully and neatly, with felt tip pens, in color code designated, and in the manner approved in advance by the Architect.
  - 2. Label each document "Project Record" in large, neat, printed letters.
- C. Record Drawings:
  - 1. Record the following kinds of information on black-line or blue-line prints:
    - a. Changes made by Change Orders and other modifications described in the General Conditions.

- b. Locations of work buried under or outside the building, such as plumbing and electrical lines and conduits.
- c. Locations of work concealed inside the building whose general location is changed from that shown on the Contract Documents.
- d. Locations of items, not necessarily concealed, which have been changed, with the Architect's prior acceptance, from the locations indicated on the Contract Documents.
- e. Locations of significant items such as main power disconnect, main water and gas shutoffs, motor disconnects, filters, controls, isolating valves and the like shall be highlighted on the record drawings.
- f. In addition to the previously specified requirements for record drawings:
  - 1) Keep up to date during the entire progress of the work, and make available to the Owner's Representative.
  - 2) Furnish additional drawings necessary for clarification.
  - 3) Record deviations from the sizes, locations, and other features of installations shown in the Contract Documents.
  - 4) Establish locations of underground work by dimensions to column lines or walls, locating turns, and by referenced centerline or invert elevations and rates of fall.
  - 5) Give sufficient information to locate work concealed in the Building.
  - 6) Drawing to Scale:
    - a) Locate main runs of piping, conduit, ductwork, and similar items by dimensions.
    - b) Locate other items either by dimensions or in relation to spaces within the building.

- 2. Furnish reproducible record drawings, made from final Shop Drawings, updated to show actual conditions, for specified work.

D. "As-Built" Drawings:

- 1. At time of acceptance of the work and prior to final payment, using the record drawings (redline drawings) for reference, Contractor to prepare "As-Built" drawings on reproducible prints furnished by the Architect.
- 2. Employ a professional to prepare the "As-Built" drawings from the record drawings; record information in ink.

- E. Specifications and Addenda:
  - 1. Mark each Specification Section to record:
    - a. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment incorporated in the work.
    - b. Changes made by Change Order and other modifications described in the General Conditions.
- F. Large Scale Layout Drawings:
  - 1. The preparation of large scale detailed layout drawings may be required for the work of Divisions 15 and 16 of the Specifications. These layout drawings are not Shop Drawings as defined by the General Conditions, but, together with Shop Drawings or layout drawings of affected Sections, are used to check, coordinate, and integrate the work of the various Sections.
  - 2. If furnished, include the layout drawings as part of the Project record documents.
- G. Record Construction Schedule: Using the latest Progress Schedule required by Section 01330 as a reference, submit a Record Construction Schedule showing the actual dates and duration of construction activities.
- H. Sign and date the completed Project record documents; deliver to the Architect who will deliver to the Owner's Representative after final acceptance of the work.

### 1.03 PRODUCT DATA

- A. Furnish three copies of manufacturers' product data, specifications, installation instructions, and maintenance instructions for products incorporated in the work; information specified herein shall be for products in addition to equipment items requiring operating and maintenance data specified elsewhere in this Section. All product data pertaining to an item shall be assembled together.
- B. Sign and date the completed product data, and submit to the Architect, who will deliver them to the Owner's Representative.
- C. Partial submittals will be rejected. These submittals shall be compiled in three ring binders with proper tab indicating title, category and subcategory (as deemed pertinent). Include a Transmittal Letter and A Closeout Log on each Closeout Submittal with proper ID number, per CSI Specification number.

### 1.04 OPERATION TESTS

- A. Conduct operational tests as required to demonstrate that all systems have been completed and are in compliance with all requirements.
- B. Furnish a written record of test results using recording type instruments where applicable and as directed.

## 1.05 OPERATING AND MAINTENANCE DATA

- A. General: Where maintenance manuals, record data, and operating instructions are specified, assemble in three ring, plastic binders sized for 8-1/2-inch x 11-inch sheets; include the following:
  - 1. Identification on or readable through the front cover, containing the Project name and address and the general subject matter in the manual.
  - 2. Typewritten index near the front of the manual indicating locations of emergency data for equipment included in the manual.
  - 3. Instructions regarding operation and maintenance of the equipment included in the manual.
  - 4. Replaceable parts, part numbers, cost, and name and address of nearest parts distributor.
  - 5. Copy of each warranty and service contract issued for the equipment included in the manual.
  - 6. Include additional data required for the Owner's operation and maintenance.
- B. Catalog Data: Where contents of manuals include manufacturers' catalog pages, indicate the items included in the Project and delete data that is not applicable.
- C. Shop Drawings: Furnish one set of reviewed Shop Drawings showing changes made during construction.
- D. Number of Copies Required:
  - 1. Submit manuals in the quantity required to be returned, plus the following to be retained by the Owner's Representative:
    - a. Four copies of Mechanical and Electrical Manuals.
    - b. Two copies of other manuals.
    - c. Partial closeout submittals will be rejected.

## 1.06 INSTRUCTION OF THE OWNER'S PERSONNEL

- A. Where specified, furnish qualified personnel for on the job instruction of the Owner's operating and maintenance personnel.
- B. Where possible, furnish instruction, including special start-ups and running time, prior to occupancy of the building, including special start-ups and running time, at no additional expense to the Owner.
- C. Hours of Training:
  - 1. Where a designated number of hours of training are stipulated for training Owner's personnel in either operation or maintenance of building systems, the designated time allotted for training shall be for time students are present.

Instruction transportation time shall be in addition to the allotted time.

2. Where hours of training is not stipulated, the minimum duration of training shall be as required for the instructor to demonstrate both proper operation and maintenance for each building system, for which instruction is specified.
- D. Location of Training: Conduct all training at the Project.
  - E. Schedule of Training: Conduct training during normal business hours. Schedule date and time of training at the convenience of the Owner. Training shall be completed within 30-days of the Date of Substantial Completion.

#### 1.07 SERVICE AND MAINTENANCE CONTRACTS

- A. Compile, review, and submit specified service and maintenance contracts as specified for warranties and bonds.

#### 1.08 PREPARATION FOR FINAL INSPECTION

- A. Perform final cleaning as specified in Section 01740.
- B. Assemble warranties, service and maintenance contracts, operating and maintenance instructions, and other items as specified, and submit to the Architect.
- C. Remove temporary tapes, wrapping, coatings, paper labels, and other similar items. Dust, mop, wash, or wipe exposed and semi-exposed surfaces.
- D. At the Contractor's request, the Architect and Owner's Representative will attend a pre-final detailed Project review, to allow the Contractor to gather the majority of punch list items while the subcontractors are still on the Project. Provide a typewritten list of all items remaining to be completed or corrected; list by room number and item number. Segregate plumbing, HVAC, and electrical on separate lists.
- E. At the Contractor's request, the Architect and Owner's Representative will make a final Project review when the items in the pre-final punch list have been completed and after final cleanup, operation tests and the like have been performed.
- F. When the Architect and Owner's Representative determines that the Project is substantially complete and that final punch list items are completed, a final Project Inspection Report shall be executed.
- G. Upon execution of the Final Project Inspection Report, record and pay for Notice of Completion and furnish copies to the Owner's Representative and the Architect.

#### 1.09 RESTORATION OF DAMAGED WORK

- A. Restore or replace damaged materials and finishes caused by movement of equipment or other operations as specified or directed by the Architect, at no additional cost to the Owner.

- B. Restoration shall be equal to the original work, and finishes shall match the appearance of existing adjacent work.

#### 1.10 REMEDIAL WORK

- A. Replace work due to faulty workmanship or materials at no additional cost to the Owner.
- B. Coordinate work with the Owner's Representative and perform at such time and manner to cause minimal interruption and inconvenience to the Owner's operations.

#### 1.11 EXTRA MATERIALS

- A. Where specified, provide extra materials in the quantities and manner specified.
- B. Delivery and certification of extra materials shall be prerequisite to Substantial Completion.

### **PART 2 - PRODUCTS**

Not Used.

### **PART 3 - EXECUTION**

Not Used.

*[End of Section]*



**SECTION 01788  
PRODUCT WARRANTIES AND BONDS**

**PART 1 – GENERAL**

**1.01 DESCRIPTION**

- A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.
- B. Refer to the General conditions for terms of the Contractor's special warranty of workmanship and materials.
- C. Specific requirements for warranties for the work and products and installations that are specified to be warranted are included in the individual Sections of Divisions 2 through 16.
- D. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- E. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the continuous warranty on the work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

**1.02 DEFINITIONS**

- A. Standard Product Warranties are pre-printed written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the District.

**1.03 WARRANTY REQUIREMENTS**

- A. Related Damages and Losses: When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.
- B. Reinstatement of Warranty: When work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the continuous warranty by written endorsement. The reinstated warranty shall be equal to the original warranty.
- C. Replacement Cost: Upon determination that work covered by a continuous warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of

replacing or rebuilding defective work regardless of whether the District has benefited from use of the work through a portion of its anticipated useful service life.

- D. District's Recourse: Written warranties made to the District are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the District can enforce such other duties, obligations, rights, or remedies.
  - 1. Rejection of Warranties: The District reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- E. The District reserves the right to refuse to accept work for the Project where a special warranty, certification, or similar commitment is required on such work or part of the work, until evidence is presented that entities required to countersign such commitments are willing to do so.

#### 1.05 SUBMITTALS

- A. Submit written warranties to the Architect prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Final Acceptance by the District for the work, or a designated portion of the work, submit written warranties upon request of the Architect.
  - 1. When a designated portion of the work is completed and occupied or used by the District, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within fifteen days of completion of that designated portion of the work.
- B. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the District's Representative for approval prior to final execution.
- C. Form of Submittal: At Substantial Completion compile three copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual. Use warranty form in Section 01789.
  - 1. Partial warranty documents submittals will be rejected. Include a Transmittal Letter and A Closeout Log on each warranty documents submittals with proper ID number, per CSI Specification number.

- D. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-inch by 11-inch paper.
1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name, of the product, and the name, address and telephone number of the installer.
  2. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS", the Project title or name, and the name of the Contractor.
  3. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

## **PART 2 - PRODUCTS**

Not Used.

## **PART 3 – EXECUTION**

Not used.

*[End of Section]*



**SECTION 01789  
FORM OF WARRANTY**

WARRANTY FOR \_\_\_\_\_.

We hereby warrant that all materials and equipment for the \_\_\_\_\_ that we have provided at \_\_\_\_\_ are new, unless otherwise specified, and that all work is of good quality, free from faults and defects and in conformance with the Contract Documents. Work not conforming to these requirements, including "equals" not properly approved and authorized, will be considered defective.

If within one continuous year after the Date of District acceptance of the work or within one continuous year after acceptance by the District of designated equipment, or within such longer period of time as may be prescribed by law or by the terms of any applicable special warranty required by the Contract Documents, a portion of the work is found to be defective or not in accordance with the Contract Documents, we agree to correct it promptly after receipt of a written notice from the District to do so; unless the District has previously issued a written acceptance of such condition. This obligation shall survive termination of the Contract.

If we fail to commence compliance with the above paragraph within 7 calendar days after receipt of written notice from the District to do so, or fail to pursue such compliance with diligence we, jointly and severally, do hereby authorize the District to have said defective work and damages repaired or replaced and made good at our sole expense, including compensation for the District's consultants' additional services made necessary by such default, and we will honor and pay the costs and charges for it together with interest at the maximum rate then permitted by governing obligations, and if the District brings action to enforce this warranty, we agree to pay the District's reasonable attorney's fees incurred in connection therewith. This warranty is for \_ years.

Signed \_\_\_\_\_  
(subcontractor's name, address, license number, and date of signing)

Countersigned \_\_\_\_\_  
(Contractor's name, address, license number, and date of signing)

*[End of Section]*



## 1.00 GENERAL

### 1.01 SUMMARY

- A. This Section requires the selective removal and subsequent off-site disposal of the following:
1. Removal and disposal of all abandoned pipe and conduit except for pipe or conduit indicated specifically on plans for abandonment in place.
  2. Demolition of asphalt concrete and pavements as indicated on the drawings to straight, neatly sawcut surface.
  3. Trees as indicated on plans, completed including roots.
  4. All other removals which may or may not be shown on plans as required for the project construction.
  5. Relocating existing utilities.

### 1.02 SITE CONDITIONS

- A. Protections: Contractor shall provide temporary barricades and other forms of protection to protect general public from injury due to demolition work.
- B. Traffic: Conduct demolition operations and debris removal to ensure minimum interference with roads, streets, walks, bikepaths, and other adjacent occupied or used facilities. Access must be coordinated with the District.
- C. Utility Services: Maintain all existing utilities to remain in service and protect them against damage during demolition operations.
- D. Environmental Controls: Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration. Comply with governing regulations and County Air Pollution Control District pertaining to environmental protection. Do not use water when it may create hazardous or objectionable conditions such as flooding and pollution.

### 1.03 REFERENCES

- A. Geotechnical Study prepared by Geotechniques dated February, 2011, Project No. 1003.026.

## 2.00 PRODUCTS (NOT APPLICABLE)

## 3.00 EXECUTION

### 3.01 DEMOLITION

- A. General: Perform demolition work in a systematic manner. Use such methods as required to complete work indicated on drawings in accordance with governing regulations.
- B. Provide services for effective air and water pollution controls as required by County Air Pollution Control District regulations. Regulating the classic.

- C. Prior to commencing grading operations, soil containing debris, organics, pavement, or other unsuitable materials, shall be stripped from the foundation and pavement areas. Entire root mat below upper few to several inches of ground surface shall be removed entirely and wasted. Demolition areas shall be cleared of old foundations, slabs, abandoned utilities, tree roots, and soil disturbed during the demolition process. Depressions or disturbed areas left from the removal of such material shall be replaced with compacted fill.
- D. Concrete sidewalks will be removed to the nearest construction or expansion joint to the limits of removal as shown on the plans. Exact locations will be determined in the field by the District's Representative.

### 3.02 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove from Project site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose of off site.
- B. If hazardous materials are encountered during demolition operations, contact District's Representative.
- C. Burning of removed materials is not permitted on project site.

### 3.03 HAZARDOUS MATERIALS

- A. Except as otherwise specified, in the event Contractor encounters on the Project site material reasonably believed to be asbestos, polychlorinated biphenyl (PCB), or other hazardous materials which have not been rendered harmless, Contractor shall immediately stop Work in the area affected and report the condition to the District's Representative in writing. The Work in the affected area shall not thereafter be resumed except by written agreement of the Contractor if in fact the material is asbestos, PCB, or other hazardous materials and has not been rendered harmless. The Work in the affected area shall be resumed in the absence of asbestos, PCB, or other hazardous materials, or when such materials have been rendered harmless.

### 3.04 CLEANUP AND REPAIR

- A. General: Upon completion of demolition work, remove tools, equipment and demolished materials from site.
  - 1. Repair demolition performed in excess of that required. Return elements of construction and surfaces to existing condition prior to start of operations. Repair adjacent construction or surfaces soiled or damaged by demolition work.

END OF SECTION



1.00 GENERAL1.01 STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

- A. This Section includes the contract or requirements for implementation and maintenance of the Storm Water Pollution Prevention Plan (SWPPP), WDID No. XXXXXX, prepared by.
1. The contractor shall continue to comply with the administrative requirements related to the SWPPP during and following completion of construction.
  2. Any and all fines resulting from the negligence of the Contractor to properly implement the measures specified in the SWPPP and/or by the Qualified SWPPP Practitioner shall be paid for by the Contractor.

2.00 PRODUCTS (NOT USED)3.00 EXECUTION3.01 STORM WATER POLLUTION PREVENTION MEASURES

- A. All storm water pollution prevention measures shall be in accordance with the SWPPP. In the event circumstances during the course of construction require changes to the original SWPPP, a revised plan shall be promptly submitted to the Qualified SWPPP Developer in each instance. No responsibility shall accrue to the District as a result of the plan or as a result of knowledge of the plan. All work installed by the contractor in connection with the SWPPP but not specified to become a permanent part of the project shall be removed and the site restored to its original condition prior to completion of construction or when directed by the District's Representative.

END OF SECTION



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## 1.00 GENERAL

### 1.01 SUMMARY

- A. Section includes: Excavation, Compaction and Fill.

### 1.02 QUALITY ASSURANCE

- A. Codes and Standards: Perform earthwork in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Standard Specifications for Public Works Construction (SSPWC), 2009.
- C. CAL/OSHA Construction Safety Order Requirements.
- D. Soil Testing Service
1. The District will engage a soil testing service to include testing soil materials proposed for use in the Work and for quality control testing during grading operations.
  2. Samples of materials shall be furnished to the testing service by the Contractor at least one week before their anticipated use.
  3. Work of this Section includes smoothing out areas for density tests and otherwise facilitate testing work, as directed.

### 1.03 REFERENCES

- A. Standard Specifications for Public Works Construction (SSPWC), 2009.
- B. Geotechnical Study prepared by Geotechniques dated February, 2011, Project No. 1003.026.

### 1.04 PROJECT CONDITIONS

- A. The Contractor shall visit the site and familiarize himself with existing site conditions.
- B. Additional test borings and other exploratory operations may be made by the Contractor at no cost or liability to the District.
- C. Existing Utilities: Where uncharted or incorrectly charted piping or other utilities are encountered during excavation, contact the District Representative immediately for directions. Cooperate with the District Representative in keeping respective services and facilities in operation. Repair damaged utilities to the satisfaction of the District Representative at no cost to the District.
- D. Protect existing underground utilities and improvements from settlement and lateral movement during and after excavating.
- E. Protection of Subgrade: Do not allow equipment to pump, rut, or disturb subgrade, stripped areas, or other areas prepared for Project.

- F. Contractor shall implement measures to prevent soil erosion, and where possible, sediment shall be retained onsite.
- G. Contractor shall implement all necessary recommendations contained in the Geotechnical Study.

## 2.00 PRODUCTS (Not Applicable)

## 3.00 EXECUTION

### 3.01 SITE PREPARATION

#### A. General:

1. Remove vegetation including entire root mat within upper several inches and dispose offsite prior to start of excavating. Remove improvements or obstructions interfering with installation of new construction. Transport and legally dispose of off site. Removal includes stumps and roots. Care shall be taken so as not to scar any area of the tree's bark. Contractor shall utilize the best construction method to minimize the erosive effect from the removal of site vegetation.
2. Carefully and cleanly cut roots and branches of trees indicated to be left standing, where such roots and branches obstruct new construction. Paint cuts over one inch in size with tree pruning compound.
3. In order to protect from sediment transfer or contamination from urban run-off during construction, the contractor shall implement all BMPs specified in the SWPPP. In addition, the following grading and erosion control practices shall be observed:
4. If grading occurs during the rainy season (November through April), sediment traps, barriers, covers and other methods specified in the SWPPP shall be used to reduce erosion and sedimentation.
5. Excavated materials shall not be deposited or stored where the material can be washed away by high water or storm run-off.
6. Grading operations on site shall be conducted so as to prevent damaging effects of sediment production and dust on the site and on adjoining properties.
7. When vegetation has to be removed on site, the methods shall be one that minimizes the erosive effects from the removal.
8. Exposure of soil to erosion by removing vegetation shall be limited to the area required for construction operations. The construction area shall be fenced to define the project.
9. BMPs identified in the SWPPP regarding temporary mulching, seeding, or other suitable stabilization shall be implemented to protect areas during construction or other land disturbance activities on site.
10. Topsoil, removed from the surface in preparation for grading and construction activities on Campus is to be stored on or near the site and protected from erosion while grading operations are underway, provided that such storage may not be located where it would cause suffocation of root systems of trees to be preserved. After completion of such grading, topsoil is to be restored to exposed cut and fill embankments of building pads so as to provide a suitable base of seeding and planting.

11. Any sediment basins, sediment traps, or similar control measures specified in the SWPPP shall be installed before extensive clearing and grading operations begin for site development.
12. Water or dust palliatives shall be applied to exposed earth services as necessary to control dust emissions.
13. Revegetation or stabilization of exposed earth surfaces shall take place as soon as possible.

B. Removals:

1. Clear the site of trees, shrubs, and other vegetation, which is indicated to be removed.
2. Completely remove stumps, roots, and other debris to avoid problems with future utilities.
3. Clearing and grubbing shall consist of cutting and removing weeds, followed by stripping and wasting root mat, typically between 4 and 6 inches thick. Removal and wasting organic material consists of offsite disposal.
4. Use only hand methods for grubbing inside the drip line of trees indicated to be left standing.
5. Existing fills, soil containing debris, organics, pavement, or other unsuitable materials shall be excavated and removed prior to commencing grading operations.
6. Demolition areas shall be cleared of old foundations, slabs, abandoned utilities, landscaping, and soils disturbed during the demolition process. Depressions or disturbed areas left from the removal of such material shall be replaced with compacted fill.
7. The limits and depths for removal of existing fill materials shall be evaluated by project soils engineer during grading.
8. Revegetation or stabilization of exposed earth surface shall take place as soon as possible.

C. Removal of Improvements:

1. Remove above-grade and below-grade improvements necessary to permit construction and other work as indicated.
2. Remove from site and legally dispose of off-site, existing fill materials, soil debris, or other unsuitable materials prior to commencing grading operations.

### 3.02 EXCAVATION

A. Excavation for Pavements:

1. Cut surface under pavements to comply with the Geotechnical Study, cross-sections, elevations and grades as shown, within a tolerance of plus or minus 0.04 foot.

B. Excavation for Planting Areas:

1. Conform to cross-sections, elevations and dimensions shown, within a tolerance of plus or minus 0.10 foot.

### 3.03 COMPACTION

A. General:

1. Control soil compaction during construction providing minimum of 95 percent of the maximum dry density, as determined by ASTM D1557, and as recommended in the Geotechnical Study.
2. Processing and Placement of Fill Materials: Onsite or imported fill soil shall be placed and compacted between 0 and +3 percent over optimum moisture content, as specified in the Geotechnical Study. Each layer shall be spread evenly and thoroughly blade-mixed during spreading to provide relative uniformity of material within each layer. Blocky or chunky earth materials shall be broken down to pea-size or finer during processing and prior to application of compactive effort. Where imported soils are placed adjacent to onsite fill material, the soil should be mixed to provide relative uniformity of material within the layer being placed. Processing and placement of fill materials shall be inspected and approved by the District's Testing Laboratory.
3. Fill shall be spread in loose lifts no thicker than about 8 inches prior to being compacted. Fill and backfill materials may need to be placed in thinner lifts to achieve the recommended compaction with the equipment being used. Loose lift thickness shall not exceed 6 inches when using hand-operated compaction equipment.
4. Percentage of Maximum Density Requirements: Compact soil to not less than the percentages of maximum dry density specified in the Geotechnical Study and in accordance with ASTM D1557 method of compaction. However, all fill material shall have a minimum 95% relative compaction.

B. Moisture Control:

1. When moisture content of exposed scarified soil and/or fill material is below that sufficient to achieve recommended compaction, water shall be added to the soil and/or fill. While water is being added, soil shall be bladed and mixed to provide relatively uniform moisture content throughout the material.
2. When moisture content of exposed scarified soil and/or fill material is excessive, material shall be aerated by blading or other methods. Fill placed in pavement areas shall be compacted at near optimum moisture content. Jetting is not permitted for compaction.

3.04 FILL

- A. In all excavations, use satisfactory excavated or borrow material sampled and tested by the District's Testing Laboratory.
- B. Select backfill materials for retaining walls and below-grade walls, and placed within the upper 18 inches of floor slab subgrade shall consist of granular material with the following properties:
  1. Sand equivalent of at least 20,
  2. 100 percent passing the 3-inch sieve,
  3. Expansion index less than 10,
  4. 50 to 100 percent of the material passing the No. 4 sieve, and
  5. At least 15 percent of the material passing the No. 30 sieve.
- C. Onsite or imported fill material shall be free of organics, debris, or rocks larger than 4 inches.

- D. Fill excavations as promptly as Work permits, but not until completion of the following:
  - a. Acceptance by the District Representative of construction below finish grade including, where applicable, waterproofing, damp-proofing, and drainage pipe.
  - b. Examination, testing, approval and recording locations of underground utilities.
  - c. Removal of concrete formwork.
  - d. Removal of shoring, bracing, and backfilling of voids with satisfactory materials.
  - e. Removal of artificial fill, trash and debris.
  - f. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
- E. Protect excavations by methods required to prevent cave-in or loose soil from falling into excavation
- F. Protect excavations by methods required to prevent movements and/or loosening of soils providing lateral or vertical support to existing improvements.
- G. Deepen bottom of over-excavations in building areas to limit fill thickness gradient to less than 20 percent.
- H. Materials loosened or disturbed by installation and removal of shoring shall be compacted to a minimum of 95 percent of the maximum dry density.
- I. Continual dust control, as required by the SWPPP, and in accordance with County Air Pollution Control District's Standards shall be required for the project construction.

### 3.05 GRADING

- A. General: To provide support for building floor slabs, all existing fill and unsuitable natural soils shall be excavated and replaced as properly compacted fill.
- B. Compaction: After grading, compact subgrade surfaces to the depth and percentage of compaction for each area classification. All fill material shall be compacted to a minimum 95% relative compaction.
  - 1. Fill placement and grading operations shall be performed only under the observation of the District's Testing Laboratory.
  - 2. The exterior grades around building areas shall be sloped to drain away from the building to prevent ponding of water adjacent to foundations.
  - 3. Grading operation shall be conducted so as to prevent damaging effects of sediment product and dust on the site and adjoining properties.

### 3.06 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Transport excess excavated material and legally dispose of offsite.

### 3.07 FIELD QUALITY CONTROL

- A. Quality Control Testing During Construction:
1. The District's Testing Laboratory will observe, test and approve excavation bottoms, subgrades and fill layers before further fill placement and construction Work can be performed. The District's Testing Laboratory will determine the frequency of tests. Subgrade: Allow at least one field density test of subgrade to be made for every 2000 sq. ft. of paved area, but in no case less than 3 tests. Fill Placed During Rough Grading of Slope/Building Pad: Allow at least 1 test for every 500 cubic yards of fill placed.
  2. Contractor shall cut testing surface at locations indicated by Testing Laboratory personnel.
  3. Field examination and testing will be performed by the District's Testing Laboratory. The Contractor shall cooperate with such testing and shall give the District Representative advance notice of grading scheduling.
  4. Frequency of Tests for Trenching: Not-to-exceed 18 inches in depth and not-to-exceed 150 foot intervals or as determined by the District's Testing Laboratory.
  5. If in the opinion of the District's Testing Laboratory, based on soil testing reports and observations, subgrades or fills which have been placed are below specified density, provide corrective work as specified at no additional expense to the District.

### 3.08 PROTECTION

- A. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
- B. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, compact to required density and provide other corrective work as specified, with retesting, prior to further construction.
- D. Earth materials and improvements constructed thereon shall be supported laterally and vertically, as needed, to prevent movements and deflections of same. Remediation and repair of loosened materials or movements of improvements shall be at the Contractor's expense.

END OF SECTION



1.00 GENERAL1.01 SUMMARY

- A. Excavating trenches for construction of utilities.
- B. Trench backfill materials.
- C. Backfilling and compacting requirements.

1.02 QUALITY ASSURANCE

- A. Codes and Standards: Perform earthwork in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Standard Specifications for Public Works Construction (SSPWC), 2009.

1.03 REFERENCES

- A. Standard Specifications for Public Works Construction (SSPWC), 2009.
- B. Geotechnical Study prepared by Geotechniques dated February, 2011, Project No. 1003.026.

1.04 SUBMITTALS

- A. Materials source.
- B. Sand equivalent test reports per ASTM D2419.
- C. Certificates.
- D. Drawings for shoring, bracing, sloping, or other provisions for worker protection for any excavation shall conform to the requirements of the CAL/OSHA Construction Safety Orders Requirements.

1.05 EXISTING UTILITIES

- A. Drawings show existing major underground utilities from reference drawings. Prior to excavation, the Contractor shall notify the District Representative to obtain any additional information which may be applicable to the Work.
- B. Protect underground utilities and structures to remain in place from settlement and lateral movement during excavation.
- C. Any incident of a utility being inadvertently damaged by the Contractor shall be immediately shut-off and then be immediately repaired by the Contractor at no cost to the District.
- D. Contractor to pothole all utility connections and crossings to field verify exact

size, location, depth, and material prior to beginning construction and notify the District Representative of any discrepancies.

## 2.00 PRODUCTS

### 2.01 APPROVALS

- A. Imported material shall be approved by the District Representative prior to being brought to the site. Provide a sample of the material in sufficient quantity for the District's Testing Laboratory's use in evaluating the material.

### 2.02 TRENCH BEDDING AND BACKFILL MATERIAL

- A. Bedding and pipe zone materials extending 1 foot above top of pipe shall be sand and have a sand equivalent (SE) of 30 or greater.
- B. Crushed aggregate base per Section 02231, Aggregate Base Course, shall be used for HDPE pipe trench bedding and backfill material, to stabilize yielding or wet trench bottom, or as specified by the pipe manufacturer. Crushed aggregate base shall be wrapped with Mirafi 140N geotextile fabric.
- C. Slurry backfill shall conform to the requirements of SSPWC Sections 201-1 and 201-6. Contractor shall take due precautionary measures to prevent misalignment and/or floating of pipe during backfill operations.
- D. Onsite native soil for trench backfill shall conform to Section 02200, Earthwork, Subsections 3.4 Fill, and SSPWC Section 306-1.3.
- E. Topsoil shall be Class B topsoil in accordance with Section 212-1.1.3 of the SSPWC. Topsoil removed from trenches shall be stockpiled at locations approved by the District Representative.

### 2.03 SOURCE QUALITY CONTROL

- A. Inspection and testing shall be performed by the District's Testing Laboratory.

## 3.00 EXECUTION

### 3.01 PREPARATION

- A. Identify required lines, levels, contours, and datum.

### 3.02 TRENCH EXCAVATION

- A. Organics, including entire root mat, shall be stripped from trench alignment and wasted prior to excavating.
- B. All saw cutting shall be neat, straight cuts and shall conform to SSPWC Section 300-1.3.2. All cuts shall be square unless otherwise specifically noted on plans.
- C. Trench excavation shall conform to the specifications of the Geotechnical Study, SSPWC Section 306-1.1, and the following requirements:
  - 1. The bottom of the trench shall be graded and prepared to provide a firm and uniform bearing throughout the entire length of the pipe barrel.

Suitable excavations shall be made to receive the bell of the pipe and the joint shall not bear upon the bottom of the trench. All adjustments to line and grade shall be made by scraping away or filling in with sand under the body of the pipe and not by wedging or blocking.

2. If the trench is excavated below the required grade, correct any part of the trench excavated below the grade, at no additional cost to the District, per Geotechnical Study Section 4.10.
3. Trench bottom shall be observed by the Geotechnical representative prior to placement of bedding sand. Bedding sand shall have a minimum compacted thickness of 4 inches.
4. Bedding and pipe zone sand shall be moisture-conditioned to optimum moisture content and compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D1557.
5. Minimum trench width shall accommodate size of compaction equipment in pipe shading zone.
6. Place the backfill material over the full width of trench in compacted layers not exceeding 6 inches deep to the established grade with allowance for the pipe base.
7. Trench backfill materials shall be moisture-conditioned to optimum moisture content outside the trench and processed and reduced to to pea-sized consistency. Backfill shall be compacted to a minimum of 95 percent of the maximum dry density.
8. If shoring is required, the trenches shall be shored and braced in accordance with the Trench Construction Safety Orders of the Division of Industrial Safety.
9. When subgrade is encountered that in the opinion of the District Representative is unsuitable for pipe support, the District Representative may order the excavation to be carried to an approved depth below the bottom of the pipe and backfilled with sand or aggregate base, to the lines and grades shown on the drawings and specified by the District Representative.
10. The minimum width of the trench at the top of the pipe zone shall be as necessary to install the pipe and achieve compaction in the shading zone. The utility lines shall be centered in the trench. In the event of (1) actual physical interference between existing crossing subsurface utilities and the proposed utility lines and (2) vertical discrepancy in connecting proposed utility lines to existing utility system, a minimum clearance of 1 foot between the utility line and the crossing, interfering utility shall be provided, unless otherwise indicated on the plans.
11. Where existing utilities or tree roots are to be protected, trench excavation shall be by hand. No mechanical excavating equipment shall be used within 6 inches of any utility or root.
12. Trenching machinery may be used for excavations provided the specified trench width can be maintained.

### 3.03 TRENCH BACKFILL

- A. Pipe bedding and trench backfill materials:
  1. Suitable imported pipe bedding for utilities shall consist of material having a sand equivalent of at least 30.
  2. The sand backfill material shall be placed within the pipe zone that extends from the bottom of the pipe to at least 12 inches above the top of the pipe for the full width of the trench.

3. The horizontal distance between the springline of the pipe and the side walls of the trench shall be such that bedding material can be properly placed and compacted below the haunches of the pipe.
  4. Crushed aggregate base shall be used for HDPE pipe trench bedding and backfill material, or as specified by the pipe manufacturer.
  5. Crushed aggregate base shall be wrapped with Mirafi 140N geotextile fabric.
  6. The horizontal distance between the springline of the HDPE pipe and the side walls of the trench shall be 12 inches minimum.
  7. Mechanical compaction of bedding and pipe zone materials shall be performed and water consolidation (jetting) methods of compaction shall not be permitted.
  8. All fill materials shall be compacted to a minimum 95% relative compaction. Placement, processing, and compaction of bedding and pipe zone materials shall be consistent with Section 02200, Earthwork, Subsections 3.3 Compaction and 3.4 Fill, of these Specifications and SSPWC.
- B. Trench backfill placed above the pipe zone shall consist of suitable onsite or imported soil or cement slurry per plan and trench section. The trench backfill materials shall be compacted to at least 95 percent relative compaction. Mechanical compaction of trench backfill shall be performed and water consolidation (jetting) methods of compaction shall not be permitted. Trench backfill in landscape areas shall be compacted to a minimum of 95 percent relative compaction or per landscape specifications, whichever is more stringent.
- C. Trench backfill shall be moisture conditioned and processed and compacted consistent with Section 02200, Earthwork, Subsections 3.3 Compaction and 3.4 Fill, of these Specifications and SSPWC Section 306-1:
1. During the process of laying pipe in trenches, sufficient material shall be carefully placed and hand tamped about the pipe to hold it firmly to established line and grade. Oversized material, broken rock or shale, if encountered, shall not be used for backfill.
  2. No motor driven mechanical compacting equipment shall be used over pipelines until the backfill has been compacted to 12 inches over the crown of the pipe.
  3. All backfill material shall be deposited in horizontal layers not exceeding the thickness specified in Section 306-1.3.2 of the SSPWC and not exceeding 8 inches in loose thickness. The distribution of materials shall be such that all material following compaction and consolidation will form a homogeneous mass free of voids, pockets, streaks or other imperfections. Backfilling shall be done with earth free from lumps, hardpan, chunks, paving material, organic matter or other deleterious substances.
  4. Jetting of bedding or backfill material to obtain specific moisture content or for compaction shall not be permitted. If encountered, existing fill in the utility excavation shall be excavated and recompacted or removed and replaced with new fill materials per requirements of this section.
  5. Compaction of all backfill material for trenches, pavements or structures, shall be to a minimum of 95 percent of the maximum dry density determined by ASTM D1557.
  6. Appropriate warning detector tape shall be placed over all utilities. Underground detectable warning tape shall be placed over all non-

metallic underground utilities.

7. Prior to final cleanup or resurfacing, the District's Testing Laboratory shall take compaction tests in any backfill area and at any depth, with the Contractor providing equipment and operator to assist in such test. If any such compaction test fails, the Contractor shall correct such failure and pay for any retesting that is required. The District's Testing Laboratory shall take as many tests as he feels is required to receive a satisfactory and acceptable job.

#### 3.04 STOCKPILING

- A. Stockpiling of imported materials or excavated materials shall direct surface water away from approved stockpile site to prevent erosion.
- B. After stockpiles are removed, leave area in a clean and neat condition.

#### 3.05 FIELD QUALITY CONTROL

- A. Inspection and testing shall be performed by the District's Testing Laboratory.
- B. Samples of materials shall be furnished to the testing service by the Contractor at least one week before their anticipated use
- C. Work of this Section includes smoothing out areas for density tests and otherwise facilitate testing work, as directed.

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Perform excavation, fill, backfill and compaction required to conform to the requirements of the Construction Documents and Geotechnical Study for the construction of the parking structure and related appurtenances.
  - 2. Subgrade preparation under structural foundations, elevator pits and slab on grade.
  - 3. Maintenance of excavations, including shoring, sheeting and all other necessary lateral support, as required.
  - 4. Obtain permission, cut off, cap and remove or reroute as required, underground utilities which interfere with proposed construction.
  - 5. Disposal of excess debris, unsuitable fill and surplus materials from site.
  - 6. Import soil, if required.
  - 7. Fine grading as necessary to complete the work.
  - 8. Furnish and install vapor barrier under interior floor slabs of the BI Level Storage, Mechanical Room, Electrical Cart Storage Electrical Room, Communications Room Storage Room and Elevator Mechanical Room.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 02100: Site Clearing
- B. Section 02200: Earthwork
- C. Section 02221: Trench Backfill Compact
- D. Section 02231: Aggregate Base Course
- E. Section 02720: Site Storm Drainage
- F. Section 02900: Landscape
- G. Section 07122: Fluid Applied Waterproofing
- H. Divisions 2, 15 & 16: Excavation and Backfill for Underground Utilities

1.03 WORK NOT INCLUDED

- A. Observation and testing of required earthwork which is provided by the Geotechnical Engineer and paid by District.
- B. Initial site demolition, grubbing and clearing, refer to Section 02100 - Site Clearing.

1.04 REFERENCE STANDARDS

American Society of Testing and Materials (ASTM) Specifications  
ASTM C33 Specification for Concrete Aggregates

- ASTM D448 Classification for Sizes of Aggregate for Road and Bridge Construction.
- ASTM D882 Test Methods for Tensile Properties of Thin Plastic Sheeting
- ASTM D1004 Test Method for Initial Tear Resistance of Plastic Film and Sheeting
- ASTM D1248 Standard Specification for Polyethylene Plastic
- ASTM D1556 Test Method for Density of Soil in Place by the Sand Cone Method
- ASTM D1557 Test Method for Laboratory Compaction Characteristics of Soil
- ASTM D2103 Standard Specification for Polyethylene Film and Sheeting
- ASTM D2167 Test Method for Density and Unit Weight of Soil in Place
- ASTM D2487 Classification of Soils for Engineering Purposes
- ASTM D2922 Test Method for Density of Soil and Soil-Aggregate in Place (Nuclear Method)
- ASTM D3017 Test Method for Water Content of Soil and Rock in Place (Nuclear Method)
- ASTM E96 Test Methods for Vapor Transmission of Materials
- ASTM E154 Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs

- B. Standard Specifications for Public Works Construction (SSPWC), latest edition, as adopted by local jurisdiction
- C. Geotechnical Study "Parking Structure Moorpark College", dated February 2011, by Geotechniques.

1.05 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Provide field density test reports for existing sub-grade and compacted fills in conformance with Sections 01425 – Testing and Inspection.
- C. Sample(s) (at least 50 pounds) of proposed import soil. Refer to requirements hereafter.

1.06 REQUIREMENTS

- A. The scope of work of this section relates to all earthwork operations that are necessary for the construction of the proposed parking structure over a prepared pad and for the construction in conformance with the Geotechnical Study and all supplemental data. This specification manual also contains Section 02200– Earthwork, which applies to all operations and procedures that are to be complied with for appurtenances outside the lines of the parking structure. Conflicts related to overlapping specified requirements shall be brought to the Owner's attention for direction prior to execution. No allowance will be made to the Contractor for issues that could have been resolved.
- B. Prior to performing any excavation, verify acceptance with Dig Alert (800) 227-2600 or Underground- Service Alert (800) 422-4133.
- C. Perform work in compliance with applicable requirements of laws, codes, ordinances and regulations of Federal, State and Municipal authorities having jurisdiction over work.



- D. Site and soil coefficient shall conform to the generalized soil characteristics given in the Geotechnical Investigations Report and Chapter 18(A), Section 1803(A) and conforming to Table 18-I-A of the California Building Code. Grading at a minimum shall conform to Chapter 33(A), Section 3301(A).1.
- E. Prevent surface water and subsurface ground water from entering excavations and ponding on prepared sub-grades and from flooding the project site and surrounding areas. Provide the equipment and procedures to incorporate a dewatering system, as required.
- F. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil bearing water runoff or airborne dust to adjacent properties, walkways, roadways or into public way.
- G. Requirements of Section 02220 – Rough Grading and Excavation apply to the work of this section as if contained in full herein.
- H. The Geotechnical Engineer shall be provided with a sample (at least 50 pounds) and notified of the location of any soils proposed for import at least 72 hours in advance. Each proposed import source should be sampled, tested and accepted for use prior to delivery of the soils to the site. Soils imported prior to acceptance may be rejected if not suitable for use as compacted backfill.

1.07 PROJECT CONDITIONS

Contractor shall examine site, contract drawings, record of existing utilities and construction, record of test borings and geotechnical report, etc. Records of test borings are for information only and are not guaranteed to represent all conditions that will be encountered. Contractor is required to accept actual conditions at the site and do the work specified without additional compensation for possible variation from grades and conditions shown, whether surface or sub-surface.

1.08 QUALITY ASSURANCE

- A. District's Geotechnical Engineer shall perform field compaction density tests on placed fill to verify compliance with Section 01425 -Testing and Inspection.
- B. Test results that indicate that the fill or backfill is in non-compliance with the required moisture and density, the Contractor shall accomplish such remedy as may be directed by the Architect / Engineer. Subsequent testing to show compliance with requirements shall be by the District's testing laboratory and at the Contractor's expense.
- C. Tolerances for excavation and backfill elevation are plus or minus 0.10 foot.

1.09 PROTECTION

- A. Existing Utilities
  - 1. Maintain existing utilities that are to remain in service. Before excavating over or adjacent to existing utilities, notify utility District to ensure protective work shall be coordinated and performed in accordance with utility District's requirements. If existing service lines, utilities and utility

structures that are to remain in service are uncovered or encountered during these operations safeguard and protect from damage and support if necessary.

2. Consult Architect and Utility Owner immediately for directions should uncharted or incorrectly charted piping or other utility be encountered during excavation. Cooperate with District and public or private utility companies in keeping their respective services, utilities and facilities in operation. If damaged, repair utilities to satisfaction of Architect and applicable utility Owner.

- B. Existing Facilities: Protect and maintain in satisfactory manner, existing pavements, curbs, gutters, structures, conduits, fences, walls and other facilities above and below grade. Protect existing improvements from settlement and lateral movement during excavation and through duration of open excavation. Restore facilities damaged by construction operations.

#### 1.10 POLLUTION CONTROL

- A. The Contractor shall take all necessary precautions and measures to control, minimize and remedy the generation of objectionable dust or materials/spoils spillage. Such measures shall include but not be limited to water spraying of aggregate stockpiles, tarpaulin-covered truck beds, minimization of mud tracking by haul vehicle tires, and maintenance/cleaning of access roads, entry areas and connecting roadways.
- B. Clean adjacent structures and improvements of all dust, dirt, debris caused by operations as directed by the Architect / Engineer. Return areas to conditions existing prior to the start of work.
- C. Contractor shall conform to all environmental mitigation control requirements as specified, as if contained in full herein.

#### 2.00 MATERIALS

##### 2.01 FILL AND BACKFILL MATERIAL

- A. Soil placed as engineered fill shall be conditioned 0 to 3 percent over optimum moisture content, processed and reduced to pea-sized or finer consistency, and compacted to a minimum of 95 percent of the maximum dry density, as determined by ASTM D1557
- B. Imported soils shall be approved by the Geotechnical Engineer prior to importing and shall be subject to verification testing upon onsite stockpiling.
- C. General fill, whether reconditioned onsite fill or imported fill, shall be clean, granular material/mixture, free from oversized rock greater than 4 inches, organic matter, rubbish, construction debris and other deleterious substances. .. Geotechnical Engineer shall approve any soils prior to importing. Expansion index of general fill material shall be less than 20.

- B. Select fill material for below slab on grade and for use as backfill behind structural foundation / retaining walls, whether onsite select fill, reconditioned onsite fill or imported fill shall be clean, granular material / mixture free from deleterious substances and rock larger than 4 inches. Properties of select fill shall include:

1. Sand equivalent of at least 20,
2. 100 percent passing the 3-inch sieve,
3. Expansion index less than 10,
4. 50 to 100 percent of the material passing the No. 4 sieve, and
5. At least 15 percent of the material passing the No. 30 sieve.

Select fill materials shall be approved prior to and verified after importing by the Geotechnical Engineer prior to placement as fill.

2.

- 6.
- 7.
- 8.

- C. Materials loosened or disturbed and voids created by installation and removal of shoring shall be backfilled, as applicable, and compacted to a minimum of 95 percent of the maximum dry density.

- D. Aggregate Base Course / Drainage Fill Materials:

1. Natural Gravel / Rock: Washed, clean gap-graded mixture of clean angular crushed gravel, ASTM D448 coarse aggregate grading size 4 with particle size ranging from 3/4 inch to 1-1/2 inch.
2. Reclaimed Rock: Caltrans Standard Specifications Class 2 conforming to Section 26-1.02A crushed miscellaneous base rock material with no asphalt derivatives.

- E Sand: ASTM C33 consisting of clean, natural sand graded to not more than 8% passing a #100 sieve and not more than 3% passing #200 sieve.

## 2.02 TEXTILES

- A. Filter fabric: Envelope gravel and rock fill materials with Mirafi 180N or equivalent.
- B. Vapor Barrier: Provide a puncture and tear resistant, high tensile strength, impermeable, chemical resistant, (gasoline/hydrocarbon resistant), 15 mil polyolefin liner / membrane, SocoShield as manufactured by Socopac Co. 714-661-1389, Stego Wrap as manufactured by Stego Industries, Inc. 877-464-7834; Blackline 400 as manufactured by Monarflex; Vapor-Mat as manufactured by W.R. Meadows 909-469-2606, or equal.

## 3.00 EXECUTION

### 3.01 VERIFICATION OF EXISTING CONDITIONS

- A. The Contractor shall be held to have ascertained conditions at the site by inspection, the character and extent of work to be performed within the Contract limits or adjacent thereto, as well as other related work performed prior to start of work specified herein.
- B. Recommendations made in the Geotechnical Study shall be part of this specification. Contractor shall coordinate with the findings and recommendations of the Geotechnical Study for conditions that will be encountered by executing the work of this Contract. Refer to a copy of the Geotechnical Study that is bound under a separate cover as provided by the District's representative.

### 3.02 LAYOUT OF WORK

- A. The Contractor's surveyor shall layout and correctly establish the lines, levels, grades and elevations of the work, and be responsible for their accuracy and proper correlation with documented control lines, monuments and data. Monument markers and control data as may be set shall be carefully preserved. If displaced, contractor shall reset to original layout.
- B. Contractor shall employ the means and methods to preserve the safety, stability, integrity and existing conditions in and around the subject property, including public right of way, access in and out of the site, onsite structures and improvements, signage, landscaping and irrigation, utility lines and connections and adjacent / adjoining property(s).
- C. Comply with all requirements of the State of California and the District having jurisdiction over the work required to complete this Contract.

### 3.03 LEGAL REQUIREMENTS

- A. Give adequate and required legal notice to the Owner, the utilities and governing authorities prior to commencing work.
- B. Provide such barricades, temporary fences, lights, warnings signs guards, etc., as may be necessary to assure safety and to deter trespassers. Maintain these provisions during entire duration of work. Where required, provide temporary facilities for the protection of pedestrians in the public right of way shall be constructed, painted and maintained in conformance with the governing code requirements and authorities having jurisdiction over the project.
- C. Coordinate operations with all trades, utilities and public agencies to assure continuity of both access and service of all utility, service and distribution lines, in conformance with applicable requirements of these organizations. Services that supply the District's operations on site shall not be impeded. Pay for all permits required for work under this Section.

### 3.04 DUST PALLIATION

- A. Contractor shall employ mitigating measures and practices to eliminate dust conditions during excavation, fill, compaction, loading and hauling operations under this Section. Comply with required, Federal, State and City pollution

requirements and the local mitigation measures issued by the regional air quality management district agency having jurisdiction over the work.

- B. Comply also to all environmental mitigation control requirements, as if specified in full herein

### 3.05 PROTECTION

- A. Before commencing excavation work, verify and locate all existing underground utility lines on site, above and below grade. Verify that existing active utilities do not interfere with construction. Where site utilities conflict with new construction or where active utilities not indicated by the Contract Documents are encountered, stop work and notify the Architect, prior to proceeding.
- B. Should active, inactive or abandoned sewers, gas, water piping, electrical, telephone or other underground utilities be encountered which interfere with the work, protect, remove and/or relocate, at the direction of the Owner. Remove abandoned, inactive utilities to a point not less than 10 feet outside proposed building lines. Plug or cap remaining ends to industry standards. Protection, removal and/or discontinuance of utility services shall conform to the requirements of the applicable utility company or service agency having jurisdiction. Be responsible for advance notification or immediately upon encountering unrecorded services.
- C. Provide and be responsible for necessary shoring to safeguard work, workers, public and property. Include provisions for cribbing, planking, sheeting, walling or other work that may be necessary to properly retain earth banks and prevent caving-in and displacement of adjoining soil. Conform to the California Construction and General Industrial Safety Orders, OSHA requirements and Construction Safety Act. Obtain and pay for all required permits, including the Industrial Safety Permit and all inspections required by governing agencies. Provide stamped and signed shoring plans with calculations prepared by a California licensed Engineer as required in order to obtain approval / permit for the work.
- D. Fence or barricade changes in plane more than 45 degrees of horizontal and more than 3 feet in height. Cover holes and trenches when work is not in progress.
- E. Differential Settling: Where utilities must cross over or through compacted fill or compacted backfill and enter the building, plan earthwork operations to allow sufficient time for settling to occur or provide either flexible or swing joints to allow for the vertical displacement. Determine extent of consolidation by the use of settlement markers.
- F. Grade all excavated surfaces to provide positive drainage of water. Take remedial measures to control runoff or erosion of freshly graded areas. Avoid damages to adjoining properties or finished work until permanent drainage and erosion control measures are installed.
- G. Protect or immediately replace any reference points, benchmarks or monuments damaged, destroyed or dislocated.

### 3.06 PREPARATION

- A. Site Preparation: Clean areas within the Contract Limit lines as required after site clearing and demolition work is complete and after the rough grading work has also been executed.
  - 1. Strip topsoil in areas of building and paving construction and stockpile on site where directed. Remove subsoil, rocks, plants, roots and other matter considered debris.
  - 2. Remove any concrete, masonry and rubble where structure is to be supported. Remove abandoned below grade construction that obstructs the new work. Demolish and remove all existing fill material and such obstructions as required to permit placement of engineered fill beneath structural footings and slabs on grade. Remove all unsuitable materials and dispose of legally off site.
- B. Organic material shall not be permitted in fills.

### 3.07 EARTHWORK

- A. Perform all overexcavation, fill and compaction for building pad and paving to the depth(s) as indicated in the referenced Geotechnical Study. Conform to all requirements for excavation, overexcavation and lateral distance of excavation, removal of deleterious materials and existing artificial fills exposed in the excavation bottom, placement of fill materials, acceptable debris which may be incorporated, maximum dimension of fill particle size, thickness of lifts placed, moisture conditioning and recompaction density. Requirements shall apply to all on-site soils that are acceptable for reuse and for import soils. No soil shall be imported prior to being evaluated by the Geotechnical Engineer to verify compliance of the maximum expansion index (EI) permitted.
- B. Deepen bottom of overexcavations in building area as necessary to limit fill thickness gradient to less than 20 percent.
- C. Subgrade Preparation: After observation of excavation bottoms by the District's Geotechnical Engineer, the subgrade shall be scarified a depth of 1 foot, moisture-conditioned to uniform moisture content of 0 to 3 percent over optimum, and compacted to a minimum of 95 percent of the maximum dry density as determined by ASTM D1557.
- D. Excavation is unclassified and includes excavation to required subgrade elevations regardless of the character of materials and obstructions encountered.
- E. Excavate for the foundation to lines and grades indicated. Allow additional space as required for construction operations and inspection. The Geotechnical Engineer shall inspect the bottoms of excavations prior to proceeding or placing fill.
- E.
- F. Maintain stockpiled materials in the following manner:
  - 1. Stockpile acceptable soil materials for fill and backfill and base and drainage aggregates without intermixing.

2. Place, grade and shape stockpiles to drain surface water.
  3. Cover to prevent wind blown dust.
  4. Stockpiles shall be away from edge of excavations.
  5. Do not store within drip line of trees that are to be maintained.
- G. Onsite soils may be used for general fill once they are cleaned of all organic material, rock greater than 4 inches, and..
- H. Import soils used to raise site grade shall be equal to, or better than, onsite soils in strength, expansion and compressibility characteristics.
- I. Protect existing soils from elevated moisture contents and pumping resulting from heavy and frequent equipment loading. If unstable soils are encountered, stabilization of the excavated bottom or pumping layer shall be required prior to placing fill. Accomplish drying of the soils by ripping, reducing and aeration, or stabilize subgrade by placement of a minimum 1-foot thick layer of aggregate base or cement treatment of the upper 1 foot using 6 percent cement by weight in accordance with Section 301-3.1 of SSPWC..
- J. Depress / account for finished grade elevations in areas requiring installations of a capillary break or base course / vapor barrier to the depth indicated and for the total section specified. This project has three different areas of subgrade treatment and require different finish subgrade elevations than the general slab on grade sub-grade. Refer to excavation and placement of materials for specifics.

### 3.08 EXCAVATION

- A. Refer to the Geotechnical Study for soils conditions and excavation recommendations. Recommendations herein are of a general nature and should be verified / coordinated with the Geotechnical Study and Addendums.
- B. Excavated soils that are free of expansive clay, debris, organic matter, and rocks larger than 4 inches in maximum dimension may be stockpiled for recompaction, subject to the approval of the Geotechnical Engineer.
- C. Excavation shall be deepened as needed to remove artificial fill materials and to limit fill thickness gradient to less than 20 percent.
- D. Excavation shall be carried to the lines and grades indicated on the drawings with a tolerance of plus or minus 0.1 foot.
- E. Should soil of inadequate bearing capacity be encountered at the elevations indicated, carry excavation to the greater depth as directed by the Geotechnical Engineer for proper bearing / support. Extend excavation a sufficient distance from the foundation to allow for form installation, inspection, backfill and compaction unless the Geotechnical Engineer authorizes concrete deposit directly against excavated earth form surfaces.
- E. To verify the presence of the firm or dense soil at footing design elevations, all footing excavations shall be observed by the Geotechnical Engineer. Trim minor areas by hand to the required final lines and grade. Footing excavation bottoms shall be cleaned of any loose soil before placing concrete.

- F. Unauthorized overexcavation made below the elevations indicated shall be filled with slurry concrete performed by the Contractor at his own expense.

3.09 PLACING, SPREADING AND COMPACTING FILL MATERIAL

- A. Materials for fill shall consist of acceptable spoils removed from the required onsite excavation or from borrowed sources (import fill) as approved by the Geotechnical Engineer.
- B. Place moisture-conditioned and processed fill materials in horizontal loose lifts not exceeding 8 inches for the full width of the cross section. Mechanically compact fill to a minimum of 95 percent of the maximum dry density, as determined by ASTM D1557. The optimum loose lift thickness will depend on the compaction equipment used and can best be determined in the field. The following uncompacted thickness can be used as a preliminary guideline:

Plate Compactors	4-6 inches
Small vibratory or static rollers (5-ton+/-) or track equipment	6-8 inches
Scrapers, heavy loaders or heavy vibratory rollers	8-12 inches

The maximum lift thickness should not be greater than 12 inches and each lift should be thoroughly compacted and accepted prior to subsequent lifts.
- C. Spread each layer evenly and thoroughly mix to insure uniformity of material in each layer. Do not place fill materials in areas where there is standing water or on surfaces that have not been approved. Do not damage waterproofing systems if present when placing backfill.
- D. Bring moisture content of fill material to 0 to 3 percent above optimum moisture content. Uniform moisture content is required throughout layers of fill materials. Remove and replace or scarify and air dry soil materials that are too wet to compact to the specified density. Suspend compaction operations when satisfactory results cannot be obtained because of rain or other unsatisfactory conditions. Stockpile or spread and dry removed wet soil materials.
- E. Maintain moisture content of loosened scarified material such that first layer of fill will readily bond to surface.
- F. Compaction or consolidation by soaking or jetting with water is not acceptable as an alternative method to utilization of mechanical equipment.
- G. Do not backfill and compact behind walls until support systems have reached design strength. Protect structure below grade at all times during backfilling operations.
- I. Scarify, aerate or moisten soft areas that develop under construction operations as required and compact to the full depth required to obtain the specified density for each layer. Compact those portions of fill which are too near to adjacent walls, pavements or other fixed objects to permit the use of heavy rolling equipment by tamping in 4 inch layers with mechanical tampers.
- J. Overfill fill slopes such that final slope gradient is achieved by trimming back to a compacted core.



- K. Shrinkage (loss of soil volume) and subsidence (settlement of in-place subgrade) shall be a consideration on project soil export. For earthwork volume estimating purposes an average shrinkage value of 10 to 15 percent and subsidence of 0.1 feet shall be assumed for the in-situ soils. These values are estimates only and exclude losses due to removal of vegetation or debris. Actual shrinkage and subsidence shall depend on the types of earthmoving equipment used and may be verified during grading.
- L. Trench/Wall Backfill: In backfill areas where mechanical compaction of soil backfill is impractical due to space constraints, sand-slurry may be substituted for compacted backfill. The slurry should contain two sacks of cement per cubic yard and have a maximum slump of 6 inches.

### 3.10 GEOTECHNICAL TESTING – FIELD QUALITY CONTROL

- A. Refer to Section 01425 - Testing and Inspection.
- B. The Geotechnical Engineer shall observe and perform field density compaction and moisture tests as required. Where compaction equipment has disturbed the surface to a depth of several inches, density tests shall be taken in the compacted material below the disturbed surface. Testing surfaces shall be cut smooth by the Grading Contractor. Do not spread additional layers of fill until the field density tests indicate that specified moisture and compaction density has been obtained. Do not pour concrete until all recommendations have been met.
- C. Observation and testing by the Geotechnical Engineer shall be provided during all excavation, grading, filling and compacting operations. Give at least 48 hours notice prior to beginning operations to allow proper scheduling of work. Continuous inspection shall be provided during fill placement and compaction operations.
- D. Geotechnical Engineer shall perform field quality control testing of subgrade prior to subgrade base course preparation.
- E. Contractor to pay all costs for retesting required as the result of the density test failures due to improper placement and all additional costs for inspection required as a result of correcting defective work.
- F. When reports indicate that subgrade fill or backfill materials are below specified density; Contractor is required to scarify and moisten or aerate, or remove and replace unacceptable soils to the depth required, re-spread, level, recompact and retest until required density is obtained.
- G. Engineer shall observe and retest each subgrade and each fill lift or backfill layer being reworked. Do not proceed with subsequent fill or base course placement until test results for previously completed work confirms compliance with specified requirements.
- H. Earthwork performed without the required observation by the Geotechnical Engineer, that is determined does not meet the requirements of these specifications and of the Geotechnical Study, shall be removed and replaced by the Contractor at no additional cost to the District.

- I. Observation by the Geotechnical Engineer does not relieve the Contractor of responsibility for construction of compacted fills to comply with this specification.
- J. Sufficient tests of fill soils shall be made to determine the relative compaction of the fill in accordance with the following minimum guidelines:
  - 1. One test for each 18 inches of fill thickness
  - 2. One test for each 500 cubic yards of material placed

### 3.11 SUBGRADE PREPARATION

- A. Replace artificial fill with properly compacted engineered fill.
- B. Place approved fill materials to the proposed final subgrade elevations for concrete slab support. Using the ASTM D1557 method of compaction, obtain minimum 95 percent of the maximum dry density obtainable.
- C. Bring final subgrades for paving to proper elevation by excavating, filling and compacting. Finish within a 3/8" tolerance when measured along a 10-foot straight edge in any direction.
- D. Gravel Subgrade - Slab OnGrade:
  - 1. Typical slab on grade is to be poured directly onto the approved compacted subgrade. No additional preparation needs to occur unless indicated otherwise.
  - 2. At the B1 Level Storage, Mechanical Room, Electrical Cart Storage Electrical Room, Communications Room Storage Room and Elevator Mechanical Room moisture condition, spread, level, and compact gravel course material for capillary break in layers not exceeding 6 inches in loose thickness. Compact and add additional materials to obtain required cross section, thickness and density. Continue cutting or filling, and rolling until surfaces are hard and true to grade and cross-section. Surface shall be dense and cease to creep in front of roller or tamper.
  - 3. Vapor Barrier: Install the specified vapor barrier over the prepared gravel layer. Lap joints a minimum of 6 inches and seal exposed joint with a 3-inch-wide moisture resistant tape. Cover vapor barrier membrane with a minimum 2-inch thick layer of clean damp sand. Compact sand layer to tighten surface with a vibraplate. Finished surface shall be free of lumps, voids or sharp protrusions.
  - 5.
- E. Exterior Flatwork: Subgrade soils below flatwork shall be moistened to a moisture content of at least 120 percent of optimum to a depth of 12 inches. Moistening should be accomplished by lightly spraying the area over a period of a few days just prior to pouring concrete

### 3.12 FINAL GRADING

- A. Grading shall be performed to the lines, grades and elevations indicated. All unacceptable materials encountered shall be removed and disposed of. When necessary, temporary drains and drainage ditches shall be installed to intercept or divert surface water which may affect the progress or condition of the work.

- B. Owner retains the right to make adjustments or revisions in lines or grades if found necessary as the work progresses.
- C. All fill or cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment required. .
- D. No grading is to be done in areas where existing pipelines that may be uncovered and/or damaged are removed or relocated.

3.13 CLEAN-UP

- A. Upon completion of work of this section, remove from the site excess dirt, rubbish, trash and debris.
- B. Store reuseable material neatly in designated areas.
- C. Remove equipment, leaving the entire project area in a neat and acceptable condition.

END OF SECTION



**1.00 GENERAL****1.01 SUMMARY**

- A. Aggregate base course for concrete walkways, AC paving, trench backfill material for HDPE pipe.

**1.02 RELATED SECTIONS**

- A. Section 02200 - Earthwork.
- B. Section 02221 - Trenching and Backfilling.
- C. Section 02510 - Asphaltic Concrete Paving.
- D. Section 02620 - Concrete for Curbs and Walkways.

**1.03 REFERENCES**

- A. State of California Department of Transportation Standard Specifications (SSS), Caltrans, May 2006.
- B. Standard Specifications for Public Works (SSPWC), 2009.
- C. Geotechnical Study prepared by Geotechniques dated February, 2011, Project No. 1003.026.
- D. ASTM Standards.

**1.04 SUBMITTALS:**

- A. Submit material samples and reports in accordance with requirements of The District.
- B. Submit samples in sufficient quantities for material testing.

**2.00 PRODUCTS****2.01 MATERIALS**

- A. Aggregate Base Material shall be Class 2 Aggregate Base conforming to SSS Section 26-1.02A. Aggregate Base shall have a minimum sand equivalence of 22 and a minimum R-value of 78 and shall be free of organic materials and other deleterious substances.

**3.00 EXECUTION****3.01 EXAMINATION**

- A. Verify substrate has been inspected; gradients and elevations are correct, and dry.
- B. Base course shall be dense and unyielding when proof-rolled with a full water truck.

### 3.02 AGGREGATE BASE PLACEMENT

- A. Aggregate base placement shall conform to the provisions of the SSPWC, Section 301-2.
- B. Level and contour surfaces to elevations and gradients indicated.
- C. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.
- D. Where the required aggregate base thickness is 6 inches or less, the watered base may be spread and compacted in one layer. Where the required thickness is more than 6 inches, the aggregate base material shall be spread and compacted in 2 or more layers of approximately equal thickness. The maximum compacted thickness of any one layer shall not exceed 6 inches.

### 3.03 TOLERANCES

- A. Flatness: Maximum variation of 1/4 inch.
- B. Scheduled Compacted Thickness shall conform to the provisions of the SSPWC Section 301-2.2.

### 3.04 FIELD QUALITY CONTROL

- A. Inspection and testing shall be performed by the District's Testing Laboratory. Compaction testing will be performed in accordance with ASTM D1557, latest edition.
- B. If tests indicate work does not meet specified requirements, remove, replace, and retest work at no additional cost to the District.

END OF SECTION

## 1.00 GENERAL

### 1.01 SUMMARY

- A. Asphaltic concrete paving for parking lots and driveway pavements.

### 1.02 RELATED SECTIONS

- A. Section 02200 – Earthwork
- B. Section 02231 – Aggregate Base Course
- C. Section 02620 – Concrete for Curbs and Walkways

### 1.03 REFERENCES

- A. Standard Specifications for Public Works Construction (SSPWC), 2009.
- B. ASTM Standards.
- C. Geotechnical Study prepared by Geotechniques dated February, 2011, Project No. 1003.026.

### 1.04 SUBMITTALS

- A. Submit asphalt concrete mix design(s) for approval of the District Representative.

### 1.05 TESTING AND INSPECTION

- A. Testing and inspection of asphalt pavement mix(es) and testing of placed stabilizing base course and asphalt pavement will be performed by the District's Testing Laboratory. Testing and inspection will be performed so as to minimize disruption of work.
- B. Allow the District's Testing Laboratory access to the mixing plant for verification of weights or proportions, character of materials used and determination of temperatures used in the preparation of asphaltic concrete mix.

## 2.00 PRODUCTS

### 2.01 GENERAL

- A. Provide the aggregate base, and bituminous surface conforming to the requirements of the Standard Specifications for Public Works Construction (SSPWC).

### 2.02 PAVING MATERIALS

- A. Asphalt Concrete: Asphalt concrete material shall be Type III, C2-PG 64-10 per SSPWC Section 400-4. The grading and proportioning of aggregates shall be such that the combined mineral aggregate conforms to the specified requirements.
- B. Asphalt Emulsion: SSPWC Section 203-3, Grade SS-1h.

- C. Prime Coat: Grade SC-70 per SSPWC Section 203-2.
- D. Aggregates for base course shall conform to requirements of Specification Section 02231, Aggregate Base Course.

### 2.03 ASPHALT PAVEMENT MIX

- A. Combine mineral constituents in proportions to produce a mixture conforming to requirements of the SSPWC Section 400-4.
- B. Percentage by weight of asphalt cement in mixture shall be in accordance with SSPWC Section 400-4.
- C. Maintain thorough and uniform mixture.
- D. Bring asphalt and mineral constituents to required temperatures before mixing. Ensure aggregates are sufficiently dry so as not to cause foaming in mixture.

## 3.00 EXECUTION

### 3.01 GENERAL

- A. Execute Work in accordance with SSPWC Section 302 and the Geotechnical Study.

### 3.02 PREPARATION

- A. Ensure grading of subgrade to required elevation. Subgrade preparation shall be per SSPWC Section 301.
- B. Before final rolling, shape entire section, add additional sub-soil if necessary, and compact subgrade to provide grades, elevation and cross-section indicated. Points of finished subgrade surface shall be within 0.04 foot of elevations indicated on the Drawings.

### 3.03 BASE COURSE

- A. Place aggregate base in accordance with requirements of SSPWC Section 301 and to the thickness shown on the Drawings. Grade and compact in 6-inch layers to at least 95 percent of compaction (ASTM D1557).

### 3.04 MAINTENANCE

- A. Maintain the base course until the asphaltic pavement is in place. Maintenance shall include drainage, rolling, shaping and water as necessary to maintain the course in proper condition. Maintain sufficient moisture at the surface to prevent a dusty condition. Areas of completed base course that are damaged shall be conditioned, reshaped and recompact in accordance with the requirements of the Specifications without additional cost to the District.

### 3.05 TACK COAT



- A. Prior to the application of the asphalt concrete, a paint binder (tack coat) shall be applied to all surfaces of walkway, curbs, gutters, manholes and drainage structures which will be in contact with asphalt pavement per SSPWC Section 302-5.4.
- B. Coat surfaces of catch basins which are to remain free of asphalt with oil, or provide equivalent protection, to prevent asphalt adhesion.

3.06 PRIME COAT

- A. Prior to the application of the asphalt concrete, a prime coat shall be applied at a rate of 0.20 to 0.40 gallons per square yard.

3.07 ASPHALT CONCRETE

- A. Requirements: The bituminous concrete shall consist of mineral aggregate, uniformly mixed with bituminous material in a central plant in accordance with SSPWC Section 400-4. The percentage of asphalt binder shall be in accordance with SSPWC Section 400-4. The mixing plant and construction equipment shall conform to the requirements of SSPWC Sections 302-5 and 400-4.
- B. Placing: Deliver bituminous mixtures to the work site temperatures specified in SSPWC Section 302-5.5. Spread and place in accordance with SSPWC Section 302-5.5. Asphalt surface shall be fog-sealed.
- C. Compaction: Initial or breakdown rolling and the final rolling of the uppermost layer of the asphalt concrete shall be in accordance with SSPWC Section 302-5.6. Compaction by vehicular traffic shall not be permitted.

3.08 JOINING PAVEMENT

- A. Carefully make joints between old and new pavements or between successive days work in such manner as to insure a continuous bond between old and new sections of the course in accordance with SSPWC Section 302.
- B. Expose and clean edges of existing pavement. Cut edge to straight, vertical surfaces. Paint all joints with a uniform coat of tack coat before the fresh mixture is placed. Prepare joints in the new pavement in accordance with SSPWC Section 302-5.7.

3.09 JOINING NON-PAVED AREAS

- A. Where paving will join landscape or other non-hardscape area a redwood header shall be installed per plans.

3.010 TOLERANCES

- A. Flatness: Maximum variation of 1/8 inch when measured with a 10-foot straight edge.
- B. Variation from True Elevation: Within 1/4 inch.

3.011 FIELD QUALITY CONTROL

- A. Inspection and testing shall be performed by the District's Testing Laboratory.
- B. Field inspection and testing will be performed by the District's Testing Laboratory. The Contractor shall cooperate with such testing and shall give the District Representative advance notice of paving scheduling. Sufficient "Advance Notice" shall be determined by the District Representative.
- C. If tests indicate materials do not meet specified requirement, replace material and retest at no additional cost to the District.
- D. Frequency of Test: As determined by the District's Testing Laboratory.

3.012 PROTECTION

- A. After placement, protect pavement from mechanical injury.

END OF SECTION

1.00 GENERAL1.01 SUMMARY

- A. All striping and pavement markings shall be located per plans. All standard parking stalls shall be delineated with a four inch wide white stripe.
- B. All construction shall conform to the Standard Specifications for Public Works Construction.

1.02 REFERENCES

- A. Standard Specifications for Public Works Construction (SSPWC), 2009
- B. Federal Standard 595B - Colors Used in Government Procurement.
- C. California Building Code (CBC), 2007.
- D. State of California Department of Transportation Standard Specifications (SSS), Caltrans, May 2006.

2.00 PRODUCTS2.01 FIELD QUALITY CONTROL

- A. All paint and related materials shall conform to Section 210.1 of the Standard Specifications for Public Works Construction.
- B. Painting and striping of the accessible parking stalls shall conform to the Architectural Plans.

3.00 EXECUTION3.01 PREPARATION

- A. Painted lines and markings on pavement shall be 3" minimum wide and blue in color equal to Color No. 15090 per Federal Standard 595B.
- B. Parking spaces for the disabled shall be marked according to CBC Section 1129B.4 and the Architectural Plans.
- C. Tactile warning lines shall be in conformance to CBC Section 1133B.8.3 and 1133B.8.4 and Specification Section 09614.

3.02 FIELD QUALITY CONTROL

- A. All pavement striping and markings shall conform to Section 310-5.6 of the Standard Specifications for Public Works Construction and Specification Section 09614.

END OF SECTION



1.00 GENERAL1.01 SUMMARY

- A. Concrete for Curbs, Gutters, and Walkways

1.02 RELATED SECTIONS

- A. Section 02200 – Earthwork
- B. Section 03200 – Concrete Reinforcement
- C. Section 03345 – Concrete Finishes

1.03 REFERENCES

- A. Standard Specifications for Public Works Construction (SSPWC), 2009.
- B. Geotechnical Study prepared by Geotechniques dated February, 2011, Project No. 1003.026.
- C. ASTM Standards.

1.04 SUBMITTALS

- A. Submit the following:
  - 1. Product Data: Provide data on admixtures and curing compounds.
  - 2. Concrete mix design(s).
  - 3. Certificates from the batch plant.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with the SSPWC, latest edition; and ASTM Standards, latest edition.
- B. Obtain cementitious materials from same source throughout.

1.06 ENVIRONMENTAL REQUIREMENTS

- A. Do not place concrete when base surface temperature is less than 40 degrees F or surface is wet.

2.00 PRODUCTS2.01 FORM MATERIALS

- A. Form Materials: Section 303-5 of the SSPWC.

2.02 CONCRETE MATERIALS

- A. Concrete material for curbs, gutters, walkways and site pavement shall be Class 560-C-3250 Portland Cement Concrete per SSPWC Section 201-1. Maximum water-cementitious ratio shall be 0.50.

- B. Concrete pavement subject to vehicular traffic shall have a minimum 28-day compressive strength of 3,500 pounds per square inch (psi). Minimum concrete pavement reinforcement shall be No. 3 bars spaced at 18 inches on center, each way. Reinforcement shall not be less than the structural requirements for shrinkage and temperature. Load transfer at cold joints shall be transferred using minimum 5/8-inch smooth dowels, with one end treated (i.e., greased) to slip. The dowels should be at least 18 inches long and spaced no less than 12 inches on center. Maximum water-cementitious ratio shall be 0.50.

## 2.03 ACCESSORIES

- A. Curing Compound shall conform to SSPWC Section 201-4.1 Pigmented compound shall not demonstrate any residual coloring of the concrete after one week.

## 2.04 CONCRETE MIX

- A. Mix and deliver concrete in accordance with ASTM C94.
- B. Use accelerating admixtures in cold weather only when approved by the District Representative. Use of admixtures will not relax cold weather placement requirements.
- C. Use calcium chloride only when approved by the District Representative.
- D. Use set retarding admixtures during hot weather only when approved by the District Representative.

## 2.05 CONCRETE REINFORCEMENT

- A. Refer to Specification Section 03200 – Concrete Reinforcement for steel reinforcement and reinforcement accessories.

## 2.06 SEALERS

- A. Refer to Specification Section 03345 – Concrete Finishes for sealing agents.

## 2.07 SOURCE QUALITY CONTROL

- A. Provide certificates of compliance from the batch plant.

## 3.00 EXECUTION

### 3.01 EXAMINATION

- A. Verify compacted subgrade is acceptable and ready to support imposed loads.
- B. Verify gradients and elevations of subgrade are correct.

### 3.02 PREPARATION

- A. Moisten subgrade to minimize absorption of water from fresh concrete. Compact subgrade material to a depth of 12" beneath aggregate base below curb and gutter and concrete pavements to 95% relative compaction.
- B. Coat surfaces of catch basin frames with oil to prevent bond with concrete pavement.
- C. Notify the District Representative a minimum of 24 hours prior to commencement of concrete placement operations.

### 3.03 FORMING

- A. Place and secure forms to correct location, dimension, and profile.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

### 3.04 PLACING CONCRETE

- A. Place concrete in accordance with SSPWC Section 303-5.
- B. All curbs shall be poured monolithically.
- C. Premolded 0.25" thick expansion joints conforming to SSPWC Section 303-5.4.2 shall be placed at ends of all curb returns, at intervals not exceeding 20 feet, and around utility poles, and as specified in the Plans and SSPWC Section 303-5.4.
- D. Construct weakened plane joints conforming to SSPWC Section 303-5.4.3, one inch deep, at intervals not exceeding 10 feet.
- E. Score lines conforming to SSPWC, Section 303-5.5.3 shall be made in walks.
- F. The top edges of curbs shall have 0.5" radius.

### 3.05 FINISHING

- A. Unless otherwise specified in the Contract Documents, i.e. the Architectural Plans or within other Sections of these Specifications, concrete finishing shall be completed as indicated in SSPWC Section 303-5.5.

### 3.06 FIELD QUALITY CONTROL

- A. Inspection and testing shall be performed by the District's Testing Laboratory.
- B. The District's Testing Laboratory will perform slump and compressive strength tests.
- C. Contractor shall maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

### 3.07 PROTECTION

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, vandalism and mechanical injury.
- B. It is the Contractor's responsibility to replace all concrete work subject to vandalism and graffiti at no additional cost to the District.

END OF SECTION



## 1.00 GENERAL

### 1.01 SUMMARY

- A. Pipe and fittings for site water lines.
- B. Valves.
- C. Fire hydrant.
- D. Water Meter.
- E. Backflow Preventer.

### 1.02 RELATED SECTIONS

- A. Section 02200 - Earthwork.
- B. Section 02221-Trenching and Backfilling.

### 1.03 REFERENCES

- A. American Water Works Association Standards (AWWA).
- B. Ventura County Water Works Districts - Design Standards.
- C. Standard Specifications for Public Works Construction (SSPWC), 2009.
- D. Geotechnical Study prepared by Geotechniques dated February, 2011, Project No. 1003.026.

### 1.04 SUBMITTALS

- A. Submit the following:
  - 1. Product Data: Provide data on pipe materials, pipefittings, valves, fire hydrant and accessories.
  - 2. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

### 1.05 PROJECT RECORD DOCUMENTS

- A. Accurately record actual locations of piping mains, valves, connections, fire hydrant, and invert elevations.
- B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

### 1.06 QUALITY ASSURANCE

- A. Perform work in accordance with County of Ventura Standards, AWWA, and Standard Specifications for Public Works Construction.

- B. Valves: Manufacturer's name and pressure rating marked on valve body.

## 1.07 DELIVERY AND STORAGE

- A. Deliver and store valves in shipping containers with labeling in place.

## 2.00 PRODUCTS

### 2.01 GENERAL

- A. All water lines shall be designed for a minimum working pressure of 250 psi. All fittings appurtenant piping materials shall be designed for a minimum working pressure of 250 psi unless otherwise indicated.

### 2.02 PIPE

- A. Joints: Mechanical joints shall be used for the waterline construction unless otherwise shown on plans and standard details. Gaskets for mechanical joints shall be rubber conforming to ANSI A21.11 and AWWA C111.
- B. Fittings: Fittings shall be ductile iron rated for 250 psi working pressure. Mechanical joint fittings shall conform to ANSI A21.10 or AWWA C110 (short body style, not approved). Lining for fittings shall be Plastic Engineering P.E.I. 100 epoxy to a minimum thickness of 10 mils. Fittings shall be wrapped with 6 mil. polyethylene sheet. Grease all underground nuts and bolts before wrapping with the polyethylene sheet.
- C. Polyvinyl Chloride (PVC) potable water pipe: For pipe size smaller than 4" diameter pipe material shall be polyvinyl chloride (PVC) schedule 80 solvent weld pipe and shall be manufactured in accordance with ASTM D-1785, or type K Copper pipe shall be used as indicated on plans. For pipe size equal or larger than 4" diameter pipe material shall be (Polyvinyl chloride (PVC) pressured pipe and shall be manufactured in accordance with AWWA Standard Specification C-900).

### 2.03 GATE VALVES

- A. Conform to AWWA C-509-01.
- B. Gate valves shall be iron body, NRS valves with O-ring seals, and shall open when the stem is rotated counterclockwise. The valves shall be designed for a minimum working pressure of 250-psig, have a bronze stem, and have a cast iron wedge with styrene butadiene rubber permanently bonded to the wedge. The valves shall have full port openings for unobstructed flow, be designed for underground service, and be in full compliance with the latest revision of AWWA C509. The valve linings and coatings shall be in accordance with AWWA C210-84. Linings and coatings shall be factory applied. Valves shall be furnished with 2-inch square operating nut. Valve shall be wrapped with 6 mil. polyethylene sheet. Grease all underground nuts and bolts before wrapping with the polyethylene sheet.

### 2.04 FIRE HYDRANT

A. Per County of Ventura Standard Plans & Specifications.  
2.05 WATER METER

B. Per County of Ventura Standard Plans & Specifications.

2.06 ACCESSORIES

A. Concrete for Thrust Blocks: Contractor shall construct concrete thrust block per County of Ventura Standards.

B. Thrust blocks shall be constructed to bear against undisturbed earth and shall not bear against adjacent pipe, fittings, or valves. Where concrete must be poured around adjacent pipe, a block out or a short pipe length shall be used such that a flexible joint exists within 12 inches of each side of thrust block, unless indicated otherwise on the plans. Concrete shall not be allowed to set in contact with pipe surfaces or to enter or come in contact with any joint.

C. Valve Appurtenances: The Contractor shall furnish and install all valve appurtenances. Provide two galvanized T-handled operating wrenches, 4 feet total length or as required to easily access valve from grade.

D. Valve box body shall be unreinforced concrete 8 3/4" inside diameter traffic box with cast iron ring. The valve box cover shall be cast iron. Both valve body and cover shall be Christy G3 or equal. The cover shall be marked "water." The cover of each valve box shall be provided with a 2" diameter bronze disc and the Contractor shall stamp the valve number on the disc per the Architect's instructions. The disc shall be mounted to the valve box cover or higher using stainless steel screws. The extension piece shall be 8" in diameter, Class 150 P.V.C. water line conforming to the requirements of AWWA C-900.

E. Appropriate warning detector tape shall be placed over all utilities.

1. Underground detectable warning tape shall be placed over all non-metallic underground utilities.

2. 12 gauge copper continuous location wire shall be placed on all water mains.

3.00 EXECUTION

3.01 EXAMINATION

A. Verify the existing water main sizes, class of pipes, and locations as indicated.

3.02 PREPARATION

A. Remove scale and dirt, on inside and outside, before assembly.

B. Prepare pipe connections to equipment with flanges or unions.

3.03 BEDDING

- A. Excavate pipe trench in accordance with Specification Section 02221 for work of this section. Hand trim excavation for accurate placement of pipe to elevations indicated.
- B. Place bedding material at trench bottom, level fill materials in one continuous layer not exceeding 6 inches compacted depth, compact to minimum 90 percent compaction.
- C. The compaction of the backfill material along the sides and one foot above the pipe shall be done with hand tampers to protect the pipe. Jetting is not permitted to obtain required compaction.
- D. Maintain optimum moisture content of bedding material to attain required compaction density.

### 3.04 INSTALLATION – PIPE

- A. Route pipe in straight line.
- B. Install pipe to allow for expansion and contraction without stressing pipe or joints.
- C. Install access fittings to permit disinfection of water system.
- D. Form and place concrete for thrust blocks at each elbow or change of direction of pipe main.
- E. Establish elevations of buried piping to ensure cover conforming to the District Standards. The minimum cover from the finish grade to the top of pipe is 36 inches for potable and fire waterline, any shallower cover to clear with the existing utility crossings shall be reviewed and approved by the Architect.
- F. Install 12 gauge copper continuous location wire on all water mains.
- G. Backfill trench in accordance with Specification Section 02221.
- H. Maintain separation of water main from sewer piping in accordance with the State Department of Health Services, Criteria for the Separation of Water Mains and Sanitary Sewers (Section 64630, Title 22 California Administrative Code), and State Regional Water Quality Control Board.
- I. All pipe laid in trench which is to be left for further extension (i.e., end of work day) shall have its open end covered to protect from possible rodent intrusion.

### 3.05 INSTALLATION – VALVES

- A. Set valves on solid bearing per Ventura County Water District Standard Plate No. 19.
- B. Center and plumb valve box over valve. Set box cover flush with finished grade.
- C. Provide concrete collar around valve box per Ventura County Water Districts Standard Plate No. 2.

D. Install brass valve 1 ½" diameter tags and imprint valve number per the District.

3.06 PRESSURE TEST OF WATER PIPING SYSTEM

- A. Water piping system shall be pressure tested for 2 hours at 200 psi, with no allowable drop in water pressure.
- B. All leakage tests shall be completed and approved prior to placing of permanent resurfacing.
- C. Pressure test shall be witnessed by Ventura County Water District inspector.

3.07 DISINFECTION AND BACTERIA TESTING OF WATER PIPING SYSTEM

- A. Water piping system shall be disinfected and flushed per AAWA Section C651.
- B. Before pipeline is connected to existing system, or placed in service, employ an approved independent testing laboratory to sample, test and certify water quality.

3.08 TEST RECORDS

- A. Records shall be made of each piping system installation during the test. These records shall include:
  - 1. Date of test.
  - 2. Description and identification of piping tested.
  - 3. Test fluid.
  - 4. Test pressure.
  - 5. Remarks to include such items as:
    - a. Leaks (type, location).
    - b. Repairs made on leaks.
  - 6. Certification by Contractor and signed acknowledgment by Ventura County Water District.

3.09 FIELD QUALITY CONTROL

- A. Inspection shall be performed by Ventura County Water District.

END OF SECTION



## 1.00 GENERAL

### 1.01 SUMMARY

- A. Site storm drainage piping, fittings, accessories, and bedding.
- B. Catch basins.
- C. Manholes.
- D. Inlet and outlet structures.

### 1.02 RELATED SECTIONS

- A. Section 02200 – Earthwork.
- B. Section 02221 – Trenching and backfilling.

### 1.03 REFERENCES

- A. Standard Specifications for Public Works Construction (SSPWC), 2009.
- B. Standard Plans for Public Works Construction (SPPWC), 2006.
- C. ASTM Standards.
- D. Geotechnical Study prepared by Geotechniques dated February, 2011, Project No. 1003.026.

### 1.04 SUBMITTALS

- A. Submit the following in accordance with provisions in Division 1:
  - 1. Product Data: Provide data indicating pipe, pipe accessories and catch basin grates.
  - 2. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.
  - 3. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
  - 4. Layout diagram for storm drain components per plan.

### 1.05 PROJECT RECORD DOCUMENTS

- A. Submit record drawings. Accurately record locations of pipe runs, connections, catch basins, structures, manholes and invert elevations.
- B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

### 1.06 FIELD MEASUREMENTS

- A. Verify that field measurements and elevations are as indicated on drawings.

- B. Complete pothole work per plans and notify the District of any discrepancy prior to commencing construction.

#### 1.07 COORDINATION

- A. Coordinate the work with connection to existing storm drain mains, and trenching.

### 2.00 PRODUCTS

#### 2.01 PIPE MATERIALS

- A. Polyvinyl Chloride (PVC) SDR35, per SSPWC Section 207-17.
- B. High Density Polyethylene Pipe (HDPE), per SSPWC Section 207-18.

#### 2.02 PIPE ACCESSORIES

- A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required. Fittings shall be watertight.
- B. Solvent cap cement: pipe with solvent cement joints per SSPWC Section 207-17.3.3.
- C. Appropriate warning detector tape shall be placed over all utilities.
  - 1. Underground detectable warning tape shall be placed over all non-metallic underground utilities.

#### 2.03 CATCH BASINS AND MANHOLES

- A. Precast catch basins shall include traffic rated grate, as manufactured by Brooks or approved equal.
- B. Cast-in-place catch basins shall be per SSPWC Section 303-1.
- C. Cast-in-place manhole shall be per SPPWC Standard Plan 321-1.

#### 2.04 INTERCEPT DRAIN

- A. Intercept drain shall be constructed per SSPWC Section 303.
- B. Compact top 12" of native materials below the bottom of drain to minimum 95 percent of relative density.
- C. Intercept drain pigmentation shall be Omaha Tan.

#### 2.05 METAL

- A. All exposed metal parts are to be galvanized in accordance with SSPWC Section 210-3.

#### 2.06 CONCRETE



- A. Concrete material for pipe collars and beam support, pre-cast manhole components, and catch basins:
  - 1. Class 560-C-3250 Portland Cement Concrete per SSPWC Section 201-1.
- B. Concrete material for interceptor drain:
  - 1. Class 500-C-2500P Portland Cement Concrete per SSPWC Section 201-1.
- C. Concrete material for pipe encasement, anchors, and thrust blocks:
  - 1. Class 450-C-2000 or 565-E-2000P Portland Cement Concrete per SSPWC Section 201-1

## 2.07 BEDDING MATERIALS

- A. Bedding materials shall be sand with a minimum Sand Equivalent (S.E.) of 30.

## 2.08 FILTER FABRIC

- A. Filter fabric shall be non-woven polypropylene geotextile, Mirafi 180-N or approved equal, and shall conform to SSPWC Section 213-2.

## 3.00 EXECUTION

### 3.01 EXAMINATION

- A. Verify that trench cut is ready to receive Work and excavations, dimensions, and elevations are as indicated on Drawings.

### 3.02 PREPARATION

- A. Hand trim excavations to required elevations. Correct over excavation with compacted bedding material.
- B. Remove large stones or other hard matter which could damage piping or impede consistent backfilling or compaction.

### 3.03 BEDDING

- A. Excavate pipe trench in accordance with Specification Section 02221. Hand trim excavation for accurate placement of pipe to elevations indicated on Drawings.
- B. Place sand bedding material in trench bottom, level materials in continuous layer. Bedding shall be 6" minimum thickness, compact to 90 percent density.
- C. Maintain optimum moisture content of bedding material to attain required compaction density.

### 3.04 INSTALLATION – PIPE

- A. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Construct tongue-and-groove mortar type of joint on RCP per SSPWC Section 207-2.5.

- B. Lay pipe to slope gradients noted on drawings; with maximum variation from true slope of 1/8 inch in 10 feet.
- C. Install sand backfill along sides and over top of pipe. Provide sand backfill over top of pipe to minimum compacted thickness of 12 inches, compacted to 90 percent density.
- D. Refer to Specification Section 02221 for Trenching Requirements. Do not displace or damage pipe when compacting.
- E. The compaction of the backfill material along the sides and one foot above the pipe shall be done with hand tampers or equal to protect the pipe.

### 3.05 INSTALLATION - CATCH BASINS, MANHOLES

- A. Form bottom of excavation clean and smooth to correct elevation.
- B. Form and place cast-in-place concrete base with provisions for storm drainage pipe end sections.
- C. Level top surface of concrete base to receive shaft sections.
- D. Establish elevations and pipe inverts for inlets and outlets as indicated on drawings.
- E. Compact top 12" of native materials below the bottom of catch basins and manholes to minimum 95 percent of relative density.

### 3.06 FIELD QUALITY CONTROL

- A. Inspection and testing shall be performed by the District's Testing Laboratory.
- B. Request inspection prior to and immediately after placing backfill cover over pipe.
- C. If tests indicate work does not meet specified requirements, remove work, replace and retest at no additional cost to the District.

### 3.07 PROTECTION

- A. Protect pipe and backfill cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

## 1.00 GENERAL

### 1.01 SUMMARY

- A. Site sanitary sewerage piping, fittings, accessories and bedding.
- B. Cleanouts.

### 1.02 RELATED SECTIONS

- A. Section 02200 - Earthwork.
- B. Section 02221-Trenching and Backfilling.

### 1.03 REFERENCES

- A. Standard Specifications for Public Works Construction (SSPWC), 2009.
- B. Standard Plans for Public Works Construction (SPPWC), 2006.
- C. ASTM Standards.
- D. Geotechnical Study prepared by Geotechniques dated February, 2011, Project No. 1003.026.

### 1.04 SUBMITTALS

- A. Submit:
  - 1. Product Data: Provide data indicating pipe, pipe accessories and appurtenances, and manhole covers.
  - 2. Manufacturer's Installation Instructions: Indicate special procedures required to install products specified.
  - 3. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
  - 4. Manufacturer's Certificate: Certify that installers are certified for installing plastic pipe.

### 1.05 PROJECT RECORD DOCUMENTS

- A. Submit Record Drawings: Record location of pipe runs, connections, manholes, cleanouts, and invert elevations.
- B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

### 1.06 REGULATORY REQUIREMENTS

- A. Conform to California Title 24 (CCR) Part 5, latest edition, for installation of the Work of this section.

- B. Minimum separation distance and requirements between water, reclaimed water and sewer pipes per the State of California, Department of Health Services shall be established.

## 2.00 PRODUCTS

### 2.01 SEWER PIPE MATERIALS AND ACCESSORIES

- A. Polyvinyl Chloride (PVC) Pipe for Gravity Sewer: ASTM 3034-SDR35 Ring-Tite Polyvinyl Chloride (PVC) gravity sewer pipe and fittings; inside nominal diameter as indicated on Drawings. PVC pipe shall use "locked-in" rubber sealing ring conforming to ASTM D-3212. Joints using flexible Elastomeric Seals. Minimum pipe stiffness at 5% deflection shall be 46 psi for all sizes when tested in accordance with ASTM Method of Test D2412.
- B. Appropriate warning detector tape shall be placed over all utilities.
  - 1. Underground detectable warning tape shall be placed over all non-metallic underground utilities.

### 2.02 CLEANOUTS

- A. Form and cast-in-place, Class 618-CLE-4000 P concrete base pad, with provisions for sewer pipe end section.
- B. Frame and cover shall be Alhambra Foundry Model A-1240 or equal, lettered "SEWER".

### 2.03 MANHOLES

- A. Cast-in-place manhole shall be per SPPWC Standard Plan 201-1.

### 2.04 BEDDING MATERIALS

- A. Bedding: Bedding materials shall be sand or with a minimum Sand Equivalent (S.E.) of 30.

## 3.00 EXECUTION

### 3.01 EXAMINATION

- A. Verify that trench cut and/or excavation base is ready to receive work and excavations, dimensions, and elevations are as indicated on drawings.

### 3.02 PREPARATION

- A. Hand trim excavations to required elevations. Correct over excavation with granular fill.
- B. Remove large stones or other hard matter which could damage pipe or impede consistent backfilling or compaction.

### 3.03 BEDDING

- A. Excavate pipe trench in accordance with Specification Section 02221. Hand trim excavation for accurate placement of pipe to elevations indicated on drawings.

- B. Place bedding material at trench bottom, level materials in continuous layer not exceeding 6 inches compacted depth, compact to minimum 90 percent relative density.
- C. Maintain optimum moisture content of bedding material to attain required compaction density.

#### 3.04 INSTALLATION – PIPE

- A. Install pipe, fittings and accessories in accordance with manufacturer's instructions.
- B. Sewer pipeline shall be placed from downstream to upstream beginning at the downstream connection to the existing sewers.
- C. Lay pipe to slope gradients noted on drawings; with maximum variation from true slope of 1/8 inch in 10 feet.
- D. Install bedding along sides and over top of pipe to minimum compacted thickness of 12 inches; compacted to 95 percent density.
- E. Refer to Specification Section 02221 for Trenching Requirements. Do not displace or damage pipe when compacting.
- F. Install continuous trace wire over top of pipe.
- G. Connect to building sanitary sewer lateral at 5' outside of edge of building.
- H. The compaction of the backfill material along the sides and one foot above the pipe shall be done with hand tampers to protect the pipe.

#### 3.05 INSTALLATION – CLEANOUTS

- A. From bottom of excavation clean and smooth to correct elevation.
- B. Establish elevations and pipe inverts for inlets and outlets as indicated on drawings.
- C. Mount lid and frame level in grout, secured to cone section to elevation indicated on drawings.

#### 3.06 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed by the District's Testing Laboratory.
- B. Request inspection prior to, and immediately after placing bedding.
- C. Compaction testing will be performed in accordance with ASTM D1557 by the District's Test Laboratory.
- D. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to the District.

### 3.07 FIELD TESTS ON INSTALLED SEWER PIPE

- A. Preliminary Tests: The Contractor may perform any tests desired which are not harmful to the lines before backfilling is completed.
- B. Cleaning: Before final tests are performed for acceptance of any sewer pipe, clean the pipe by inflatable rubber ball method.
- C. Perform air pressure test per SSPWC Section 306-1.4.4.
- D. Repairs, if necessary: If the leakage or infiltration is greater than the amount specified, the pipe shall be overhauled and re-laid if necessary by the Contractor, at its own expense, until the joints will hold satisfactorily.
- E. Regardless of the results of the above tests, any visible evidence of individual leaks shall be corrected by the Contractor to the satisfaction of the Architect.
- F. Cleaning Sewer: After all backfilling, compaction testing and paving is completed, sewer lines shall be cleaned by Inflatable Rubber Ball Method, flushed and cleaned, before acceptance by the Architect and connection to their sewer system is made.
- G. The Contractor shall furnish all sewer line plugs necessary for blocking off all lines as required by the Architect until final acceptance.

### 3.08 PROTECTION

- A. Protect finished installation.
- B. Protect pipe and aggregate cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

1.00 GENERAL

## 1.01 SECTION INCLUDES

- A. Landscape irrigation system piping, valves and heads.
- B. Landscape irrigation system controller.

1.02 RELATED SECTIONS

- A. Section 02222 - Excavating, Backfilling and Compacting for Utilities
- B. Section 02900 - Landscape Planting.

1.03 SYSTEM DESCRIPTION

- A. System Description: Electric solenoid-controlled underground irrigation system.
- B. Source Power: 120 volt, 60 Hz, 1 phase.
- C. Low Voltage Controls: 24 volt.
- D. Irrigation System Drawings: Provide complete landscape irrigation system for landscaping indicated on Contract Drawings. Contract Drawings are schematic and do not indicate all offsets, fittings, sleeves and other components necessary for irrigation system. Field adaptations of design intent shall be made to accommodate actual Project conditions.

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01340.
- B. Materials List: Prior to installation of products, submit a detailed list of each material proposed for use. Prepare typewritten material list using the following format.

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>MANUFACTURER</u>	<u>MODEL NO.</u>
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- C. Project Record Drawings:
  1. Submit complete project record drawings on reproducible media, showing exact locations of all installed items dimensioned from permanent structures. Submit project record drawings prior to Substantial Completion Inspection.
  2. Dimension the following irrigation system components from two permanent points of reference:
    - a. Main lines.
    - b. 24-volt control and common wiring.
    - c. Automatic valves, gate valves, quick coupling valves.
    - d. Points of connection.
- D. Controller Charts:
  1. Submit controller charts with project record drawings.

2. Prepare charts after project record drawings have been reviewed and accepted by Owner.
3. Provide controller charts as follows:
  - a. Chart may be a reproduction of the project record drawing, if the scale permits fitting controller doors. If photo reduction prints are required, keep reduction to maximum size possible to retain full legibility of all linework and text.
  - b. Reproduce charts on blackline media, indicating as-built condition of irrigation system and indicating area covered by the subject controller.
  - c. Identify areas of coverage of each remote control valve using distinct pastel color tones over the applicable area.
4. Submit charts for review before Substantial Completion Review.
5. Following acceptance of charts by District, hermetically seal between two layers of 20 mil thick plastic sheet and mount inside controller doors.

#### 1.05 QUALITY ASSURANCE

- A. Permits: Obtain and pay for all permits and inspections required by governing authorities having jurisdiction.
- B. Regulatory Requirements: Comply with all codes, ordinances and standards of governing authorities having jurisdiction over Work.
- C. System Adaptation: Provide components as necessary to avoid conflicts and to accommodate above-grade features and below-grade structures, piping and conduit systems. Adapt layout to suit grading and paving sequencing, including additional components, at no change in Contract Time and Contract Sum.
- D. Coordination: Coordinate layout of irrigation system to suit points of electrical and water services, plant materials and supports. Installation resulting in conflicts shall be re-constructed at no change in Contract Time and Contract Sum.
- E. Protection: Erect and maintain barricades, warning signs and lights, and provide guards as necessary or required to protect all persons on the site.
- F. Electrical Products: All electrical wiring, controls, motors, and devices shall be UL listed and so labeled.
- G. Manufacturer's Qualifications: Company specializing in manufacturing the products specified in this Section, with minimum three years documented experience.
- H. Installer's Qualifications: Company specializing in performing the Work specified in this Section with minimum 5 years documented experience.

#### 1.06 DELIVERY, STORAGE AND HANDLING

- A. Protection: Protect all materials to prevent intrusion of dirt and moisture.
- B. Storage: Store piping materials to prevent breakage, damage to ends and intrusion of dirt. Store



plastic piping to protect from excessive ultraviolet (UV) exposure. Store valve, control and electrical components in clean, dry, enclosed location to prevent damage, soiling and loss.

## 1.07 WARRANTY

- A. Warranty: All Work specified in this Section shall be guaranteed against all defects and malfunction of workmanship and materials by the Contractor for a period of one (1) year from the date of final acceptance by the District.
1. Should any trouble develop within the time specified above, all necessary repairs and/or replacements shall be made by the Contractor, in an expedient manner, at no additional cost to the District.
  2. The District retains the right to make emergency repairs without relieving Contractor's guarantee obligation.
- B. Repairs by Owner: In the even the Contractor does not respond to the District's request for repair work under this guarantee within a period of 48 hours, the District may make such repairs as District may deem necessary and Contractor shall reimburse District the full expense of such repairs.
- C. Settlement of Backfill: All settling of backfilled trenches that occurs during the guarantee period shall be repaired by Contractor at no expense to the District, including the complete restoration of all damaged planting, paving and other improvements affected by such settling.

## 2.00 PRODUCTS

### 2.01 MANUFACTURERS

- A. Acceptable Manufacturers: See Irrigation Legend on Drawings. Additional manufacturers will be considered in accordance with the "or equal" provision specified in Section 01600 - Product Handling.

### 2.02 PIPING SYSTEM

- A. Piping, General: All piping shall bear the following markings.
1. Manufacturer's name.
  2. Nominal pipe size.
  3. Standard to which manufactured.
  4. Schedule or Class.
  5. NSF seal of approval.
  6. Date of extrusion.
- B. Pipe Fittings, General: All fittings shall bear the following markings.
1. Manufacturer's identifying mark (trademark or seal).
  2. Standard to which manufactured.
  3. NSF seal of approval.
- C. Main Pipe: From point of connection to circuit valves, provide as follows.
1. PVC pipe, ASTM D2241, 315 psi, pressure rated, solvent welded sockets.
- D. Circuit Pipe: From circuit valves on, provide as indicated on drawings.

1. PVC pipe, ASTM D1785, Schedule 40, solvent welded sockets.
- E. Pipe Fittings: Provide to suit piping type and as follows.
1. For PVC plastic pipe, ASTM D2466 socket fittings.
- F. Solvent Cement: ANSI/ASTM D2564 for PVC pipe and fittings.
- G. Sleeve Material: PVC Schedule 40.
- H. Valves: Manufacturer, model, and size as indicated on drawings.
- I. Irrigation Outlets: Manufacturer, model, and size shall be as indicated on the Drawings.
- J. Quick Coupler: Two-piece type brass body, 150 pound class, with 3/4-inch female threads opening at base, permitting operation with a special connecting device (coupler) designed for this purpose.
1. Manufacturer and model shall be as indicated on the Drawings.
- K. Valve Box and Cover: Carson Industries #1419, plastic body with bolt-down cover. Covers shall be heat engraved "GV" or "RCV" with station numbers for control valves by Contractor. Valve boxes are not to be installed in hardscape or traffic areas.
- L. Irrigation Controller: Per drawings.
- M. Sprinkler Heads: Per drawings.

### 2.03 ELECTRICAL WIRING AND SERVICE

- A. Low Voltage Service and Connections:
1. Connections between controller and remote control valves shall be made with direct burial AWG-UF, 600 volt wire, insulation thickness 3/64-inch, utilizing low density high molecular weight polyethylene insulation, minimum 14 AWG.
  2. Common wires: White, with unique color strip for each controller.
  3. Splicing Materials: Pen-Tite or equal. Use one splice per connector pack.
  4. Control wires running under all walks, paving and/or any other hardscape shall be sleeved with SCH 40 PVC plastic pipe.

### 2.04 OPERATION AND MAINTENANCE MATERIALS

- A. Operation and Maintenance Tools: Furnish the following operating and maintenance tools to District.
1. Four valve box keys for lock lid valve boxes.
  2. Two quick coupler fittings and matching hose swivels.
- B. Delivery: Deliver operating and maintenance materials to District prior to date established in Certificate of Completion of irrigation system Work.

## 3.00 EXECUTION

### 3.01 SYSTEM DESIGN

- A. Design Pressures: As indicated on the Drawings.
- B. Location of Heads: Design location is approximate. Make minor adjustments as necessary to avoid plantings and other obstructions.
- C. Minimum Water Coverage:
  - 1. Turf areas, 95 percent.
  - 2. Other planting areas, 85 percent.
- D. Piping Layout: Piping layout indicated is diagrammatic only. Route piping to avoid plants, ground cover, and structures. Layout may be modified, if necessary to obtain coverage, to suit manufacturer's standard heads. Do not decrease number of heads indicated unless directed.
- E. Staking: Layout and stake locations of system components before trenching. Review layout requirements for adjacent and affected Work. Coordinate locations of sleeves under paving to accommodate system.
- F. Verification of Dimensions:
  - 1. Verify all horizontal and vertical site dimensions prior to layout of heads. Do not exceed spacings shown on drawings for any given area. If such modified spacings demand additional or less materials than shown on the drawing, notify the Architect before beginning any work in the adjusted area.

### 3.02 TRENCHING AND BACKFILLING

- A. General: Comply with trenching and backfill requirements specified in Section 02225 - Trenching and Backfilling.
  - 1. Excavate trenches straight and true with bottom uniformly sloped to low points.
  - 2. Excavate trenches to required depths, with bottom of trenches flat to ensure piping is supported continuously to an even grade.
  - 3. Where lines occur under paved areas, provide sleeves to bear imposed loads or increase trench depth to prevent crushing loads on piping.
- B. Trenching at Existing Trees: Where necessary to excavate adjacent to existing trees, use all possible care to avoid injury to trees and tree roots.
  - 1. At locations with tree roots 2-inches diameter and larger, excavate by hand and tunnel under and around root. Cover root heavily with burlap to prevent scarring and excessive drying.
  - 2. At locations with tree root smaller than 2-inches diameter, ditching machine may be used to make clean cuts through roots, with wall of trench hand trimmed.
  - 3. Complete Work and close trenches adjacent to trees within 24 hours.
- C. Clearances: Provide not less than 6-inches clearance between each irrigation system line and not less than 6-inches clearance between irrigation system lines and lines of other systems, unless otherwise indicated. Do not install parallel lines directly over other lines (stacked arrangement).
- D. Trench Depth: Excavate trenches to a depth of 3-inches below invert of pipe, unless otherwise indicated, and to provide cover as specified following. Trench to

accommodate grade changes and slope to drain. Maintain trenches free of debris, material, or obstructions that may damage pipe.

- E. Minimum Cover: Provide following minimum cover over top of installed piping:
  - 1. Minimum cover over installed supply piping: 18-inches.
  - 2. Minimum cover over installed mainline piping: 18-inches.
  - 3. Minimum cover over installed lateral outlet piping: 12-inches.
  - 4. Minimum cover over control wire: 18-inches.
- F. Bedding and Initial Backfill: Clean, fine granular material complying with requirements specified in Section 02222 - Excavating, Backfilling and Compacting for Utilities.
- G. New Paved Areas: Coordinate installation of piping, sleeving and wires under paved areas to avoid cutting and patching of completed paving.
- H. Wiring at paved Areas: All wires under paved areas shall be continuous.

### 3.03 IRRIGATION SYSTEM INSTALLATION

- A. Irrigation System Installation, General: Unless otherwise indicated, comply with requirements of California Plumbing Code (CPC).
- B. Connection to Main:
  - 1. Connect to supply piping at location indicated. Verify location in field.
- C. Existing Water Service: Schedule temporary water shut-off at Owner's convenience.
- D. Valve Box Installation: Fill area under box with pea gravel as shown on Drawings before box is installed.
- E. Circuit Valves: Install in valve box, arranged for easy adjustment and maintenance.
  - 1. Adjust automatic control valves to provide flow rate of rated operating pressure required for each sprinkler circuit.
  - 2. Valve Identification: Install aluminum identification tags on each valve solenoid "pigtail," indicating controller circuit number.
- F. Piping: Lay pipe on compacted sub-base, uniformly sloped without humps or depressions.
  - 1. Install PVC pipe in dry weather when temperature is above 40 degrees F in accordance with manufacturer's instructions. Allow joints to cure at least 24 hours at temperature above 40 degrees F before testing, unless otherwise recommended by manufacturer.
  - 2. Use threaded schedule 80 nipples for risers to each outlet.
  - 3. Piping and electrical sleeves under paving shall be set in place prior to paving work. If pipe must be laid after paving is in place, it shall be done by jacking, boring, or hydraulic driving. If cutting or breaking of any paving is necessary, it shall be done and replaced with like material at the expense of the Contractor. Obtain approval of District prior to any cutting or breaking. Hydraulic driving will not be permitted under asphalt paving. All lines set in place under paving shall extend 18-inches minimum beyond such paving and be capped hand tight. No fittings, including coupling, will be permitted under

surfaces to be paved except where the length of the line under the paving exceed 20 feet or where lines are encased in sleeves, except where shown on the drawings.

- G. Plastic Pipe and Fittings: Install piping in accordance with manufacturer's instructions and recommendations.
- H. Plastic Pipe and Threaded Fittings: Assembled using Teflon tape applied to male threads only.
- I. Quick Coupling Valves: Unless otherwise indicated, locate valves within 12 inches of hardscape.
- J. Sprinkler Heads: Flush circuit lines with full head of water and install heads after hydrostatic test is completed.
  - 1. Locate part-circle heads to maintain a minimum distance of 4-inches from walls and 2-inches from other boundaries, unless otherwise indicated.
- K. Dielectric Protection: Use dielectric fittings at connection where pipes of dissimilar metal are joined.
- L. Control Wiring: Install control wiring in accordance with requirements specified in Division 16 - Electrical.
  - 1. Place wiring in same trench and along the same routing as pressure supply lines unless otherwise approved.
  - 2. Install wiring prior to main line whenever possible.
  - 3. When more than one wire is placed in a trench, tape wires together at maximum 10 feet on center.
  - 4. Provide a 12-inch expansion loop at each connection and directional change.
  - 5. Use a continuous wire between existing control wire stub-out and remote control valves.
  - 6. Except as otherwise approved, do not splice wire at any point. All approved splices shall be enclosed in an acceptable box.
- M. Pipe Clearing: After pipe is installed, but before outlets are installed and backfilling commences, open valves and flush system with full head of water.

### 3.04 OBSERVATION AND TESTING

- A. Observations: Observations will be performed by District's Representative, at the following times and at random times during installation.
  - 1. Do not cover irrigation system components, except as specified for lines under paving, until system performance has been observed.
  - 2. Request observations in writing at least 72-hour in advance of tests to be observed. Layout: Observation to verify system layout will be made.
  - 3. Flushing: Observations of system flushing will be made.
  - 4. Pressure Tests: Observations of pressure tests will be made.
  - 5. Coverage: Observations of sprinkler system operation will be made to verify performance before placing plant materials.
  - 6. Communications during observations: Provide handheld radio equipment or message personnel for expeditious communication from review area to automatic controllers.

7. Provide up-to-date project record drawings at each review.
- B. Hydrostatic Test: Test Water piping and valves, before backfilling trenches, to a hydrostatic pressure of not less than 150 psi for two hours, unless otherwise directed. Pressure changes shall be installed at the point of connection and at major extremities of the pressure supply lines.
    1. Provide all equipment necessary to test systems, including force pump.
    2. Do not backfill over lines any more than necessary for stability during testing, until line has been observed, and tested.
    3. Do not install remote control valves, quick couplers or any other valve assembly until testing is completed and results accepted.
    4. Piping may be tested in sections to expedite Work.
    5. Remove and repair piping, connections, valves which do not pass hydrostatic testing.
    6. System will be considered acceptable if no leakage or loss of pressure occurs during test period.
  - C. Testing of Piping Under New Paving: Pressure test piping for each section under paving at the time of installation. Advanced testing of piping under paving will be accepted only if piping length is over 20 feet. Upon completion of entire irrigation system piping, test system including segments under paving.
  - D. Operational Testing: Perform operational testing after hydrostatic testing is completed, backfill is in place, and sprinkler heads are adjusted to final position.
    1. Demonstrate that system meets coverage requirements and that automatic controls function properly.
    2. Make all necessary adjustments, including realignment of heads, to provide required coverage as directed.
    3. Coverage requirements are based on operation of one circuit at a time.
    4. Should any components be found to be inoperative or functioning improperly, make corrections immediately by adjustment or, if component cannot be adjusted, by replacement with new material of like kind, at no change in Contract Sum or Time.

### 3.05 BACKFILLING

- A. Piping Trench Backfilling: Backfill trench to subgrade elevation as specified in Section 02222 - Excavating, Backfilling and Compacting for Utilities, to 90 percent. Place backfill material in 6-inch lifts, compacting each lift.
- B. Grading: Restore finish grade to adjacent grades, free of dips, depressions, humps or other irregularities.

### 3.06 ADJUSTMENT

- A. Adjustment: Adjust landscape irrigation system after completion of grading, seeding or sodding, and rolling of grass areas.
- B. Sprinkler Head Height Adjustment: Adjust lawn sprinkler heads so they will be flush with or not more than 1/2-inch above finish grade.
- C. Control System Adjustment: Adjust control system to achieve time cycles required.

- D. Outlet Coverage Adjustment: Adjust outlets for correct water coverage area and rate. Remove and replace outlet heads as necessary to achieve system performance.

3.07 INSTRUCTION

- A. Instruction: Instruct District's personnel in operation and maintenance of system, including adjusting of sprinkler heads.
- B. Scheduling: Provide instruction at the District's convenience prior to Substantial Completion review.

END OF SECTION





1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Bus Benches
  - 2. Litter Receptacle

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 05500: Miscellaneous Steel

1.03 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Materials list of items proposed to be provided under this Section.
- C. Manufacturer's specifications, catalogues, shop drawings and other data needed to prove compliance with the specified requirements with regards to size, materials, finish, anchorage and quantities of items being supplied.
- D. Shop Drawings: Indicate size, fabrication and mounting requirements. Indicate number, attachments and any other factor which may govern installations.

1.04 REQUIREMENTS

- A. The components indicated on the Drawings show dimensions established to accomplish the Architect's intended visual intent. The Contractor shall verify that the components that will be actually provided for the work of this Section will conform to the visual design criteria and profiles indicated on the drawings without materially altering profiles and alignments.
- B. Any additional support or footings required for the components shall be provided and installed as part of the work of this Section.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

Protect the site furnishings and related components during shipment by means of crates and/or padding so that they arrive at the project undamaged. Protect fixtures, before, during and after installation until acceptance by Architect and acceptance by the District.

2.00 PRODUCTS

## 2.01 BENCHES

- A. Description: Model to be "Plexus II" as manufactured by Landscape Forms, (800) 521-2546. Unit to be straight, backed and embedded anchorage. Color: Provide manufacturers standard Pangard II polyester powder-coat / grey
- B. Quantities: Verify quantity / length(s) with drawing details, the Architect and the District. Provided by Larry Casey & Associates, (818) 761-0655.

## 2.02 LITTER RECEPTACLE / TRASH CAN

- A. Description: Model to be 'SPexus litter receptacle', as manufactured by Landscape Forms, (800) 521-2546. Unit to be 28" top-opening, vertical strap. Color: Provide manufacturers standard Pangard II polyester powder-coat / grey
- B. Quantities: Verify quantity / length(s) with drawing details, the Architect and the District. Provided by Larry Casey & Associates, (818) 761-0655.

## 3.00 EXECUTION

### 3.01 FIELD CONDITIONS

- A. Verify drawing dimension with actual field conditions. Inspect related work and adjacent surfaces, affecting installation. Examine substrate surfaces to receive work of this section and associated work and conditions under which work will be installed.
- B. Report to Architect any conditions which prevent proper execution of this work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the installer. Starting of work will be construed as applicators acceptance of conditions.

### 3.02 INSTALLATION

- A. Install units in accordance with manufacturer's latest published requirements / instructions, specifications, details and approved shop drawings.
- B. Use manufacturer's supplied anchors required for installing and attaching the equipment / components specified herein.
- C. Erect the components, plumb and level, square, true to lines, neat and finished appearance, and/or elevations shown on the Drawings.
- D. Include setting of each item in its correct place, fastening it, as each item may require. Position supports and anchorage devices and set components in place prior to securing fasteners.

### 3.03 CLEANING

Clean soiled units using methods recommended by unit manufacturer. Use extreme care to prevent damage to unit surfaces and surrounding materials.

### 3.04 PROTECTION

- A. Protect all installed work and equipment / components from damage by subsequent construction operations. Damaged or marred work shall be repaired or replaced to the Architects satisfaction.
- B. Patching shall be field mixed and applied, using materials / mixtures to match color and texture of surrounding finish, as factory applied. Replace units which cannot be acceptably patched.
- C. Patches noticeable from a distance of 5'-0" are not acceptable.

END OF SECTION



## 1.00 GENERAL

### 1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division 1 apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Provide bicycle racks including accessories as required for a complete, finished installation.

### 1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 05500: Miscellaneous Steel

### 1.03 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Shop Drawings: Indicate construction, materials, dimension, thickness, fabrication details, finish and method of anchorage.
- C. Manufacturer's specifications, catalogues, shop drawings and other data needed to prove compliance with the specified requirements. Information shall include dimensions, fabrication materials, finish, required anchorage and quantity of items being supplied.

### 1.04 REQUIREMENTS

- A. The components indicated on the Drawings show dimensions established to accomplish the Architect's intended visual / design intent. Contractor shall verify that components provided for the work will fit the visual design criteria and profiles indicated on the drawings without materially altering profiles and alignments.
- B. Any additional footings required for the components of this section shall be provided / installed as part of this work.

### 1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

Protect products and related components during shipment by means of crates and/or padding so that they arrive at the project site undamaged. Protect fixture before, during and after installation until acceptance by Architect and acceptance by District.

## 2.00 PRODUCTS

### 2.01 BICYCLE RACKS

- A. Description:
1. Units to be manufactured from 2-3/8" (2.375") diameter Schedule 40 steel tubing pipe 0.154 inch thick. Rack is to be a minimum 35 inch high serpentine type stand. Finish to be a hot-dipped galvanized with in-ground type anchoring. Refer to Architect for exact mounting detail.
  2. Quantity: Unit(s) are to be manufactured to accommodate 6-7 bicycles per rack. Refer to drawing details and Architect for number of racks required / total number of bicycles that are to be parked.
    - Park, Play and More, (888) 260-7529
    - Columbia Cascade, (503) 223-1157 - Original Cycloops 2170-13-P-C
    - Brandir International, Inc., (212) 505-6500 - The Original Ribbon Rack
    - Madrax, Inc., (800) 448-7931 - Heavy Duty Winder
    - Bike Security Systems - Bike Stanchions
    - Keyrac II / KY2, (Class I) - manufactured by Sports Rack (800) RACK USA; or approved equal.

### 3.00 EXECUTION

#### 3.01 FIELD CONDITIONS

- A. Verify drawing dimension with actual field conditions. Inspect related work and adjacent surfaces affecting installation. Examine substrate surfaces to receive work of this section and associated work and conditions under which work will be installed. Where embeds are indicated as being placed in the concrete slab for mounting / welding of surface mounted flanges, verify sizes required and placement locations required.
- B. Report to Architect any conditions which prevent proper execution of this work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the installer. Starting of work will be construed as applicators acceptance of conditions.

#### 3.02 INSTALLATION

- A. Install unit(s) in accordance with manufacturer's latest published requirements / instructions, specifications, details and approved shop drawings.
- B. Use manufacturer's supplied anchors required for installing / attaching the equipment / components specified herein, including methods for placement.
- C. Erect the components, plumb and level, square, true to lines, neat and finished appearance, and / or elevations shown on the Drawings.
- D. Include setting of each item in its correct location, or incorporating it into other portions of the work, as each item may require.

#### 3.03 CLEANING

Clean soiled finished surfaces of units using methods / materials / cleaners recommended by unit manufacturer. Use extreme care to prevent damage to unit surface finishes and surrounding materials.

3.04 PROTECTION

- A. Protect all installed work and components from damage by subsequent construction operations. Damaged or marred work shall be repaired or replaced to the Architects satisfaction.
- B. Patching and repair of finishes shall match finish and texture of surrounding finish. Replace units which cannot be acceptably patched / repaired.
- C. Patches and repairs noticeable from a distance of 5'-0" are not acceptable, as determined by the Architect.

END OF SECTION





1.00 GENERAL1.01 SCOPE

- A. Topsoil.
- B. Soil preparation and amendments.
- C. Finish grading of landscape areas.
- D. Providing and planting materials, including the following:
  - 1. Trees.
  - 2. Shrubs.
- E. Relocation and planting of existing trees.
- F. Lawns, seeded.
- G. Miscellaneous landscape materials.
- H. Initial maintenance of landscape materials for 90 days.

1.02 RELATED SECTIONS AND DOCUMENTS

- A. Document - Geotechnical Data: Existing soil conditions.
- B. Section 02100 - Site Clearing. Removal and disposal of existing plant materials not indicated for relocation or preservation.
- C. Section 02221 - Excavating, Backfilling and Compacting for Structures: Requirements for finish grading in landscaping areas.
- D. Section 02810 - Landscape Irrigation. Irrigation system for landscaping.

1.03 DEFINITIONS

- A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel and Brome Grass.
- B. Plants: Living trees, plants and ground cover specified in this Section, and described in ANSI Z60.1.

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01340.
- B. Samples: Topsoil. Submit three 10-lb. samples of topsoil fill to testing laboratory, in air-tight

containers.

- C. Project Record Drawings: Accurately record location of all underground utilities and changes in finish elevations and gradients which materially affect drainage.
- D. Plant and Material Certifications:
  - 1. Certificates of inspection as required by governing authorities having jurisdiction.
  - 2. Manufacturer's or vendor's certified analysis for soil amendments and fertilizer materials.
  - 3. Label data substantiating that plants, trees, shrubs and planting materials comply with specified requirements.
- E. Planting Schedule: Proposed planting schedule, indicating dates for each type of landscaping Work during normal seasons for such work in area of site. Correlate with specified maintenance periods to provide maintenance from date of Substantial Completion review. Once accepted, revise dates only as approved in writing, after documentation of reasons for delays.
- F. Substitutions:
  - 1. If any plant specified is not obtainable, submit a written request for substitution.
  - 2. Substitutions of plant materials will not be permitted unless authorized in writing.
  - 3. Refer to Section 01300.
- G. Selection, Tagging and Ordering Plant Material:
  - 1. Submit request for inspection and documentation to the Architect/Engineer and University at least one month prior to start of landscape planting Work, certifying that all plant materials have been ordered.
  - 2. Plants shall be subject to inspection and rejection by the Architect/Engineer and District at place of growth and after delivery, for conformance to Specifications.

#### 1.05 QUALITY ASSURANCE

- A. Nursery's Qualifications: Company specializing in growing and cultivating the plants with three years documented experience and which is regularly inspected by the State Department of Agriculture.
- B. Installer's Qualifications: Landscaping Work shall be performed by a single firm specializing in commercial landscaping.
- C. Source Quality Control:
  - 1. General: Ship landscape materials with certificates of inspection required by governing authorities. Comply with regulations applicable to landscape materials.
  - 2. Do not make substitutions. If specified landscape material is not obtainable, submit proof of non-availability to Architect/Engineer and District together with proposal for use of equivalent material.
  - 3. Analysis and Standards: Package standard products with manufacturer's certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

4. Topsoil: Before delivery of topsoil, submit independent laboratory analysis of topsoil fill. Analysis shall indicate percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value. Submit data to independent testing and inspection agency for Project, as specified in Section 01400 - Quality Control, for approval.
  5. Trees, Shrubs and Plants: Provide trees, shrubs and plants of quantity, size, genus, species and variety shown and scheduled for landscaping Work and complying with recommendations and requirements of ANSI Z60.1 - American Standard for Nursery Stock. Provide healthy, vigorous stock, grown in recognized nursery in accordance with good horticultural practice and free of disease, insects, eggs, larvae and defects such as knots, sun-scald, injuries, abrasions or disfigurement.
  6. Label at least one tree and one shrub of each variety with a securely attached waterproof tag bearing legible designation of botanical and common name.
    - a. Dimensions: The height and spread of all plant material shall be measured with branches in their normal positions. The caliper of other dimensions of any plant materials shall be of standard quality and size for type listed. When the same species of tree is shown in a group planting on the plan, all trees in the group shall match in height, spread and appearance.
  7. Inspection: Architect/Engineer will inspect box size trees at place of growth before delivery, for compliance with requirements for genus, species, variety, size and quality. The District retains right to further inspect trees and shrubs for size and condition of balls and root systems, insects, injuries and latent defects, and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
- F. Regulatory Requirements: Comply with requirements of governing authorities having jurisdiction.
1. Fertilizer and Herbicide: Provide certificate of compliance from governing authority having jurisdiction indicating approval of fertilizer and herbicide mixture.
  2. Plant Materials: Certified by state department of agriculture; free of disease or hazardous insects.
- G. Industry Standards: The following standards shall be reference form a part of this Section.
1. Standardized Plant Names latest edition, issued by the American Joint Committee on Horticulture Nomenclature.
  2. American Standard for Nursery Stock, latest edition issued by the American Association of Nurserymen, Inc.
- H. Inspection:
1. All inspections herein specified shall be made by the Architect/College. Contractor shall request at least 48 hours in advance of the time inspection is required.
  2. Inspection will be required for the following parts of the work:
    - a. When preliminary grading is completed prior to soil preparation.
    - b. Completion of soil preparation.
    - c. Plants prior to delivery to site prior to installation.

- d. When plant material is spotted for installation but before planting holes are excavated and when specimen tree locations are staked.
- e. Specimen trees at source, before delivery. All trees shown in tree masses shall be matched in form and height, general appearance, and shall be approved at the nursery before delivery.
- f. When finish grading is completed in ground cover and other planting areas.
- g. Lawn areas prior to seeding or sodding.
- h. Final inspection prior to acceptance of project.

#### 1.06 COMPLIANCE TESTING

- A. The District may perform testing of raw materials used for soil preparation and backfill of plant holes. In addition, tests may be performed to verify proper blending and quantities of materials used on conditioning soil in planting areas. Test shall be performed by a Soils Laboratory selected by the District. The District will pay for testing if compliance is verified. In the event of noncompliance, the Contractor at no additional expense to the District shall make necessary corrections by adding, properly mixing, or otherwise adjusting backfill mixes in the manner to be specified by the District. Contractor shall pay for testing that shows any noncompliance and any subsequent testing required until conformance has been attained.

#### 1.07 DELIVERY, STORAGE AND HANDLING

- A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis and name of manufacturer. Protect materials from deterioration during delivery and while stored on site.
- B. Fertilizer: Deliver fertilizer in waterproof bags showing weight, chemical analysis and name of manufacturer.
- C. Plant Materials, General: Plants damaged during transit or delivery, or exhibiting broken limbs, defoliation or damage from heat, frost or wind, shall be rejected at the project site and replaced with new stock at no change in Contract Time or Sum.
- D. Handling Plants, General: Handle plants in a manner to avoid any damage to the plant. Protect plants at all times from sun or drying winds. Plants that cannot be planted immediately upon delivery shall be kept in the shade, well protected and adequately watered.
- E. Trees and Shrubs: Deliver trees and shrubs after preparations for planting have been completed and plant immediately. Keep plants moist.
  - 1. Do not prune prior to delivery unless otherwise approved by Architect / Engineer.
  - 2. Do not bend or bind-tie trees or shrubs in such manner as to damage bark, break branches or destroy natural shape.
  - 3. Provide protective covering during delivery.
  - 4. If planting is delayed more than 6 hours after delivery, set trees and shrubs in shade, protect from weather and mechanical damage, and keep roots moist by covering with mulch, burlap or other acceptable means of retaining moisture.
- F. Ground Covers: Deliver plant materials immediately prior to placement. Keep plants moist. Do not remove container-grown stock from containers until planting time.

1.08 PROJECT CONDITIONS

- A. Utilities: Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate, as required. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.
- B. Excavation: When conditions detrimental to plant growth are encountered, such as rubble fills, adverse drainage conditions, or obstructions, notify Architect/Engineer before planting.

1.09 SEQUENCING AND SCHEDULING

- A. Planting Time: Proceed with, and complete landscaping Work as rapidly as portions of site become available.
  - 1. Correlate planting with specified maintenance periods to provide maintenance from date of Substantial Completion review.
  - 2. All irrigation work shall be inspected and approved before start of any work of this Section.
- B. Coordination with Lawns: Plant trees and shrubs after final grades are established and prior to planting of lawns, unless otherwise acceptable to Architect/Engineer. If planting of trees and shrubs occurs after lawn work, protect lawn areas and promptly repair damage to lawns resulting from planting operations.
- C. Coordination with Utilities: Underground Utilities and Obstructions: Verify the location of all underground utilities and other obstructions that may affect the work. Report any obstructions encountered to Architect/Engineer and District. Repair all damage to any know utility line or other underground obstruction at no change in Contract Time or Contract Sum.

1.10 WARRANTY

- A. Warranty for Lawns: Through specified lawn maintenance period.
- B. All plant material shall be guaranteed by the Contractor as to growth and health for the following period of time from date of final acceptance:
  - 1. One, five, fifteen gallon shrubs, trees and vines: 90 days.
  - 2. Ground covers: 90 days.
  - 3. Specimen box trees 20" box and larger: 1 year.
- C. Remedial Work Under Warranty: Remove and replace trees, shrubs or other plants found to be dead or in unhealthy condition during warranty period. Make replacements during growth season following end of warranty period. Replace trees and shrubs which are in doubtful condition at end of warranty period; unless, in opinion of Architect/Engineer, it is advisable to extend warranty period for a full growing season.
  - 1. Another warranty inspection will be conducted at end of extended warranty period, if any, to determine acceptance or rejection.
  - 2. Only one replacement (per tree, shrub or plant) will be required at end of warranty period, except for losses or replacements due to failure to comply with specified requirements.

1.11 MAINTENANCE SERVICE

- A. Maintenance Service: Maintain plant life for 90 days after Date of Substantial Completion and until final acceptance.
- B. If plantings are not acceptable at the end of the maintenance period, due to defective maintenance, the maintenance shall be continued by the Contractor until all work meets the Specifications and can be approved.
- C. Maintenance shall include continuous operations of watering, weeding, mowing, rolling, trimming, edging, cultivating, fertilizing, spraying, insect and pest control, seeding and/or other operations necessary to assure good normal growth.
- D. All planted areas shall be kept free of debris and shall be weeded at not more than 10-day intervals. Grass, when 2-1/2 inches high, shall be cut immediately to 1-1/2 inches high and shall be mowed whenever the grass grows to 2-1/2 inches high.
- E. During the installation period and maintenance, the Contractor shall be responsible for maintaining adequate protection for all areas. Any damaged plantings shall be repaired at the Contractor's expense.
- F. At the termination of the maintenance period, all plant materials shall be live, healthy, undamaged and free of infestations. All lawn areas shall be completed covered at the time of final acceptance. Inferior plantings shall be replaced and brought to a satisfactory condition before final acceptance of the work will be made. All groundcover and shrub areas shall be neatly raked and free of weeds.

## 2.00 PRODUCTS

### 2.01 TOPSOIL

- A. Topsoil: Topsoil will be stockpiled for re-use in landscaping Work. If quantity of stockpiled topsoil is insufficient, provide additional topsoil as required to complete landscaping Work.
- B. Imported Topsoil: Fertile, friable, natural loam, surface soil, reasonably free of subsoil, clay lumps, brush, weeds and other litter, and free of roots, stumps, stones larger than 2-inches in any dimension, and other extraneous or toxins matter harmful to plant growth.
  1. Obtain topsoil from local sources or from areas having similar soil characteristic to that found at Project site.
  2. Obtain topsoil only from naturally, well-drained sites where topsoil occurs in a depth of not less than 4 inches.
  3. Do not obtain from bogs, marshes or other wetlands.
  4. Include amending and fine grading of topsoil to suit Project conditions. Include fertilizing of topsoil as specified. If the soils analysis results in need for additional fertilizing or a change to the specified amendments, a Change Order may be issued in accordance with the provisions of the Conditions of the Contract if it can be demonstrated that no suitable topsoil is available within 20 miles of the Project site.

### 2.02 SOIL AMENDMENTS

- A. Lime: Natural dolomite limestone containing not less than 85 percent of total carbonates with a minimum of 30 percent magnesium carbonates, ground so that

not less than 90 percent passes a 10-mesh sieve and not less than 50 percent passes a 100-mesh sieve.

- B. Aluminum Sulfate: Commercial grade.
- C. Peat Humus: Finely divided peat, so completely decomposed and free of fibers that its biological identity is lost. Provide in granular form, free of hard lumps and with pH range suitable for intended use.
  - 1. Minimum organic material: 85 percent, measured by oven dry weight.
  - 2. pH range: 4 to 5.
  - 3. Moisture content: 30 percent.
- D. Bonemeal: Raw, commercial grade, finely ground; minimum 4 percent nitrogen and 20 percent phosphoric acid.
- E. Superphosphate: Soluble mixture of treated minerals; 20 percent available phosphoric acid.
- F. Sand: Clean, washed sand, free of toxic materials.
- G. Perlite: Conforming to National Bureau of Standards PS 23.
- H. Vermiculite: Horticultural grade, free of toxic substances.
- I. Nitrolized Shavings: Organic amendment shall be nitrolized-mineralized redwood shavings (.5% actual nitrogen) or nitrolized-mineralized fir (.8% actual nitrogen) or nitrolized-mineralized fir bark (1% actual nitrogen). It shall be fine textured, having actual minimum 80% passing #8 screen and minimum 95% passing #4 screen. Salinity shall not be higher than 3.5 millimhos per centimeter at 25 degrees C measured by saturation extract conductivity. Pine shall not be permitted.
- J. Mulching Material: Wood cellulose fiber, chip form, free of growth or germination-inhibiting ingredients, consisting of ground or shredded redwood bark.
- K. Commercial Fertilizer: 12-12-12 Commercial fertilizer, uniform in composition, free-flowing and suitable for application with approved equipment, conforming to applicable fertilizer laws, and bearing the name or mark of the manufacturer.
  - 1. Fertilizer Tablets: Fertilizer tablets shall be a highly compressed homogeneous tablet weighting 7 gr. Chemical analysis shall be 12-8-8 slow release, nitrogen 12%, phosphate 8%, potash 8%, humus 20%, humic acids 4%, iron 2%, sulphur 3.5%. Planting tablets shall be Gro-Power planting tablets or equal.
- L. Pre-Planting Herbicide: Round-Up or equal.
- M. Pre-Emergent Weed Control: Ronstar-G or equal.

## 2.03 PLANT MATERIAL

- A. Plant Materials Quality: Provide trees, shrubs, and other plants of size, genus, species and variety shown and scheduled for landscaping Work and complying with recommendations and requirements of ANSI Z60.1 - American Standard for Nursery Stock.

- B. Identification: All plant material shall be true to type and nomenclature in accordance with Standardized Plant Names, and each bundle or plant shall be properly identified with durable, legible labels.
- C. Quality and Size of Plants: In accordance with rules and grading of American Standard for Nursery Stock, and as shown on the Drawings.
  - 1. All trees, shrubs, vines and ground covers shall have a normal habit of growth and shall be sound, healthy, vigorous and free from insect infestations.
  - 2. Plants that meet the measurements specified, but do not possess a normal configuration or balance of height and spread will be rejected.
  - 3. Trees and shrubs shall be nursery-grown in containers of the size indicated on drawings, and shall have sufficient roots to hold the root ball together after removal from containers, without being rootbound.
  - 4. Container stock (1 gallon, 5 gallon, 15 gallon) shall have grown in containers for at least one (1) year, but not over two (2) years, and must be of a size accepted by the trade for that size container.
  - 5. Trees shall be straight and of uniform shape without damaged, crooked or multiple leaders. Trees with abrasions of the bark, sunscalds, disfiguring knots or fresh cuts of limbs over 1/2-inch which have not been pruned and painted or completely calloused, will not be accepted. Box size stock shall have grown in specified container size for at least one (1) year.

2.04 GRASS MATERIALS

- A. Sod: Sod shall be as specified by the District
  - 1. Specified Sod Producer: TBD.
  - 2. Acceptable Sod Producers: Alternate manufacturers will be considered in accordance with the "or equal" provision specified in Section 01300.
  - 3. Provide strongly rooted sod, not less than 2 years old, free of weeds and undesirable native grasses, and machine cut to pad thickness of 3/4-inch (plus or minus 1/4-inch), excluding top growth and thatch. Provide only sod capable of vigorous growth and development when planted (viable, not dormant).
  - 4. Provide sod of uniform pad sizes with maximum 5-percent deviation in either length or width. Broken pads or pads with uneven ends will not be acceptable. Sod pads incapable of supporting their own weight when suspended vertically with a firm grasp on upper 10-percent of pad will be rejected.

2.05 MISCELLANEOUS LANDSCAPE MATERIALS

- A. Gravel: Water-worn, hard, durable gravel, washed free of loam, sand, clay and other foreign substances and of following size range and color.
  - 1. Size Range: 1-1/2 inches maximum, 3/4-inch minimum pea gravel.
- B. Filtration/Separation Fabric: Water permeable filtration fabric of fiberglass or polypropylene fabric. Trevira "Spunbound" #115, or approved equal.
- C. Stakes: 2-inch diameter round Lodge Pole Pine free of knot holes and other defects.
- D. Deadmen: 2 x 4 by 24-inches redwood.
- E. Guys:



1. Wire ties and guys: 2-strand, twisted, pliable galvanized steel wire, not lighter than 10 gage.
  2. Eye bolts and turnbuckles: Zinc-coated, of sufficient strength to withstand wind pressure and resultant movement of plant life.
- F. Plant Ties: 24-inches cored tie by Gro-Straight or approved equal.
- G. Plant Protectors: Minimum 1/2-inch diameter rubber or plastic hose, cut to required lengths and of uniform color, material and size, to retain trees to stakes and to protect plant stems, trunks and branches from damage by guys.
- H. Root Barriers: "Control A Root" panels from Vespro, Inc. (415/434-3072) or Deep Root Corp.
- I. Water: Clean, fresh and free of substances or matter which could inhibit vigorous growth of grass.
- J. Tree Guard: Arbor-Gard protection by Deep Root Corp. or equal.

### 3.00 EXECUTION

#### 3.01 EXAMINATION

- A. Verify that topsoil material to be reused, is acceptable.
- B. Verify that building and trench backfilling has been completed and inspected.
- C. Verify that subsoil base has been contoured and compacted.

#### 3.02 PREPARATION - GENERAL

- A. Clearing:
  1. All grading shall be done upon the existing contours and any major changes shall have been done under other section of these specifications; the soil amendments shall NOT be added until the Architect/Engineer and District have reviewed the grades and District has given authorization to proceed.
  2. Clear all planting areas of existing vegetation not otherwise removed under site clearing. Work. See Section 022110 - Site Clearing.
  3. Remove all debris and foreign material considered a hindrance to planting operations or unsightly in appearance.
  4. Remove soil contaminated by construction activities, which might be detrimental to healthy growth and appearance of landscaping. Replace soil with topsoil at no change in Contract Time or Sum.
  5. Maintain previously established grades, swales and drainage patterns.
  6. Remove temporary erosion protection measures or maintain in place as directed.
- B. Weed Control: Protect all existing plants from damage.
- C. Herbicide Application: Apply pre-planting herbicide to all visible weeds, before and after soil placement as per manufacturer's instructions.
- D. Pre-emergent Weed Control: Immediately after planting, apply pre-emergent weed control materials to all planted area which will not be seeded as per manufacturer's

instructions. District's Pest Control must be present during the application of Pre-emergent Weed Control.

- E. Landscaping Layout: Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations and outline areas and secure Architect / Engineer's review before start of planting work. Make minor adjustments as directed.

### 3.03 SUBSOIL PREPARATION

- A. Prepare subsoil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade gradual. Blend slopes into level areas.
- B. Remove debris, roots, branches and stones in excess of 1-1/2 inch in size. Remove subsoil contaminated with petroleum products.
- C. Scarify subgrade to depth of 3 inches where topsoil is scheduled. Scarify in areas where equipment is used for hauling and spreading topsoil and has compacted subsoil.

### 3.04 PREPARATION OF PLANTING SOIL

- A. Soil Clearing and Cleaning: Before mixing, clear and clean topsoil of roots, plants, sod, grasses, stones, clay lumps and other extraneous materials harmful or toxic to plant growth.
- B. Soil Amendments and Fertilizers; Mix specified soil amendments and fertilizers with topsoil at rates specified. Delay mixing of fertilizer if planting will not follow placing of planting soil within a few days.
- C. Soil for Plant Pit Backfill: Mix planting soil prior to backfilling and stockpile at site. Mix as follows:
  - 1. 60% on site topsoil or import topsoil.
  - 2. 40% nitrolized redwood shavings.
  - 3. 15 lbs. Gro-Power Plus per cubic yard of mix.
- D. Soil for Planting Beds and Lawns: Mix planting soil either prior to planting or apply on surface of topsoil and mix thoroughly before planting. The top four (4) inches of all planting beds and lawn areas shall receive planting soil.

### 3.05 PREPARATION OF PLANTING BEDS

- A. Preparation of Planting Beds: Loosen soil to depth not less than 4 inches and mix with specified soil amendments and fertilizers. The following application shall be made per 1,000 square feet of planting areas.
  - 1. Three (3) cubic yards nitrolized shavings.
  - 2. 150 lbs. Gro-Power Plus.
- B. Planters:
  - 1. Place not less than 4-inch layer of gravel in bottom of planters, install filtration/separation fabric and fill within planting soil mixture consisting of 1 part topsoil, 1 part coarse sand, 1 part peat humus and 3 pounds dolomite limestone per cubic yard of mix.

2. Place planting soil in lightly compacted layers to an elevation 1-1/2 inches below top of planter allowing for natural settlement.

### 3.06 FINE GRADING

- A. Adjustments: Adjust finish grading with imported topsoil as necessary. Grades shall be smooth and even on a uniform plane with no abrupt changes or pockets, and shall slope away from all buildings. Verify the surface drainage of all planting areas, and notify Architect/Engineer and District of all discrepancies, obstructions or other conditions considered detrimental to plant materials and proper drainage.
- B. Final Finish Grading: After initial settlement, finish grade shall be lower than the adjacent walks, curbs and headers by the following amounts:
  1. Lawn Areas: 1/2-inch to 1-inch.
  2. Tree, Shrub and Groundcover Areas: 1-1/2 inches to 2-inches.
- C. Final Clearing: Immediately prior to planting operations, clear all planting areas of weeds, debris, rocks over 1-inch in diameter, and clumps of soil that will not break up. Adjust all areas disturbed by installation of sprinkler irrigation system.

### 3.07 PREPARATION FOR PLANTING LAWNS

- A. Loosen subgrade of lawn areas to a minimum depth of 6- to 8-inches. Remove stones measuring over 1 1/2 inches in any dimension. Remove sticks, roots, rubbish, and other extraneous matter. Limit preparation to areas which will be planted promptly after preparation.
  1. Prior to preparation of unchanged areas, remove existing grass, vegetation and turf. Dispose of such material outside of District's property. Do not turn existing vegetation over into soil being prepare for lawns.
  2. Allow for sod thickness in areas to be sodded.
  3. Apply specified commercial fertilizer at rates specified and thoroughly mix into upper 2-inches of topsoil. Delay application of fertilizer if lawn planting will not follow within a few days.
- B. Fine Grading: Fine grade lawn areas to smooth, even surface with loose, uniformly fine texture. Roll, rake and drag lawn areas, remove ridges and fill depressions, as required to meet finish grades. Limit fine grading to areas which can be planted immediately after grading.
- C. Preparation for Planting: Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface moisture to dry before planting lawns. Do not create a muddy soil condition.
- D. Restoration: Restore lawn areas to specified condition, if eroded or otherwise disturbed, after fine grading and prior to planting.

### 3.08 PLANTING TREES AND SHRUBS

- A. Planting, General: Install trees and shrubs in moist soil in the areas and at the spacing shown, in neat rows, insuring complete coverage of all planting areas including under and around trees and shrubs. Spacing shown on drawings are triangular spacing, unless otherwise noted.

1. No planting shall be done until all operations in conjunction with the installation of the sprinkler system have been completed, final grades have been established, the planting areas have been properly graded and prepared, and the Work has been reviewed by the Architect/Engineer and District.
- B. Pruning: Before plants are transported to the planting area, properly prune or cut back plants to reduce damage by wind and to force lateral growth.
1. Pruning operations shall conform to the best horticultural practices with due regard to the natural or desired form and growth characteristic of the individual species.
  2. All cut surfaces shall be cleanly made and painted over with tree wound paint.
- C. Protection of Plant Materials:
1. Plants shall not be allowed to dry out before or while being planted. Keep exposed roots moist at all times during planting operations. Do not expose roots to the air except while being placed in the ground. Wilted plants, whether in place or not, will not be accepted and shall be replaced at the Contractor's expense.
  2. Protect all plants from damage by sun and wind at all time before planting.
- D. Layout: Place plants for best appearance for review and final orientation by Architect/Engineer.
1. Set plants vertical.
  2. Determine location of plant material by scaling from Drawings.
  3. The layout of locations for plants, ground cover and lawn areas to be planted shall be approved on the site by the Architect/Engineer and District.
  4. All container plants shall be set by the contractor in their final locations as approved by the Architect/Engineer prior to their planting. All such locations, shall be checked for possible interference with existing underground improvements, prior to excavation of planting holes. If underground improvements are encountered, other locations for planting may be selected by the Architect/Engineer. Damage to existing utilities shall be the responsibility of the Contractor.
  5. The Architect/Engineer will provide direction for relocation of all plant materials that interfere with the designed intention of the sprinkler system.
  6. The location of all box trees shall be identified by placing a stake at locations as indicated on the Drawings. All such locations shall be reviewed by the Architect/Engineer prior to placement and excavation of planting holes.
- E. Excavating:
1. All pits shall be dug square with bottoms level; the width shall be equal to one and a half times the size of the root ball and depth equal to the root ball. Compacted soil at the sides and bottom shall be loosened by scarifying or other approved methods in accordance with planting details.
  2. If planting holes are cut with power auger, vertical sides of hole shall be additionally broken with balling bar or spade to interrupt continuous curve influence on root development.
- F. Watering: Fill excavations for trees and shrubs with water and allow water to percolate out prior to planting.
- G. Planting Trees, Shrubs and Vines:

1. All plants shall be removed from their container and set so that, when settled, they bear the same relation to the required grade that the bore to the natural grade before being transplanted. Each plant shall be planted in the center of the pit and backfilled unless otherwise specified, with the prepared soil. No soil in muddy condition shall be used for backfilling.
2. Care shall be exercised when removing plants from nursery containers to avoid damage to root ball. Any plants with broken root balls shall be immediately removed from project site and replaced with acceptable plant material.
3. All plants shall be planted approximately in the center of the holes specified. All plants shall be positioned so fullest side will face outward, or as directed.

H. Planting Specimen Trees:

1. All specimen trees will be positioned in holes and directed during the planting operation.
2. Remove bottom of specimen container boxes before planting. Remove sides of box without damage to root ball. After partial backfill of hole, remove side of boxes.
3. Fill rest of hole with prepared soil to the required grade and thoroughly settle by tamping and watering. Do not pack soil.
4. Prepare water basin as detailed.
5. Stake or guy all new trees as indicated on plans, in accordance with details.

I. Plant Tablets:

1. After the water has completely drained, planting tablets shall be placed as indicated below:
  - a. Three tablets per 1-gallon container.
  - b. Nine tablets per 5-gallon container.
  - c. Fifteen tablets per 15-gallon container.
  - d. Sixteen tablets per 24" box.
  - e. Eighteen tablets per 30" box.
  - f. Twenty tablets per 36" box.
  - g. Twenty-two tablets per 42" box.
  - h. Twenty-four tablets per 48" box and those box sizes which are larger.
2. Planting tablets quantities shall be set with each plant on the top of the root ball while the plants are still in their containers for review by District /Architect. All planting tablet installation shall be per the manufacturer's recommendations.

J Backfill: Dish top of backfill to allow for mulching.

K. Mulching: Mulch pits, trenches and planted areas. Provide not less than 2-inches of mulch, and work into top of backfill and finish level with adjacent finish grades.

L. Pruning, Thinning and Shaping: Prune, thin out and shape trees and shrubs in accordance with standard horticultural practice.

1. Prune trees to retain required height and spread.
2. Unless otherwise directed by Architect/Engineer, do not cut tree leaders, and remove only injured or dead branches from flowering trees, if any.
3. Prune shrubs to retain natural character.
4. Remove and replace excessively pruned or misformed stock resulting from improper pruning.

- M. Guying and Staking: Install guys and stakes for trees immediately after planting as detailed.
- N. Spoil: Dispose of excess subsoil removed from planting excavations. Do not mix with planting soil or use as backfill.

### 3.09 PLANTING GROUND COVER SHRUBS

- A. Layout: Place plants for best appearance for review and final orientation by Architect/Engineer. Space plants as indicated or scheduled and detailed.
- B. Mulching: Much areas between plants; place not less than 2 inches thick.
- C. All areas to be planted shall receive soil preparation as specified and have grading approved before planting.
- D. Apply a pre-emergent herbicide having a life not less than 6 months to all ground cover areas. Herbicide shall be registered for use on label of container as being safe for use on species of plants specified on planting plan. Prior to application, Architect/Engineer shall approve material, rates and time of application.
- E. Watering: Water thoroughly after planting.

### 3.10 SODDING NEW LAWNS

- A. Lay sod within 24 hours from time of stripping. Do not plant dormant sod.
- B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod strips; do not overlap. Stagger strips to offset joints in adjacent courses. Work from boards to avoid damage to subgrade or sod. Tamp or roll lightly to ensure contact with subgrade. Work sifted soil into minor cracks between pieces of sod; remove excess to avoid smothering of adjacent grass.
- C. Water sod thoroughly with a fine spray immediately after planting.

### 3.11 CLEANUP AND PROTECTION

- A. Cleaning: During landscaping Work and Maintenance period, keep pavements clean and landscaped areas clear of debris, trash and clippings.
- B. Protection, General: During and after landscaping Work and during maintenance period, protect landscaping areas from damage. Provide durable Protective barriers, covers, signs and other temporary measures as necessary.
- C. Damaged or Injured Landscaping: Treat, repair or replace damaged or injured landscaping Work as directed.

### 3.12 INSPECTION AND ACCEPTANCE

- A. Substantial Completion Review: At the completion of all landscape planting operations and prior to the beginning of the initial maintenance period, a Substantial Completion Review shall be held.

- B. Final Review for Acceptance: Within three calendar days prior to the date established in the Certificate of Completion, a Final Review shall be held to review the state of planting materials and maintenance procedures.
1. When landscaping Work is completed, including maintenance, University will make an inspection to determine acceptability of landscaping Work.
  2. Deliver requests for reviews in writing to Architect/Engineer and University no less than seven calendar days prior to requested review date.
  3. Reviews shall be scheduled at a mutually agreeable time and date. The District, Contractor and, if authorized by District, the Architect/Engineer shall attend the reviews.
  4. At the time of reviews, all planting areas under the Contract shall be free of weeds, dead leaves and trash, neatly cultivated and raked. All stakes, guys and plant basins shall be in good order. At the Final Review for Acceptance, lawns shall be neatly cut and all clippings removed.
  5. Landscaping Work may be inspected for Acceptance in portions as agreeable to District, provided each portion of landscaping Work offered for inspection is complete, including maintenance.
- C. Unacceptable Landscaping:
1. When inspected landscaping Work does not comply with requirements, replace rejected Work.
  2. Continue specified maintenance until re-inspected by District and determined to be acceptable.
  3. Remove rejected plants and materials promptly from Project site.

END OF SECTION





1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Design and construction of all building component, below grade and site retaining walls and miscellaneous site paving formwork.
  - 2. Placing in forms all anchor bolts, inserts, sleeves, accessories, etc., embedded in concrete as indicated or required.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 02225: Earthwork for Structures
- B. Section 02620: Concrete for Curbs, Gutters and Walkways
- C. Section 03200: Reinforcing Steel
- D. Section 03300: Concrete and Concrete Finishes
- E. Section 03365: Post Tensioned Concrete

1.03 REFERENCE STANDARDS

- A. California Building Code (CBC), 2010 Edition Chapter 19A, Section 1906A
- B. Standard Specifications for Public Works Construction (PWC) 2009 Edition
- C. American Concrete Institute (ACI).
  - ACI 117 "Standard Tolerances for Concrete Construction and Materials"
  - ACI 347 "Recommended Practice for Concrete Formwork"
  - ACI 223, 224 & 3.02 for Slip Dowel References
- D. American Plywood Association (APA)
- E. U.S. Department of Commerce, PS-1-95 U.S. Product Standard for Construction and Industrial Plywood.
- F. West Coast Lumber Inspection Bureau (WCLIB).

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340
- B. Manufacturers product data sheets for all formwork materials and for all materials inset, placed or anchored into the formwork. Include release compounds, joint materials, embeds, sleeves, mounting plate and anchor bolt assemblies, hardware, fasteners and other accessories required in the contract documents

and as proposed for use. Hardware / fastener and accessory insert data sheets shall also have copies of the ICC Report clearly indicating the related code approval for applicable use and the design load strength required.

- C. Shop drawings that are all-inclusive, comprehensive and fully dimensioned for all architectural, structural and site concrete formwork / false work for review. Dimension locations of all panel, construction and control joints, grooves, reveals, alignment bracings, framed openings, sleeves, inserts, embeds, anchors and block outs that are required for the execution of all work required by the contract documents and included in this contract. Indicate the proposed means, methods and detailing for sealing forms between construction-joints indicated.
- D. Calculations by the Contractors Engineer, accompanied by any drawn details or written procedures shall be stamped and signed by a Registered Engineer, licensed in the State of California, per State Construction Safety Orders Title 8 Section 1717 for review by the Architect prior to erecting formwork.
- E. Submit copies of the required form and shoring removal records that contain current and accurate record throughout the entire concrete construction progress of each pour sequence noted by number and location within the structure, design mix number, date / time, temperature and weather conditions at the time of concrete placement and the same information to document shoring removal, inclusive of additionally noting the extent by bay location and floor level(s) below the work being executed, that false work extends. Re-shoring work performed after initial formwork removal shall be noted for reason, location and other pertinent data.

#### 1.05 REQUIREMENTS

- A. Design and construction of formwork, placement of embedded anchors, sleeves, utilities, construction joints, etc. and the removal of forms, shores, false work and re-shoring shall conform to the requirements of CBC Section 1906 (A).
- B. Contractor generated formwork and placement shop drawings shall indicate the overall coordination of the work of this project to document all items required placed in the concrete prior to executing the work of each section.
  - 1. All sleeves required through beams, girders and elevated deck slabs are to be accurately located on the placement drawings by the Contractor for review and approval by the Architect.
  - 2. All design reveals are to be accurately located on exterior finishes (columns, walls, etc), where indicated on the drawings, that painted finishes change in color to match adjacent surfaces.

#### 1.06 QUALITY ASSURANCE

- A. Accomplish shoring and re-shoring design, false work, sequence, erection and removal so that actual construction loads do not exceed design loads.
- B. Contractor's responsibility for structural integrity and the safety of the workers, public and the work shall be in conformance to referenced specifications as the

minimum requirements incorporated. Support bracing, shoring, false work, re-shoring and stabilization of all formworks the sole responsibility of the Contractor to comply with the State of California, Division of Industrial Safety regulations.

- C. Contractor is responsible for the accuracy of all formwork and for accurate setting of required insert and embed items that result in placement in conformance with contract document requirements and within allowable tolerances of reference standards.
- D. Construction loads shall not impose loads that exceed the basic total (live and dead) designed loading on any member or proportional area of the structure. Areas of work shall not be supported on unshored portions of the structure irregardless of stage of completion. As a minimum standard, the Contractors 'Ways and Means' in pouring beams and decks shall include the shoring, bracing and false work to a minimum of two levels beneath the level of the current pour.

## 2.00 PRODUCTS

### 2.01 MATERIALS

- A. Lumber for Formwork: WCLIB "Construction" grade or better, Douglas Fir-WWPA No.1 or better.
- B. Lumber for Rough Carpentry: Standard Douglas Fir common grade.
- C. Plywood Forms: New, reused or reconditioned forms are permitted upon Architect concurrence. Provide minimum 5-ply 3/4" thick, Fir plywood with moisture resistant phenolic resin-impregnated cellulose fiber bonded on one face in contact with concrete with back and all edges sealed, medium (MDO) or high (HDO) density overlay finish, WPA "Plywood", except any thickness may be used when used as a liner for board formwork. Provide smooth overlay finished plywood forms for all exposed concrete surfaces except where otherwise specified for beams and girders. "Multi-Pour HDO" by Simpson Timber Co., or equal.
  - 1. Medium Density Overlay Plywood (MDO)(soffit deck forms only): "B" face, "C" back, "C" inner plies, 100% Douglas Fir, exterior glue. Overlay 64/30 MDO consisting of minimum of 1 layer of 64#/MSF MDO phenolic impregnated paper overlaid with 1 layer of 30#/MSF MDO phenolic paper on back and meet Structural 1 Specification per U.S. Product Standard PS 1-95.
  - 2. High Density Overlay Plywood (HDO)(wall, column, beam, girder and soffit): "B" face, "C" back, "C" inner plies, 100% Douglas Fir, exterior glue. Overlay: 100/30 HDO consisting of minimum of 1 layer of HDO 100#/MSF phenolic paper on the face and 1 layer of 30#/MSF HDO phenolic paper on back and meet Structural 1 Specification per U.S. Product Standard PS 1-95.
  - 3. Coated Form Plywood / HDPE: Plastic overlaid plywood factory coated with a form coating and release agent is acceptable in lieu of the HDO plywood specified above, as manufactured by Sylvan Industries Inc. 'Dura-Pour' (800) 842-1990, or equal.

- D. Beam and Girder Forms: Only steel or aluminum forms shall be used except for transfer girders where HDO plywood as defined above may be used. Wood beam forms will only be allowed when approved in advance (Bid Period) by the Architect.
- E. Tempered Hardboard: Conform to F.S. LLL-H-35.
- F. Form Ties: Adjustable prefabricated rod, flat band or wire types, internally threaded, disconnecting, removable or snap-off types. Use working strength of not less than 3,000 lbs. when fully assembled. Provide external holding devices to support form loads. Burke Snap or Penta-Ties, Concrete Tie Stay-Form or equal.
  - 1. Form ties for exposed concrete surfaces shall be manufactured to allow a positive break-back of not less than 1" inside concrete surface. Ties are to be equipped with a plastic cone of not less than 5/8" diameter / 1" long that will completely cover the hole and prevent leakage of mortar.
  - 2. Form ties for unexposed surfaces shall be bolt rods or other adjustable length devices, free of lugs, cones, washers, etc. and form plug holes no larger than 7/8" diameter or additional depressions behind the exposed surface. Removed ties shall not leave behind any metal within 1" of the finished concrete surface when forms are removed.
  - 3. Form and wire ties fabricated on site are not acceptable.
- G. Corner Chamfers: Provide minimum 3/4 inch corner strip chamfer, Burke Concrete Accessories, Inc. 'CSF', Sylvan Industries Inc. 'Poly-Comp', or equal.
- H. Stripping Gaskets: Resilient rectangular material that is non-absorbent and non-staining at junctions of formwork that permits removal of forms without damaging concrete surfaces.
- I. Styrofoam: Closed cell extruded polystyrene foam of thickness and detail indicated.
- J. Through Joints - Typical Non-Metallic Expansion: Preformed expansion joint fillers of type, size and thickness required. Materials shall not deform by handling or exposure. Damaged materials shall be replaced prior to subsequent work. Materials manufactured by W.R.Meadows "Sealtight", or equal.
  - 1. Fiber expansion joint filler conforming to ASTM D1751 for joints in sidewalks, driveways and slabs on grade.
  - 2. Flexible isomeric polymer foam expansion joint filler conforming to ASTM D1752 modified, vinyl and polyethylene foams for vertical joints in walls or between structures; W.R. Meadows, 'Ceramar', or equal.
  - 3. Cork or extruded asphalt materials are not acceptable.
  - 4. Sealant materials in accordance with Section 07900 - Caulking and Sealants
- K. Reglets: Provide minimum 22 gage galvanized steel for concealed locations within concrete structures and 0.020 in. stainless steel for exterior exposed locations. Manufactured by Fry Reglets Corp., Pittcom, or equal.
- L. Form Release Coating Compound Materials:

1. Form release coating compounds shall be applied to steel, aluminum or wood forms and to plastic or urethane form liners, where compatible. Form coating shall be specifically formulated with a rust inhibitor for use on steel forms and a wood preservative for use on wood forms.
2. Form release coatings shall be commercially formulated, VOC compliant and chemically reactive to prohibit bonding to or staining concrete surfaces. Form coating shall not leave residue on or exhibit leaching of saturated compound from within formed concrete surfaces that would adversely affect the natural exposed appearance, the penetration or performance characteristics of applied curing compounds or the penetration, bond or adhesion of sealers, paints, coatings or other subsequent treatments or finishes. Form release coatings shall not contain compounds recognized as problematic such as diesel distillates, waxes, silicones or carcinogens.
3. Acceptable Products:
  - "Atlas Release" by Atlas Tech Products, (858) 277-2100.
  - "Clean Strip J-2 Gold VOC" by Dayton Superior Chemicals
  - "Crete-Lease 727 VOC" by Cresset Chemical Co., Inc.
  - "Ultra" by Conspec Marketing & Manufacturing

### 3.00 EXECUTION

#### 3.01 QUALITY OF WORK

- A. Design and Engineering: Contractor shall design, construct and removal formwork that conforms to the tolerances established by ACI 301.
  1. Forms, shores, molds, block-outs, etc shall be built to conform to shapes, lines and dimensions of the concrete construction indicated.
  2. Concrete members shall be shored to safely support loads and lateral pressures outlined in "Recommended Practice for Concrete Formwork" (ACI 347) without causing distortion, excessive deflection or other defects to the formed surface.
  3. Design and construct forms in accordance with the American Concrete Institute recommendations for rate and method of placement, lateral pressures, hydration temperature and pour heights.
  4. Finished exterior concrete surfaces are to be left exposed, natural gray and unpainted. Completed formed surfaces shall be rendered without deflect and without need of patching, sacking or repair, that would be distinguishable in the completed work. Comply with the requirements of ACI 301-06 Section 6 – "Architectural Concrete," regarding the overall quality of formwork, pour and consolidation, surface finish and completed concrete finish.
  5. All other concrete forming shall comply to minimum standard of Class "A" architectural quality as defined by ACI 347, except where more stringent is specified.
  6. Design shoring to support construction dead and live loads and accommodate expected rate of pour.
- B. Construction: Use / reuse clean, sound, approved form materials, coated with specified release compound materials only. (Petroleum-based form release compound products are not acceptable) Provide backing on all form joints.

Foundation sidewalls shall be formed unless the Geotechnical Engineer approves concrete placement directly against clean-cut cohesive earth excavations. Earth forms require additional concrete pour to provide a minimum 3" clear coverage over reinforcing steel in lieu of the minimum indicated on drawings for consistent formwork dimension. When formwork is utilized below grade, forms shall be removed prior to backfilling operations. Assemble forms to facilitate removal without damage to concrete surfaces.

1. Form materials in contact with exposed concrete surfaces shall be MDO/HDO plywood, metal or fiberglass that results in uniform surfaces free from excessive variations or irregularities. Reuse of forming materials shall be contingent upon form surface condition after stripping and ability to produce the required finishes on subsequent pours. Inspect, clean, repair and reseal forms before each use.
2. Tie, clamp and brace forms against spreading, bulging shifting or other movement. Form joints tight to prevent leakage of mortar. Use metal form ties and spreaders designed to hold forms securely and uniformly true in line, to required dimensions and without causing offsets in joints. Use only ties with break-backs that remove 1" or more back from finish surfaces. Assemble panels in a manner that permits wall, column and beam forms to be stripped without disturbing deck soffit or beam and/or girder shoring.
3. Camber formwork as indicated or required to accommodate construction dead loads and provide true and level surfaces with forms removed and the structure loaded with its live and dead design loads.
4. Fabricate deck formwork so joints are true and level in elevation and alignment. Do not over drive nails or depress screw heads that would dimple form surfaces. Finished surfaces shall be free of unsightly or objectionable form marks, imperfections, ridges, projections, visible panel joints or raised buttons caused by panel depressions, free from rock pockets greater than 3/8" in diameter or heavy concentrations of air / pinhole voids. Repair exposed surfaces to be painted by grinding and sacking (filling voids) in order to achieve an acceptable surface finish mutually approved by the Architect and the Contractor. Once representative vertical and horizontal surface tolerances are established those areas shall become production standard for the rest of the work.
5. All perimeter soffits / slab edges above grade exposed to the exterior is required to have a continuous uniform drip line 4" back from the outside edge.

### 3.02 PREPARATION OF FORM SURFACES

- A. Form surfaces to receive concrete shall be clean and free of contaminants that would transfer into finished surfaces. Remove dirt, rust, concrete debris or remaining form release compound residue prior to each use.
- B. Apply one or two heavy saturating coats of a clear penetrating waterproof sealer for protection of all new wood form surfaces prior to applying form release compounds.

- C. Apply form release compounds uniformly in accordance with manufacturer's written instruction, using low-pressure spray, roller or clean cloth before concrete reinforcement is placed in the forms.
- D. Do not allow excess release compounds to puddle in forms or come in contact with existing concrete surfaces where fresh placed concrete is to bond or adhere.
- E. Do not apply form release compound to reinforcing steel or to surfaces that form construction joints.
- F. Coat PVC "Snaptie Cone" formed plug holes so that cones can be removed without causing damage to concrete plug edges during form stripping.
- G. Wood forms used for concrete surfaces to receive subsequent finishes adversely affected by release compounds shall have contact surfaces of untreated wood soaked with clean water to saturate forms keeping surfaces wet prior to placing concrete.

### 3.03 FORM ERECTION

- A. Construct forms to exact shapes, sizes, lines and dimensions to obtain level, plumb and straight surfaces. Provide openings, offsets, keys, reglets, anchorages, recesses, moldings, chamfers, blocking, screeds, drips, bulkheads and all other required features. Make forms easily removable without hammering or prying against concrete. Space forms apart with spreaders. Construct forms to accurate alignment, location and grade. Protect against sagging, leakage or displacement of concrete mortar that may occur during or after placement of concrete. Coordinate all related work requiring the correct placement of sleeves, embeds, inserts and anchors required within forms for work of other sections onto a comprehensive shop drawing for review by the Architect prior to executing the work.
- B. Place form ties equal distant from panel edges and equally spaced symmetrically in the panel field. Attach accurately in-line horizontally and vertically for precise pattern. Snap ties that are to be left in the concrete shall be a minimum of 3/4" back from the finished surface. Tie anchor system shall not leak concrete mortar. Grease tie bolts with a silicone grease to facilitate removal without spalling of the placed concrete. Remove ties with the special tool recommended by the manufacturer.
- C. Seat shoring on solid bearing surfaces. Design and place shoring so that loads from successive parts of the structure being constructed will be transmitted directly through the false work without creating bending or shearing stresses in the placed concrete. Construct shoring / false work so that it can be taken down without vibration to the structure.
- D. Earth forms may be used for footings and below grade concrete provided such banks stand firm without evidence of sloughing that would dilute the concrete being placed. Footings and reinforcing sections having double steel reinforcement curtains or other restricting dimensions of steel location shall be

increased in width to obtain the required 3" clear minimum coverage of reinforcing.

- E. Complete and verify the adequacy of the formwork / shoring prior to pouring concrete. Wet all forms and allow time to expand. Install outlets, anchors, inserts, dowels, sleeves and other necessary work of other sections. Forms shall be free of all corrosion, wood chips, shavings, tie wires and other debris. Contractor is responsible for the safety / adequacy of the forms, false work and shoring.
- F. Place sheathing with end joints over bearings and all joints driven close and flush without producing any offsets unless otherwise indicated. Make sections of the formwork removable to facilitate inspection and cleaning immediately before depositing concrete.
- G. Camber: Place suitable jacks, wedges or similar means to induce camber and to correct settlement in forms before and during concrete placing. Induce a positive camber of minimum 1/8 inch per 10 feet of span, plus 1/4 inch for beams and 1/8 inch for slabs, unless shown otherwise on the drawings.
- H. Chamfers or Bevels: Provide 3/4" x 3/4" chamfers on all exposed external form corners of beams, girders, spandrels, columns, pilasters and slabs unless otherwise indicated. Form concealed corners or corners receiving steel angles square unless indicated otherwise.
- I. Reglets and Rebates: Form required reglets and rebates to receive frames, flashing and other materials or equipment indicated. Coordinate with the work of all sections to obtain required dimensions, details and precise positioning of all work to be installed.
- J. Recesses, Drips, Reveals and Openings: Provide smooth milled wood, preformed rubber or plastic shape form of types shown. Accurately position to within a tolerance of 1/4" in 10'-0". Refer to drawings for locations and details for size and type intended for use.
- K. Nailing Blocks, Bucks and Backing: Install in forms accurately as required for subsequent installation.
- L. Set anchor bolts, anchor slots, hangers, inserts and reglets for securing masonry work, miscellaneous metal fabrications, sleeves for passing through plumbing pipes, mechanical, electrical, carpentry or other work.
- M. Locate control joints only where shown. Coordinate with the Architect for project specific location(s). On grade slabs shall have either full section diamond block-outs around columns or allow saw cuts of 1/4 the depth of the slab, (1" minimum) up to all column centerlines and uniform intervals 20 feet in length direction. Provide keyed joints at all slab-on grade construction joints unless detailed otherwise on structural drawings.
- N. Screeds over Vapor Barrier: Use weighted pad or cradle type screeds so as not to drive stakes through the vapor barrier. Coordinate that rebar chairs over vapor



barriers are the sand plate type and not wire chairs or dobies that may puncture the membrane.

- O. All exposed non-painted architectural grade concrete surfaces shall be formed using false work that is carefully constructed without defect that would cause void, fins, overdriven fastener buttons, projections and other protrusions. Forms shall be double-walled and back-screwed to provide concrete surfaces that are visibly smooth, true and plumb to line and level, non-jointed, non-fastener appearance finish. Brace formwork externally using false work to minimize surface exposure.

### 3.04 EMBEDDED PIPING AND ROUGH HARDWARE

- A. Coordinate the work of all sections to obtain required information and dimensions required to accurately install all required embeds, anchor bolts, mounting plates, inserts and sleeved openings for the anchorage or passage of pipes, conduits, j-boxes, ducts or other items indicated to be placed in the concrete. The interrelated work shall be located and placed as part of this scope of this work and to conform to the criteria established below.
- B. Conduits or Pipes:
  - 1. Locate so as not to reduce the strength or amount of coverage in any one area of the placed concrete. Do not place pipes other than approved conduits in a slab 7" thick or less. Conduits up to 1-1/2" nominal diameter but not more than 1/4 the slab thickness in diameter shall be buried in the concrete slab, but which must be embedded in the central one-third section of the slab. Never place conduits below the bottom reinforcing steel or over the top reinforcing steel layers. Conduit runs shall not displace reinforcing steel location layout. Stacked conduit or pre-wired conduit runs of a standard dimension that are of excess length between points of connection that contribute to the increase void area of placed concrete is prohibited. Wherever possible, conduits shall be placed without excess length and wired parallel with the rebar. Submit proposed junction box locations and conduit layouts and to the Architect for review prior to executing the work.
  - 2. Conduits may be embedded in walls only if less than 2" in outside diameter and group runs are spaced no closer than 6 diameters on centers to one another that would impact the strength or structural integrity of the structure in the questioned area.
- C. Sleeves: Contractor shall indicate on coordination shop drawings, the proposed locations where placement of pipe sleeves is necessary to pass through slabs or walls. Sleeve diameter sizes shall conform to standard reinforcing detailing as indicated on the drawings. Sizes requested in excess of the maximum diameter indicated shall be brought to the Architect attention for determination. All sleeves that pass through decks, walls and beams, whether exposed to the elements or not, but embedded in concrete shall be either galvanized steel or PVC to avoid corrosion, rusting or other deterioration. Provide sleeves of diameter large enough to pass any hub or coupling on pipe including any insulation required. Sleeve sizes shall conform to Plumbing Code requirements for side clearance.

- D. Miscellaneous Hardware: Hardware / fasteners that are to be placed in the concrete shall be ICC approved for the applicable use and required design strength. Submit manufacturer's product data to the Architect and Inspector for review.

### 3.05 FORMWORK TOLERANCES

- A. Deflection: Limit deflection of forming surfaces from concrete pressure to L/240 maximum.
- B. Finish Lines: Position formwork to maintain hardened concrete finish lines within following permissible deviations.
1. Variation from plumb:

In 10' - 0"	1/4 inch
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  2. Variation from Level or Grades Indicated

In 10' - 0"	1/4 inch
In any bay or 20' - 0"	3/8 inch
In 30' - 0"	5/8 inch
  3. Cross-Sectional Dimensions

Minus	1/4 inch
Plus	1/2 inch
  4. Irregularity

Gradual	1/8 inch maximum
Abrupt Offsets	1/8 inch maximum
- C. Building Lines: Variation of linear building lines from established position in plan and related position of walls:
1. In any one bay 1/2 inch maximum
  2. Walls over a 10' - 0" length 1/2 inch maximum

### 3.06 FORM REMOVAL

- A. Remove forms in a manner to ensure the safety of workers and of the structure and in compliance with ACI 301 reference standards.
- B. Remove formwork carefully to prevent damage, marring or gouging of formed concrete surfaces. Do not pry against exposed concrete surfaces to remove adjoining or abutting forms. Formed corners shall remain true and unbroken.
- C. Coordinate timing of form removal with design strengths and curing requirements for concrete to receive architectural finishes. Strip the forms of a surface area without delay to ensure uniformity of curing.
- D. Remove forms for cast in-place concrete only when concrete develops sufficient strength to safely sustain its own weight and superimposed loads. Allow the minimum required time period before removal of forms unless approved otherwise by the Architect. Comply with CBC Section 1906 (A) .2
1. Forms for non-tensioned members may be removed when concrete has reached 80% design strength or minimum 3000psi when sufficient to enable them to carry their dead loads and anticipated construction loads.

- Immediately reshore all horizontal members unless approved otherwise by Architect.
2. Where the structure as a whole is adequately supported on shores, the removable wall vertical forms may be removed after 24 hours provided the concrete is sufficiently strong not to be injured and liquid curing compound is applied to all exposed surfaces.
  3. Reshore immediately after stripping to distribute construction loads to elements capable of safe resistance.
  4. Remove formwork in a manner such that members are not subjected to stress reversal.

### 3.07 REUSE

Clean form materials of loose materials with compressed air and wipe with wet rags to make suitable for reuse before erection. Form materials will be considered unacceptable for reuse if the required surface finishes cannot be achieved.

### 3.08 FIELD QUALITY CONTROL

Contractor shall inspect all formwork before placing structural, non-structural / architectural and site concrete to verify integrity and safety of erected formwork, quality and condition of the forms and their ability to produce the required architectural finishes and reveals indicated and to coordinate the accurate setting of inserts, embeds, sleeves placed for the subsequent work of other trades.

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Mild steel reinforcing for poured-in-place concrete work.
  - 2. Heavy duty adhesive/injection/epoxy anchoring systems
  - 3. Provide dowels for movement joints between interior slab on-grade and exterior flatwork

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 01425: Testing and Inspection (DSA)
- B. Section 03300: Concrete and Concrete Finishes
- C. Section 03365: Post Tensioned Concrete
- D. Section 04220: Concrete Unit Masonry

1.03 CONDITIONS

The "General Notes" on the structural drawings are part of these specifications.

1.04 REFERENCE STANDARDS

- A. American Concrete Institute (ACI):
  - ACI 301 Specifications for Structural Concrete for Buildings
  - ACI 315 Details and Detailing of Concrete Reinforcement
  - ACI 318 Building Code Requirements for Reinforced Concrete
- B. American Welding Society (AWS) - AWS D1.4
- C. American National Standards Institute/American Welding Society (ANSI/AWS):
  - ANSI/AWS D1.1
- D. Concrete Reinforcing Steel Institute (CRSI):
  - CRSI - MSP-1, Manual of Standard Practice
- E. American Society of Testing and Materials (ASTM)
- F. International Code Council (ICC)
- G. California Building Code (CBC) Chapter 19A

1.05 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Shop Drawings:
1. Submit shop drawings of reinforcement, related accessories, and embeds with reinforcement, as required for fabrication and placement.
  2. Produce sufficient diagrams, notes etc., to show plan layout, plans of combined footings, elevations of walls, details, deck plans, bar placement, bending diagrams, bar schedules, bar sizes, bar grades, stirrup placement and spacing, offsets, splicing, lapping of bars and proposed welding. Include layout dimensions, size and location of splices including dowel bar splice with size and location of accessories.
  3. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures"
  4. Shop drawings are not to be generated from reproductions of contract document drawings.
  5. Obtain the review of the Architect for construction joint locations. Coordinate with reinforcing and tendon supplier/placer before submittal of shop drawings.
  6. Review of shop drawings shall not be deemed acceptance of any proposed changes or deviations to contract documents that are not specifically flagged and indicated.
- C. Mill Certificates:
1. Reinforcing steel shall be identified as being purchased direct from a United States mill. Provide a purchase order and manufacturers approved / certified test data sheets. Steel supplier shall furnish steel producer's certified reports of mill analysis with carbon equivalent and tensile and bend test results.
  2. Reinforcing steel from dealers stock not clearly identified as being purchased direct from a United States mill, shall have tension and bending tests performed, on three separate samples for each heat number, size of bar in every 10 tons of each type of steel, tested as specified in the appropriate ASTM specification. Contractor shall furnish materials for testing and pay for such tests from either the District's project testing laboratory or Contractor selected other as approved by the Architect.
  3. Submit in accordance with CBC 1916A.2.
- D. Welding Certificates: Provide AWS D1.4 certificates for all field welders and/or shop welders of certified fabrication shops performing work on this Contract.
- E. Product Data: Provide manufacturers data sheets and current ICC ES reports for the mechanical / adhesive-anchoring systems proposed. Usage shall only be permitted where specifically approved by the Architect or Structural Engineer.
- F. Weld Tests (As Applicable): Submit results of nondestructive radiographic or ultrasonic testing performed by the District's testing laboratory at the Contractors expense for retesting corrected welds that are found to be initially defective.

## 1.06 QUALITY ASSURANCE

- A. Source Quality Control: Deliver bars in bundles as delivered from the mill, identified to heat number, mill analysis and test reports and tagged with identification certificate. Unidentified steel is not to be used for this project unless Contractor obtains samples of materials, pays for quality testing indicated above and submits test data reports to the Architect for review and approval prior to site delivery.
- B. Inspection: Inspector from District's testing laboratory shall inspect placement of reinforcing steel for conformance with contract documents prior to delivery of concrete.
- C. Welding Qualifications: Employ welders qualified in accordance with CBC Section 1704A.3.1.3. and AWS D1.4 certified. Shop welding shall be by a fabricator approved by the building official in accordance with Section 1704A.2, prior to start of fabrication. District's project inspector shall continuously inspect field welding.

#### 1.07 REQUIREMENTS

- A. Conform to the requirements of CBC Section 1907(A) regarding details of reinforcement for hooks, bend diameters, bending, surface conditions, placement, spacing, etc.
- B. Reinforce all concrete whether specifically indicated or not. Provide framing and reinforcement for conditions not specifically shown or detailed in a manner consistent with other similar details.
- C. Post-installed mechanical / adhesive anchoring systems are not to be used unless specifically approved by the Architect or Structural Engineer. Fasteners are not to be used before the concrete substrate has obtained the minimum 28-day compressive design strength. Selection of fastener or system is to be based on ICC approved values of the proposed fasteners and its intended usage. Post-installed anchors will not be permitted in post-tensioned concrete.
- D. Provide minimum #3 x 18" / 9" embedment @12"oc dowels greased / wrapped or sleeved to permit slippage between slab on-grade and exterior flatwork to ensure adjoining finish elevation alignment. Coordinate minimum 3/8" asphalt saturated felt expansion joint material notched around dowels.

#### 1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver reinforcing materials in bundles marked with metal tags indicating heat number, bar size and length. Maintain organized access after bundles are broken for identification by the District's inspector.
- B. Store and handle materials to prevent damage or contamination by accumulation of dirt, mud, rust, grease, paint or other bond-breaking coatings.
- C. Deliver and store welding electrodes in accordance with AWS D1.4.

### 2.00 PRODUCTS

#### 2.01 MATERIALS

- A. Reinforcing Steel: Provide clean, new stock conforming to ASTM designations as shown. Bars larger than 1/4" in diameter shall be deformed. Location of types and grades shall be as indicated on Drawings. Maximum yield for Grade 60 steel shall not exceed 78.0ksi for ductile frame construction. Ultimate tensile stress of Grade 60 steel shall not be less than 80ksi.
1. Non-welded Bars: ASTM A615 Grade 60 unless otherwise noted.
  2. Welded Bars: ASTM A706 with maximum of 0.55% carbon equivalent.
  3. Reinforcement Resisting Earthquake:
    - a. Induced flexural and axial forces in frame members and grade beams shall comply with low alloy A706, 60ksi.
    - b. Further requirements for ASTM A615 reinforcing steel, excluding ties, at moment frames are as follows:
      - Actual yield strength based on mill tests shall not exceed specified yield strength by more than 18,000 psi
      - Actual ultimate tensile stress to actual tensile yield stress shall not be less than 1.25.
- B. Tie Wire: Annealed black 16 gage steel minimum conforming to ASTM A82 and Fed Spec QQ-W-461.
- C. Fabricated Bar Mats: Deformed steel bar mats, ASTM A184 using ASTM A615 Grade 60 steel bars.
- D. Welded Wire Mesh (Fabric) Welded wire mesh shall be clean, free from oil and rust. Wire size and gage as shown. Smooth wire shall be Grade 60 (60ksi) minimum yield strength conforming to ASTM A185 and deformed wire conforming to Grade 80 per ASTM A497.
1. Steel Pan Filled Stair Treads and Landings – Only
- E. Welding Electrodes: Comply with AWS D1.4, Table 5.1 for low-hydrogen electrodes E80XX series.
- F. Accessories: Bar supports, chairs, bolsters, spacers, etc., shall be cold-drawn deformed wire. Fabricate in accordance with ACI Detailing Manual SP-66, with heights as required unless noted otherwise on the drawings. Products manufactured by Meadow Burke Company, or equal are acceptable.
1. Standard manufacturer conforming to ACI 315 approved steel types and sizes. Use wire bar type supports complying with CRSI recommendations unless otherwise shown on the Drawings.
    - a. Where legs of supports are in contact with forms, provide supports with plastic-protected legs.
  2. Do not use plastic, wood, brick, aluminum or other non-complying material. Precast concrete block / dobies are not to be used for elevated decks.
  3. For slabs on grade and foundation elements precast concrete block / dobies, may be used.
  4. Metal accessories shall be stainless steel when any part of accessory is placed within 1/2 inch of exposed concrete surface.
  5. Special conditions where there are multiple layers of rebar are to be supported by bolsters, l - bars etc. Stacking of precast concrete blocks is not allowed.



6. Over vapor barrier membranes use sand plate bar supports.
- G. Mechanical Splice / Coupler Systems: Mechanical connections of splices of deformed bars in tension shall be in conformance with ACI 318 12.14.3.6 and 21.2.6 Type 2 splice with fasteners developing 125% of the yield stress of the bar, and 100 percent of the specified tensile strength. Provide Lenton, HRC, or other ICC approved equal. Threaded or transition couplers with plastic internal coupler end protector with O-Ring may be used only where indicated. Welded mechanical splices are not permitted without written approval of the Architect/Structural Engineer and approved inspection by the District's inspector.
- H. Post-Installed Mechanical / Adhesive Fastener Systems: Provide ICC approved mechanical fasteners, such as sleeve anchors, kwik-bolt expansion anchors, drive/impact anchors, etc. or adhesive, injection and epoxy chemical anchoring systems as manufactured by Hilti, Covert Operations Inc., ITW Ramset/Red Head, Simpson Strong Tie Company Inc. or equal. Each mechanical or chemical fastening system to be evaluated by the Engineer on a case by case basis, based on application, ultimate load, shear and tension values. Post-installed anchors will not be permitted in post-tensioned concrete.

## 2.02 TESTING OF MATERIALS

- A. Refer to Section 01425 and the requirements indicated herein.
- B. District's testing laboratory will test and inspect all materials specified as required by CBC 1916A and Section 01425 of these specifications.
- C. Reinforcing steel must be sampled and tested for compliance with ASTM requirements at the place of distribution prior to shipment. Place of distribution shall mean the mill for non-fabricated (straight) bars and fabrication shop for bent bars. District's testing laboratory will make one tensile test and one bending test from specimens of each 10 tons or fraction thereof from each heat number, size, type or grade of reinforcing steel when taken from bundles as delivered from the mill properly identified with tag and certificates. District's laboratory shall submit their independent test data results accompanied by the certified mill analysis data.
- D. Samples shall be taken by the District's testing laboratory representative consisting of not fewer than 2 pieces each 18" long of each heat number, size and kind of reinforcing steel as obtained and prepared for testing by the Contractor.
- E. District's laboratory shall perform testing of welds as required per Article 3.04.F.

## 2.03 FABRICATION

- A. Do not start fabrication of reinforcing steel before steels been sampled / tested by the District's laboratory nor before Contractor furnished shop drawings, have been reviewed.

- B. Shop fabricate reinforcing steel bar using equipment that is capable of accurately bending steel bars in strict accordance with the details of the reviewed shop drawings and contract documents.
  - 1. Field bending and fabrication of rebar shapes and sizes shall be limited to ASTM A615, Grade 40 steel; No. 4 size bars or smaller. Do not field bend ASTM A615 Grade 60 steel unless approved in writing by the Architect or Structural Engineer.
  
- C. Accurately form bars and assemblies to the indicated sizes, shapes, details, lengths, spacing and other dimensions indicated on the Drawings.
  - 1. Fabricate reinforcing bars and assemblies to fabrication tolerances complying with the CRSI Manual.
  - 2. In case of fabricating errors, do not straighten or re-bend reinforcement in a manner that will weaken or injure the material. Heating of reinforcement for bending will not be allowed.
  - 3. Do not flame cut rebar of any kind without the express acceptance of the Architect.
  - 4. Do not weld or field bend ASTM A615 Grade 60 steel unless approved by the Architect or Structural Engineer.
  
- D. Reinforcement with any of the following defects will be rejected:
  - 1. Bar lengths, depths and/or bends exceeding the specified fabrication tolerances;
  - 2. Bends or kinks not indicated in the contract documents or reviewed shop drawings;
  - 3. Bars with reduced cross section due to excessive rusting or other cause.
  
- E. Marking and Shipment of Reinforcement: Bundle fabricated reinforcement and tag with suitable identification from the fabricators shop as to content, placement location or other related detail, and additionally with the original mill tag identifying the mill analysis & heat number to facilitate sorting, transporting to and storing at the project site.
  - 1. Deliver, handle and store in such a way as to not cause physical damage to the material or fabricated assemblies.
  - 2. Keep sufficient supply of tested, approved and fabricated and non-fabricated stock reinforcement on site to avoid delays in the work.

### 3.00 EXECUTION

#### 3.01 SURFACE CONDITIONS

Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work.

#### 3.02 INSTALLATION

- A. Comply with the specified reference standards for required methods and procedures for placement of reinforcement, clearance requirements and the use of supports, except as may be modified herein. In cases of conflict the most stringent shall govern.
  
- B. Avoid cutting or puncturing the below slab on grade vapor barrier membrane during reinforcement placement and concreting placement operations. Repair any

damage caused to the vapor barrier prior to making the area inaccessible and before placing concrete.

- C. Clean reinforcement to remove loose rust and mill scale, earth and other materials that may reduce or destroy the cohesive bond with concrete.
- D. Position, support and secure reinforcement against displacement by formwork, construction and concrete placing operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers.
- E. Place reinforcement as indicated to obtain the minimum concrete coverage required for corrosion protection of the steel.
- F. Accurately place reinforcement and securely tie in precise position with specified annealed steel tie wire at points where bars cross, (minimum every other intersecting bar) and in such a way to hold against displacement during concrete placement.
  - 1. Tie stirrups to bars at both top and bottom.
  - 2. Tie all accessories.
  - 3. Twisted ends of tie wires are to be directed inward away from exposed concrete surfaces.
- G. Do not place reinforcing bars more than 2" beyond last leg of any continuous bar support.
- H. Do not use placed and supported reinforcement as a base runway for concrete conveying equipment or similar construction loads.
- I. Floor System Reinforcement: Do not place deck reinforcing steel until the concrete in walls and columns below has been placed, deck forms inspected, cleaned, placed and shored, form release compound applied and projecting reinforcing steel tie bars have been thoroughly cleaned. Construction schedule shall not eliminate any of these sequential operations.

### 3.03 SPLICES

- A. Provide reinforcement splices indicated on the structural contract drawings by placing bars, lapping ends and tying tightly with specified wire. Comply with code requirements and in conformance with ACI 318 reference standard for minimum lap of all spliced bars, mechanically coupled or welded compression splices. Do not splice bars, except as specifically indicated on contract documents and as specifically approved by the Architect, Structural Engineer and District's inspector.
- B. Lap as indicated or required by code and reference standards to develop the full strength of bars. Do not make splices at points of maximum stress that have not been indicated or specifically approved by the Structural Engineer.
- C. Mechanical tension splices where specifically detailed on the contract drawings and specifically approved by the Architect in strict conformance with manufacturer requirements using Cadweld (C-Series), Dayton Bar-Grip, Erico, Lenton, or equal.

- D. Extend reinforcing bars and dowels required to receive and engage subsequent work as indicated on the contract drawings or specifically approved to the length to develop the strength of the bar. Place extending dowels and bars in the forms and secure against displacement during concrete placement.
- E. Thoroughly clean steel bars and dowels that extend through construction joints in walls of all adhering cured concrete paste before continuing with the placement of fresh concrete.

### 3.04 WELDING

- A. Provide welded or mechanical tension splices of reinforcing steel only where specifically detailed on the contract drawings and reviewed shop drawings or specifically approved by the Architect and the District's inspector. No cutting, burning or welding of tendons or rebar in the field is permitted without the specific approval of the Architect before executing any such activity. Prepare ends of bars in compliance with AWS D 1.4.
- B. Perform welding only where indicated or specifically approved by using a pre-qualified process in accordance with AWS D1.4 and CBC Section 1704.3, using the specified low-hydrogen electrodes. Employ only experienced welding operators certified for the types of welds specified. Pre-qualification of welds shall be in accordance with CBC. Preheat bars before welding. Protect joints from drafts during the cooling process; accelerated cooling is prohibited. Do not tack weld bars and leave that connection as the means of final attachment.
- C. Clean metal surfaces to be welded of all oil, grease, dirt, loose scale and foreign material. Clean welds each time electrode is changed and chip burned edges before placing welds. Flame dry before welding.
- D. When wire brushed the completed welds must exhibit a uniform section that is smooth welded metal with feathered edges. Weld shall be without undercuts or overlays, free from porosity and clinkers and in good fusion and penetration into the base metal. Cut out welds or parts of welds found defective with chisel and replace with proper welding. Reinforcing bars to be welded (ASTM A706) shall have a maximum of 0.55 carbon equivalent. Carbon equivalent for each bar shall be known from the mill certificates prior to welding such that preheat and inter-pass temperatures may be determined.
- E. Weld using full penetration butt welds by the electric-arc method. Weld splices to develop 125% of the specified yield strength of the bars or of the smaller bar in transition. Exercise care to assure that no reduction of the cross sectional area of the steel reinforcement occurs.
- F. District's testing laboratory will perform nondestructive radiographic or ultrasonic testing on 25% of all welds. If any weld fails, the laboratory will test all remaining welds at the Contractors expense. Contractor shall correct defective welds and request retesting by the District's laboratory with services billed directly to the Contractor. Submit results of the welding retests to the District.

### 3.05 WIRE MESH REINFORCEMENT – Pan Filled Stair Pans and Landings - Only

- A. Roll out straight and cut to required size in longest lengths practical and lay reasonably flat in place.

1. Lap minimum two full mesh wire spaces at outermost sides and ends (1 foot minimum).
  2. Staggering ends when using rolled stock.
  3. When using sheet stock, offset laps of adjoining widths to prevent continuous laps in either direction.
  4. Securely wire together and to other reinforcement at frequent intervals.
- B. Support to prevent displacement by workers during pour and to carry the reinforcement. Locate mesh in center of slab or as shown on the contract drawings. Wire mesh to be used only as indicated.

### 3.06 SETTING MISCELLANEOUS ITEMS

- A. Allow for the setting of miscellaneous items of reinforcing steel as specified in "Concrete and Concrete Finish".
- B. Reinforce openings in the floors and walls required by work of other sections.
- C. Provide dowels, etc. the sizes and shapes as indicated or as required.
- D. Provide accessories to maintain vertical wall bars in place during pouring. Single curtain vertical bars shall be secured within 1/4 inch of the specified location. Support spacing of vertical bars shall not exceed 100 bar diameters.
- E. Support slab reinforcing at maximum 42". Support top reinforcement at the face of supporting walls, columns, beams and capitals.
- F. Tie all splices and accessories.

### 3.07 CHANGES OF MILD STEEL REINFORCING

- A. Make no change of mild steel reinforcing or supports on shop drawings or field installation phases without the knowledge and review of the Architect and District. A letter request noting specific recommended changes must be submitted to Architect and District prior to preparation and issuance of shop drawings. Shop drawing review will not suffice as approval for any change in the absence of an itemized letter request, and must be approved by DSA.
- B. Reinforcing steel is shown in U.S. dimensions. If metric sized steel is supplied the equivalent poundage and effective area of steel must be provided, subject to District's and Architect's and DSA review and approval.

### 3.08 ANCHORING SYSTEMS

- A. Post-installed anchors will not be permitted in post-tensioned concrete. Submit all requests for use to the Architect for review prior to starting work.
- B. Adhesive / Injection / Epoxy Systems: Installation is to be as instructed by the manufacturer based on type of insert used.
- C. Special Inspection. Refer to the requirements of CBC and the requirements of Section 01425.

### 3.09 FIELD QUALITY CONTROL

- A. The District will employ and pay a qualified independent testing laboratory to perform testing for field quality control and inspection. Retesting of materials failing to meet specified requirements shall be redone at Contractors expense. Inspector will perform the following:
1. Perform visual inspection of reinforcement and support prior to concrete placement for size, type and quality of materials.
  2. Observe placement of reinforcement including size, vertical location, horizontal spacing, correctness of bends, splices, clearance between bars and forms, firmness of installation and security of supports and ties immediately prior to concreting.
  3. Observe placement of embedded items including size, vertical location, horizontal spacing and correctness of fabrication.
  4. Inspection shall be to observe compliance with code requirements, contract documents, reviewed shop drawings and approved field orders, bulletins and change orders. Inspector shall not be responsible for Contractor coordination of items to be placed for subsequent work.

### 3.10 CLEANING

- A. Verify that forms have been cleaned and excess form release compounds have been removed prior to placing reinforcing.
- B. Reinforcing steel and anchoring systems are to be inspected and cleaned as required to remove objectionable rust, scale, dirt, debris or hardened concrete paste that may have been splattered from previous pour.
- C. Clean any spills, drips and excess materials of any nature at the completion of the work of this section.

### 3.11 PROTECTION

- A. Where post-installed mechanical / adhesive fastener systems are utilized with the specific approval of the Architect, installed anchor systems shall be protected so that anchoring adhesive can obtain its designed maximum cure and threaded rod or insert is not damaged prior to its intended use.
- B. Units damaged and not able to be used as originally intended shall be repaired or replaced, inspected and approved at no additional cost to the District.

END OF SECTION

1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Cast-in-place reinforced concrete
  - 2. Concrete finishing, curing and staining.
  - 3. Poured concrete stairs / pan filled concrete stairs
  - 4. Placement of cast in-place stair nosing inserts
  - 5. Grouting of post-tensioning anchors in coordination of the work of another section
  - 6. Equipment bases

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 02620: Concrete for Curbs, Gutters and Walkways
- B. Section 03100: Concrete Formwork
- C. Section 03200: Reinforcing Steel
- D. Section 03365: Post Tensioned Concrete
- E. Section 04220: Concrete Unit Masonry
- F. Section 05300: Metal Decking
- G. Section 07540: Elastomeric Deck Coatings

1.03 CONDITIONS

- A. The "General Notes" on the structural drawings are part of these specifications.
- B. DSA Requirements:
  - 1. Portland cement concrete paving shall have a medium salt (medium broom) finish on all surfaces sloped less than 6% and slip resistant (heavy broom finish) on all surfaces sloped greater than 6%. CBC Section 1133B.7.1.
  - 2. Treads and Nosings: Provide 2" contrasting color (70% recommended) warning stripe of material at least as slip resistant as the treads of the stairs, 1" max. from edge of nosing and top landing. At interior stairs, provide warning stripe at top landing and bottom tread nosing only. At exterior stairs, provide warning stripe at top landing and all tread nosings. CBC Section 1133B.4.4.

1.04 REFERENCE STANDARDS

- A. American Concrete Institute (ACI)
  - ACI 117 "Standard Tolerances for Concrete Construction and Materials"
  - ACI 301 "Specifications for Structural Concrete for Buildings".

- ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete".
- ACI 305 "Report on Hot Weather Concreting"
- ACI 311 "Recommended Practice for Concrete Inspection".
- ACI 318 "Building Code Requirements for Reinforced Concrete".

B. American Society for Testing and Materials (ASTM).

C. Comply with California Building Code (CBC)

#### 1.05 SUBMITTALS

A. Provisions: Comply with Section 01300 / 01340.

B. Materials list of items proposed to be provided under this Section.

C. Manufacturer's specifications, certificates and other data needed to prove compliance with the specified requirements.

D. Concrete Mix Design: Contractor shall submit mix design prepared, stamped and signed by a California registered engineer of the approved independent testing laboratory for each type and strength of concrete a minimum of three weeks prior to start of concrete work. Mix design data shall include the substantiating back-up test results to justify compliance with the specified criteria. Include test data from the aggregate supplier justifying aggregate sieve sizing, strength, chemical composition, shrinkage analysis, etc. Do not begin concrete production until design mixes and supporting test data have been reviewed.

E. Material Certificates: Provide in lieu of materials laboratory tests reports only when permitted by the Architect. Material certificates signed by the material manufacturer / supplier and Contractor certifying that materials comply with or exceed the specified requirements with the supporting data to prove compliance, inclusive of the chemical properties and shrinkage data of the aggregate proposed.

F. Shop Drawings: Submit for structural concrete and concrete slabs showing dimensioned locations, types of construction and expansion joints, method of keying, location of openings, inserts and sleeves.

G. Delivery Tickets: Provide delivery ticket with each transit truck, signed by an authorized representative of the batch plant, containing all information required by ASTM C94 as well as time batched, type and brand of cement, cement content, maximum size of aggregate, water content added at the batch plant and total water content allowed in the mix design. Loads delivered without this required ticket will be rejected.

H. Inspection Reports: District's testing lab shall submit five (5) copies of reports to everyone listed on the distribution list.

I. Samples: Provide minimum of three (3) samples, 2'-0" square of each of the following:

1. Provide the specified rotary heavy sweated swirled patterned concrete



floor finish to demonstrate obtainable variations in texture for review and selection of the floor slab finish to be used in production throughout the project.

2. Provide one 4'-0" square elevator lobby slab, steel trowel then light broom finished for slip resistance. Replicate a dimensioned portion of one lobby paving design to represent saw-cut pattern and application of the specified stains and color enhancing sealer for each of the colors indicated.
  3. Refer also to required Mock-ups, hereafter.
- J. Furnish copies of ACI 'flatwork finisher and technician' certificates earned by each worker who has completed the specialized training program. Contractor is required to have a minimum of one certified worker designated responsible party for supervising structural concrete deck finish operations.

#### 1.06 QUALITY ASSURANCE

- A. Do not commence placement of concrete until mix designs have been reviewed and approved by the Architect and by all governmental agencies having jurisdiction and until reviewed copies are on file at the job site and the batch plant, and at the Division of State Architect.
- B. Total water per cubic yard of concrete, including any water added after batching shall not exceed the volume noted in the approved mix design.
- C. Contractor shall make all payments to the testing laboratory for cement and aggregate tests the Inspector or Architect may order if it is determined batched concrete is of questionable quality (containing deleterious materials). Additionally aggregate shall be tested of conformity to relevant ASTM specification requirements whenever the original quarried source or physical character has changed as indicated by incremental cylinder breaks. See other requirements for testing in Part 2 of this Section.
- D. Schedule construction loads so as to not impose overloading of slabs. Repair any damage resulting from overloading with construction loads at no additional cost to District.
- E. Protect trowel finished slabs from subsequent construction damage, including staining concrete slurry build-ups from form leaks of overhead concrete pours and defacing of concrete deck surface finish from construction operations. Remove concrete slurry build-ups on slabs by water wet blast cleaning prior to hardening or cure.
- F. Provide the concrete finishes specified herein as approved by the Architect. Contractor shall make allowances to provide and remove the required formwork, cleaning and patching required. Provide the types of finished surfaces specified and as approved by the Architect.
  - 1 Contractor and the Architect shall review deck surface finish after finishing of the first slab on grade pour to verify the trowel rotation size and amplitude of the raised fines of the cement paste for general overall quality of the heavy sweated swirl rotary finish in comparison to the previously approved sample. Acceptance is required for establish a

standard of quality expected on production of the remaining deck pours. Comply with finish requirements specified hereafter.

- 2 Interior surfaces (soffits, beams and columns) shall be reviewed by the Contractor and the Architect at the end of the first elevated deck pour to approve a representative area and establish a production standard of quality that is to be maintained throughout the interior of the structure. Comply with finish requirements specified hereafter.
- 3 Exterior surfaces of spandrel panels and columns shall be reviewed prior to painting. Review surface finishes with Architect to determine acceptable production and patching standards. Exterior surfaces shall be considered "Architectural Concrete" and shall be rendered without visible defect.
4. Contractor shall be responsible for coordinating the applied architectural finishes selected with concrete finishes required to use the proper form release compounds and concrete curing compounds appropriate for the substrate.

- G. Contractor shall provide knowledgeable concrete finishers with a minimum of three years experience producing the deck finishes required to execute the work of this contract and have a minimum of one ACI certified 'flatwork finisher and technician' staffed that is industry trained, completed the required program(s), certified and scheduled full-time to be on-job to oversee and be responsible for the overall quality control of the structural concrete deck finish work. Contractor shall submit the ACI certificate for the designated party at the time of material submissions.

#### 1.07 REQUIREMENTS

Excess of waste concrete may not be washed into the public way or any other drainage system. Provisions shall be made to retain concrete waste and wash water on-site until they can be disposed of as solid waste.

#### 1.08 WARRANTY

- A. Deck Guarantee: All elevated deck surfaces shall be guaranteed by the Contractor to be leak proof / watertight for a period of not less than two (2) years after 'Notice of Substantial Completion' is issued for the work of this Contract. Contractor shall seal all deck cracking (where indicated by the District and mutually agreed upon by the Contractor) that allows surface water to migrate down through and visible from the underside deck soffit of the floor level below. Contractor shall propose an appropriate product and the ways and means in which to remedy the repair, at no additional cost to the District. Products, means and methods shall be as approved by the Architect.
1. This guarantee is in addition to the caulking and sealants required under the base contract, used to seal construction and expansion joints and all openings between building materials or systems components to mitigate the effects of water, wind, dirt or insect penetration.
  2. This requirement is to be deemed an extension to the Contractors standard project one (1) year warranty 'terms and conditions', applying specifically to this issue only.
- B. Repair Guarantee: Contractor shall guarantee all high-strength pre-bagged, repair mortar / topping materials used for both vertical / horizontal work

applications, whether subjected to vehicular / pedestrian traffic, interior / exterior of the structure shall not crack, spall, loose adhesion or delaminate from the substrate that it is bonded to for a period of not less than five (5) years.

2.00 PRODUCTS  
2.01 MATERIALS

- A. Portland Cement:
1. Footings, Foundations and Slab on-Grade (in contact with soils): The Geotechnical Report indicates soil containing corrosive potential with respect to concrete (sulfate and chloride levels). Concrete used shall be designed in accordance with the provisions of ACI 318, Section 4.3 and 4.4 (Section 1904A of the 2010 California Building Code). Provide a standard domestic brand conforming to requirements of "Standard Specifications for Portland Cement," ASTM C150 Type V mill tested per ACI Section 3.2. for reinforced concrete exposed to soils. Mix design shall be reviewed by a qualified specialist.
  2. Concrete Above-Grade (not in contact with soils): Provide a standard domestic brand conforming to requirements of "Standard Specifications for Portland Cement," ASTM C150 Type II mill tested per ACI Section 3.2. Use only one brand of cement throughout the project unless otherwise required and approved in writing by the Architect.
- B. Water For Concrete: Clean, potable and free from deleterious substances.
- C. Concrete Aggregates:
1. Rock Concrete Aggregates: Provide aggregate conforming to ASTM C33 that is tested to be non-reactive with test data to prove compliance and indicate the physical properties of the aggregate and source of supply expected throughout the project. Design mix test data shall indicate proof of cement alkali content and percentage of aggregate reactivity, with any statements from the Contractors testing laboratory having had prior successful experience with aggregate from the same source as proposed. Hard rock as specified herein shall be deemed to mean normal weight aggregate. Aggregates dredged from salt water sources are not permitted. Course and fine aggregates shall be from limestone and granite only.
  2. All regular weight aggregates shall conform to the following:
    - a. Coarse Aggregate: Carbonate classification and gradation per ACI 318 Section 3.3. Siliceous alluvial deposits shall be acceptable only by Engineer's approval of properties and shrinkage data.
    - b. Materials passing the #200 screen shall be limited to not greater than sand 5 % maximum and silt & clay 2 % maximum.
  3. Coarse Aggregates: Non-reactive, crushed limestone or granite rock uniformly graded to the specifications noted on the structural drawings.
  4. Fine Aggregates: Conform to ASTM C33 consisting of non-reactive, clean natural sand having hard, strong, durable particles of limestone or granite origins graded to not more than eight percent (8%) passing a #100 sieve and not more than three percent (3%) passing a #200 sieve.
- D. Admixtures: Conform to ACI 318 Section 3.6. Include admixtures, in design mix only as accepted by the Architect and Engineer. Use only a standard brand of

admixture for concrete. Not more than one admixture is acceptable unless specifically permitted in writing by the Architect.

- Use admixtures in strict compliance with the manufacturer's directions. Admixtures to increase cement dispersion or provide increased workability for low-slump concrete may be used subject to the Architect's acceptance.
- Use amounts of admixtures as recommended by the admixture manufacturer for climatic conditions prevailing at the time of placing. Adjust quantities of admixtures as required to maintain quality control and provide revised mix designs for review.
- Do not use admixtures containing chloride ions.
- 1. Pozzolan: ASTM C618 Class N.
- 2. Fly Ash: Proposed use of fly ash to replace / supplement cement content is to be approved by the Architect/Engineer prior to submittal of concrete mix designs for use in all slab on-grade and elevated deck mix designs.  
**Note:** For all concrete in contact with soil surfaces, verify compatibility / performance with the type of sulfate / chloride resistant cement used.  
----- Percentage of fly ash in mix design shall be by weight not by volume.
  - a. Class F fly ash may be substituted for up to 15% of minimum cement (per 1903A.4 at substitution rate (not more than one pound of fly ash to one pound of cement) sufficient to provide required strength at all specified ages. Strength retarding affects of Fly Ash shall be accounted for as well.
  - b. If strength or air content varies more than the allowable tolerance concrete shall be rejected by testing lab representative.
  - c. Submit all fly ash concrete mix designs per ACI 301.
- 3. Evaporation Retarder
  - a. A VOC compliant water-based, pigmented, monomolecular film-forming compound that reduces evaporation of moisture in fresh concrete to help prevent shrinkage cracks and facilitate finishing.
  - b. Acceptable Products:  
"Atlas Finish Film" by Atlas Tech Products (858) 277-2100  
"Aquafilm" by Conspec Marketing & Manufacturing  
"Sure-Film J-74" by Dayton Superior Chemicals  
Or equal
- 4. Water Reducing Admixture: ASTM C494 Type A, D or E. Using only one manufacturer / brand for a particular mix design throughout the project. Admixtures used are subject to review of the Architect. Usage must reduce the mixing water by at least 5 percent without entraining air in excess of 2 percent by volume.
- 5. Super-Plasticizers (High Range Water Reducers):
  - a. Use approved super-plasticizers where flowable concrete is specifically indicated / required to improve placement and workability; to lower W/C ratio; or for shrinkage or permeability reduction.
  - b. Use high-range, water reducing admixture in concrete with a W/C ratio of 0.42 and less.
  - c. ASTM C494 Type F or G. Master Builders "Rheobuild", Euclid "Eucon 37" or equal, capable of producing concrete which can be placed at 8-11 inch slump within 2 inches of that initially mixed for 2 hours, and of maintaining concrete temperatures within 2 degrees F from time of batching for 2 hours minimum. If the water reducing agent requires more than 2 percent air, the water

reduction shall be not less than 12 percent. In no case shall the water reducing agent entrain air in excess of 4 percent.

6. Water-Reducing Set Accelerating Admixture: ASTM C494 Type C or E.
  - a. Admixture to be a non-corrosive and non-chloride admixture.
  - b. Subject to compliance with requirements, provide one of the following:
    - W.R.Grace - "Daraset" or "PolarSet"
    - Master Builders - "Pozzutec 20" or "Pozzolith NC534"
    - Euclid Chemical Company - "Accelguard 80"
    - Cormix Construction Chemicals - "Gilco Accelerator"
7. Air-Entraining Admixture:
  - a. Use approved air-entraining admixture where concrete is exposed to weather and for lightweight concrete mixes. Air content percent in accordance with ACI 318.
  - b. Concrete used for parking slabs, beams and slab on grade shall have 62 percent plus or minus 2 percent air content.
  - c. ASTM C260, Master Builders AE-90, or equal.
8. Water Resistant Admixture: Integrally batched water repellent admixture for redi-mix concrete used for pan filled steel stairs to be Master-Builders 'Rheomix 235', Concrete Moisture Solutions "Hydra-Guard", (562) 438-4343, or equal.
9. Shrinkage Reducing Admixture: Use "Eclipse Plus" by Grace Construction Products or "Tetraguard AS20" by Master Builders.
10. Admixtures containing chlorides, fluorides, sulphides, nitrate ions or other substances detrimental to the reinforcing steel are not permitted.

E. Grout

1. A non-shrink, non-metallic, cement-based, premixed grout that meets CRD C621 and ASTM C1107 Grades A, B & C. Grout shall be non-corrosive, non-staining and contain no calcium chloride. Compressive strength shall reach a minimum of 3,500psi in 1 day and 8,000psi in 28 days at a flowable consistency when tested in accordance with ASTM C109. Grout shall exhibit positive expansion when tested in accordance with ASTM C827.
2. Acceptable Products:
  - "Atlas Hi Flow Grout" by Atlas Tech Products, (858) 277-2100
  - "Conspec 100" by Conspec Marketing & Manufacturing
  - "Sure Grip High Performance Grout" by Dayton Superior Chemicals
  - "Construction Grout" Masters Builders Company
  - "Sika Grout 212" Sika
  - "Sealtight 588" W.R.Meadows
  - Or equal

F. Drypack

1. Field mixture of one part Portland cement to two parts fine aggregate mixed to a damp consistency such that a ball molded in the hands will stick together and hold its shape. At Contractor's option the specified admixture may be added for increased workability at lower water/cement ratio. In lieu of field mixing contractor may use a factory mixed dry-pack grout.
2. Acceptable Products:
  - "Atlas Construction Grout" by Atlas Tech Products, (858) 277-2100
  - "Enduro 50" by Conspec Marketing & Manufacturing
  - "1107 Advantage Grout" by Dayton Superior Chemicals

"Construction Grout" Master Builders  
"Euco Dry Pack Grout" Euclid  
Or equal

- G. Curing Compound: Comply with ACI 301 Sec.2.1, Paragraph 3.11 - CURING for 48 hour required moisture curing, and use of the following:
1. For - Vertical Concrete Surfaces:
    - a. A VOC compliant liquid membrane-forming, water-based, non-staining compound that will not affect the appearance of the concrete nor adversely affect the bond of subsequent materials.
    - b. Curing compound to be applied to concrete surfaces that are to receive subsequent coatings or treatments, such as paint, waterproofing, sealers, etc. shall be specially formulated for such use and shall be certified by the manufacturer not to inhibit the bonding qualities of the treatments.
    - c. Acceptable Product:  
"Atlas Quantum-Cure" by Atlas Tech Products, (858) 277-2100, or equal.
  2. For - Horizontal Concrete Surfaces:
    - a. A VOC compliant liquid membrane-forming resin-based emulsion curing compound conforming to ASTM C309, Type 1, Class A & B.
    - b. Curing compound shall dissipate from concrete surface within 40 days of application when exposed to sunlight and construction traffic. Once dissipated, curing compound shall not discolor concrete nor affect the bond of subsequent materials.
    - c. Acceptable Products:  
"Atlas Res-Cure" by Atlas Tech Products, (858) 277-2100  
"W.B. Resin Cure" by Conspec Marketing and Manufacturing  
"Day-Chem Rez-Cure J-11" by Dayton Superior Chemicals  
"Aqua Resin Cure" by Burke  
"Pentra-Cure" by Convergent  
"Kurez-DR" by Euclid  
"MasterKure-N-Seal W" by Master Builders  
"Resin Cure E" by Noxcrete  
"1200" by W.R. Meadows  
Or equal
- H. Curing Barriers: Comply with ASTM C171 Type I and ASTM D2103 Type 00001, regular or polyethylene sheet complying with ASTM D2103, 5-mil minimum thickness.
1. Curing Paper: Fortifiber Corp. "Orange-Label" Sisalkraft curing paper.
  2. Blankets: Opaque white or aluminized polyethylene or polypropylene extruded onto non-woven polypropylene geotextile fabric, burlap or equal, "Barriclad 2.2", by Barriclad Technologies, Inc., JPS Specialties Inc., "Cure Lap" or "Summer Cure", or equal.
  3. Polyethylene Sheeting: TRM Manufacturing (213) 921-3458 "Weather-All Film", or equal, 4-mil white polyethylene sheeting
  4. Cellulose Fiber Blanket: MacTech Group., "Ultra Cure NCF", (858) 277-2100.
- I. Expansion (Through) Joint Filler: Refer to Sections 03100 - Concrete Formwork and Section 07900 - Caulking and Sealants.
- J. Bonding Agent

1. VOC compliant water-based, non-re-emulsifiable, acrylic latex bonding agent that meets ASTM C1059 Type II.
  2. Acceptable Products:  
 "Atlas Acryl-Bond" by Atlas Tech Products, (858) 277-2100  
 "Strong Bond" by Conspec Marketing & Manufacturing  
 "Day-Chem Ad Bond J40" by Dayton Superior Chemicals  
 "Flex-Con" by Euclid Chemical Company  
 Or equal
  3. Provide a high strength polymer modified or epoxy bonding slurry to increase adhesion between fill material and existing concrete surfaces. Provide Atlas Tech Products "Atlas LPL Epoxy Bonder, Master Builders "Concessive LPL", "Sikadur 32 Hi-Mod – LPL or Hi-Mod", Euclid Chemical "EucoPoxy LPL MV" or "Euco 452 MV", W.R. Meadows "Rezi-Weld 1000", or equal.
- K. Repair Materials
1. For - Horizontal Concrete Surfaces:
    - a. A one-component, polymer modified, cement-based, traffic-bearing concrete repair mortar meeting ASTM C928.
    - b. Compressive Strength: Minimum 2,500psi in 1 day; 6,000psi in 28 days, per guidelines of ASTM C109.
    - c. Acceptable Products:  
 "Atlas Tech DOT Patch" by Atlas Tech Products, (858) 277-2100  
 "Pavepatch 3000" by Conspec Marketing and Manufacturing  
 "HD-50" by Dayton Superior Chemicals  
 "Concrete Patch" by Five Star  
 Or equal
  2. For - Vertical or Overhead Concrete Surfaces:
    - a. A non-sag, polymer modified, rapid-setting concrete repair mortar for vertical and overhead applications.
    - b. Repair mortar shall meet ASTM C928.
    - c. Compressive Strength: Minimum 2,000psi in 1 day; 6,000psi in 28-days, per guidelines of ASTM C109.
    - d. Bond Strength: 1,000psi in 1 day; 2,000psi in 14 days, per guidelines of ASTM C1042.
    - e. Acceptable Products:  
 "Atlas Structural Repair Mortar - V & O" by Atlas Tech Products  
 "Conpatch V/O" by Conspec Marketing and Manufacturing  
 "HD-25" by Dayton Superior Chemicals  
 "Vertical Patch" by Five Star  
 Or equal
- L. Concrete Stain: Provide a colored concrete stain at each elevator lobby deck. Method of application is to be by dry shake. Product shall be "Lithochrome Color Hardener" - "Emerchome" manufactured by L.M. Scofield Company (800) 800-9900, or equal. Coordinate with the District and manufacturer for the curing and sealing of the deck, to protect the consistency and intensity of the selected color applied. provide "Colorcure Concrete Sealer" Submit samples as required by paragraph 1.05 for approval by the Architect prior to execution.
- M. Resurfacing 'Sacking' Material: Provide manufactured bag pre-mix of Portland cement or hydraulic cement based repair material containing graded fine

aggregates or silica sands, polymers, proprietary additives and evaporative reducers to increase adhesion, moisture retention and curing. Replace batched mixing water with liquid acrylic polymer in the percentages recommended by the selected manufacturer to increase workability, adhesion or bonding to hardened surfaces, where powdered polymers are not part of the factory pre-mix. Use products listed for rubbing, smoothing, restoring, resurfacing and repairing of concrete surfaces requiring thin coat patch and repair.

1. "Atlas Smoothcrete Plus" by Atlas Tech Products,
2. "Pavecrete" by Lyons Manufacturing,
3. "DauergROUT PS" by Noxcrete,
4. "Poly-Patch" by Euclid, or equal.
5. "One Pass" or "Wunderfix", by Rapid-Set

## 2.02 PROPORTIONING AND DESIGN OF MIXES BY THE CONTRACTORS TESTING LABORATORY

- A. The Contractor shall use either an independent testing laboratory not associated with the concrete supplier that is acceptable to the Architect for preparing mix designs and reporting test data of same proposed mix designs or provide established and successfully experienced mix designs from the concrete supplier demonstrating each different mix design meets the specified requirements. Prepare design mixes for each type and strength of concrete in accordance with applicable provisions of ASTM C94. All concrete mix designs are required to be stamped and signed by a California licensed engineer working independently or employed by either the testing laboratory or the ready-mix supplier and dated to be less than 6 months old. Mix designs shall be accompanied by supporting test data for the proposed mix materials or reported results of experienced mix designs from the same mix materials and sources proposed for this project.
- B. Prepare all mix designs in accord with ACI 301 and CBC Section 1905 for required Building Code minimum specified mix designs. The required average strength used as a basis for selecting proportions for each mix to be minimum 15% higher than the specified 28-day design strength. Do not exceed the water / cement ratios stated on the structural drawings.
- C. Durability requirements for exposed concrete to weather (roof, ground level, exterior walls and columns, slab on grade) shall be included in all mix design. Concrete exposed to weather shall have a maximum water / Portland cement ratio of 0.45.
- D. Mix design shall provide for an average "drying shrinkage" of concrete after 35 days of total curing not to exceed that indicated on the structural drawings or as a minimum requirement 0.045% for elevated concrete slabs. The total water content added to the design mix shall be minimized by use of a super-plasticizers or other water-reducing admixture. Drying shrinkage test record shall come from a minimum of 30 tests for each mix design where shrinkage results are required as noted on structural drawings (minimum: slabs on-grade, elevated decks and walls). Test record shall be compiled from tests performed a minimum of three batches of the mix under consideration, from the same materials described by mix design, batched at least seven days apart. Materials shall be from active use stockpiles at the batch plant(s). A minimum of 10 sets of shrinkage bars shall be



taken from each batch from random locations. Not more than two sets of shrinkage bars shall be taken from the same heat/location.

E. Admixtures:

1. Admixtures shall be included in each design mix only as accepted by the Architect and DSA. No more than one standard brand of each different functioning admixture is acceptable unless specifically permitted in writing by the Architect. Provide a letter from each different admixture manufacturer certifying that their admixture is compatible with others incorporated in the same mix design.
  - a. Use admixtures in strict compliance with manufacturer's directions. Admixtures used to increase cement dispersion, decrease water requirements or provide increased workability for low-slump concrete are highly encouraged.
  - b. Use amounts of each admixture as recommended by each selected manufacturer for climatic conditions prevailing at the time of placing. Adjust quantities of admixtures as required to maintain quality control and provide revised mix designs for review.
  - c. Do not use admixtures containing chloride ions.

F. Design strength and required slump as determined by ASTM C143, for each different strength concrete mix design utilized within the Work. Conform to that indicated on the structural drawings and attain the minimum specified 28 day values noted. A higher strength of concrete may be substituted to those indicated but will be subject to Code requirements for the higher strength / grade.

G. Proportion water content and the amount of fine and coarse aggregates so concrete is of proper strength and can be placed without segregation. Water quantity shall be inclusive of any moisture in the aggregate and shall conform to Code provisions.

H. Submit concrete mix designs for review and approval by the Engineer at least 15 working days prior to start of work. Mix designs shall include the identifying mix design designation number, material manufacturer's name, brand, type designation source proportions of each material, admixtures if any, water-cement ratio, maximum allowable water content, slump, aggregate sieve sizes and gradations from the same source (quarry) to used in the project, 3-day compression test results, 7 and 28 day compression test results, shrinkage test record and other pertinent data.

I. Adjustment to Concrete Mix Design: Mix design adjustments may be requested by Contractor at no additional cost to District and as acceptable to the Architect provided characteristics of materials, job conditions, weather, test results and other circumstances warrant. Laboratory test data / strength results for the revised mix design shall be submitted and accepted by the Architect and DSA before using in the work.

2.03 FIELD TESTS OF CONCRETE BY DISTRICT'S TESTING LABORATORY - Comply with CBC Section 1905A.6 and Testing and Inspection per CBC 1704A.4 Evaluation and acceptance of concrete in conformance with Section 1905A.6, except where more stringent specified:

- A. Test Cylinders: District's testing laboratory shall perform sampling for test cylinders as the concrete is delivered from the mixer to the concrete pump hopper, unless specifically required at the point of discharge by code, agency of jurisdiction or structural engineer. Cylinders shall be taken from full size batches of concrete from each pour or day's operation so as to represent 50 cubic yards of concrete. Each sample for testing to consist of a set of four (4) cylinders (five (5) cylinders for elevated decks) sampled in conformance with ASTM C172, 'Sampling Freshly Mixed Concrete' made and cured in accordance with ASTM C31 'Curing Test Specimens in the Field'. Place in protected area moisture curing as required per referenced documents. Provide test cylinders marked by number, indicate point from which sample was taken and project location where batch was placed. Indicate slump test results of sample, air content if any, temperature of concrete mix leaving the drum, ambient air temperature at the project site at the time of placement.
- B. Cylinders shall be tested for compressive strength in accordance with ASTM C39. One cylinder shall be tested at 3-days for (elevated) post tensioned concrete mix designs, at 7-days and two tested at 28-days. One cylinder shall be kept as a spare to be tested if previous 28-day cylinders fail to meet strength requirements. Make frequent slump tests in the field to control concrete w/c ratio consistency. Provide a minimum of one slump test at the beginning of placement and again at the time test cylinders are taken. Conform to ASTM C143 for slump test methods.
- C. The Contractor may request and pay for taking and testing of any additional cylinders for purposes other than stated above. Contractor can use high early strength results to sequence construction scheduling provided he meets minimum code requirements.
- D. If the 28-day tests fail to meet the minimum specified ultimate compressive design strength, concrete will be considered defective. Architect may direct that cores from selected areas may be taken and tested in accordance with ASTM C42.
- E. If compression testing of core specimens fails to meet the specified design strength, concrete work shall be assumed to be defective and shall be further tested. Contractor at no cost to District and in a manner directed and acceptable to the Architect, provide for adequate strengthening or removal and replacement of the defective concrete.
- F. Repair concrete work to match existing surfaces when coring or other testing is done. Costs for coring, testing of work-in-place cores and all necessary repairs pertaining thereto shall be at the Contractor's expense.
- G. Contractor shall provide at no additional cost to District such incidental labor, materials and / or equipment as may be necessary in order to assist the Owners independent testing lab / deputy inspector with all temporary and secure handling and storage of on-site cured test cylinder specimens.

2.04 CONCRETE INSPECTION BY DISTRICT'S TESTING LABORATORY - Testing and Inspection per CBC 1704A.4 Evaluation and acceptance of concrete in conformance with Section 1905A.6 except where more stringent is specified.

- A. Inspector shall visit each batch plant (if more than one is used) prior to commencement of concrete work and at the start of each day's concrete work for each type of concrete delivered to the site and as thereafter only if directed by Architect to perform the following:
1. Inspection of batch plant and equipment (i.e., truck mixer, scales, bunker loading, stock-piles, storage of materials, admixture dispensers, etc.) for determination of operation efficiency, cleanliness and ability to delivery the materials specified.
  2. Visual inspection and sampling of aggregates for testing as herein specified, aggregate stock piling to determine uniformity of grading, cleanliness, moisture variation, etc., and ability to effectively batch the aggregate without inclusion of deleterious materials.
  3. Verify size of batch hoppers against rated capacity of trucks.
  4. Check of aggregate proportioning and adjustment of mix for "free" moisture and of variations in gradation.
  5. Visual inspection of batched loads after reasonable mixing time to determine the consistency and workability before releasing concrete for delivery.
  6. Inspection of conveying system
- B. District's inspector shall be continuously on project site to perform inspection for all concrete over 2,000psi (f'c), to verify placing technique and determine concrete deposited is uniform, vertical drop is not excessive, check depth of layers and for proper steel reinforcing placement and coverage.

#### 2.05 ADDITIONAL TESTS BY DISTRICT'S TESTING LABORATORY

- A. During the progress of work, the District's testing laboratory shall perform periodic testing and reporting of tested concrete characteristics and its conformance to specified reference standards. District's laboratory shall clearly identify the tested physical characteristics indicated below without the Architect having to do extensive search of the report data to review the current test results for comparison to prior testing results. Testing shall be for the following physical characteristics in accordance with ASTM Standards:
1. Reactivity of Aggregate - C289 / C227
  2. Organic Impurities - C40
  3. Fineness Tests - C117
  4. Soundness of Aggregates - C131
  5. Weight, Air Content - C138
  6. Air Entrainment - C233
  7. Bond Test - C234
  8. Shrinkage Tests - C157 as modified by SEAOC
  9. Chloride Tests -
- B. Concrete Shrinkages Tests:
1. Prior to the Contractor placing concrete for deck slabs, the District's testing laboratory shall prepare a trial batch of the reviewed mix design using the same aggregates, cement and admixtures (if any) proposed for use on the Project, as provided to the laboratory by the Contractor. Laboratory shall prepare at least 3 specimens for determining and verifying the reported 'drying shrinkage' data of the mix design, as furnished by the Contractor

2. The 'drying shrinkage' specimens shall be 4" x 4" x 11" prisms made, cured, dried and measured as specified in ASTM C157. Laboratory shall measure and report separately for 3, 7, 14, and 28 days of drying, after the required 7 days of moist curing, report the effective gauge length of the specimens shall be a minimum of 10".
3. Take 'drying shrinkage' specimens of each class of concrete (elevated slabs, slabs on grade and walls) during construction to insure continued compliance with these specifications and the approved mix design / certified test reports. Take at least one set of 3 specimen prisms from each day's pour for each class of concrete placed for every 1,000 cubic yards of concrete placed. Take 'drying shrinkage' specimens from the same concrete used for preparing compression test specimens.
4. The average 'drying shrinkage' of the field sampled test specimens cured in the laboratory at 35 days of total curing shall not exceed that specified on the structural drawings by more than 0.045% for hard-rock / normal-weight concrete.

## 2.06 DISTRICT'S TESTING LABORATORY INSPECTION REPORTS

The District will pay for independent testing laboratory services to perform material testing and continuous on-site inspection of structural concrete depositing only to the extent required by building code requirements and as specified herein. The District's testing laboratory shall furnish and distribute copies of testing and inspection reports as soon as they become available to all parties on the District's distribution list, including the District, District's Representative, Architect, Structural Engineer, Contractor and applicable building officials. Additional distribution of reports shall be as provided by the District. All reports and logged data entries shall be organized into a dedicated 3 ring binder, labeled for the project and made available on-site at all times, within the Contractor's construction trailer. Conform to the following requirements:

- |                                     |                         |
|-------------------------------------|-------------------------|
| - Selection of Concrete Proportions | CBC Section - 1905A.2   |
| - Batch Plant Inspection            | CBC Section - 1704A.4.2 |
| - Batch Plant Inspection Waiver     | CBC Section - 1704A 4.3 |

## 3.00 EXECUTION

### 3.01 SURFACE CONDITIONS

Continuously examine areas and conditions where work will be performed. Correct conditions detrimental to timely and proper execution and completion of the work. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 CONCRETE MIXING - Refer to CBC Section 1905A .7, 8, 9, 10

- A. Transit Mixed Concrete: Conform to ASTM C94. Batch plant shall be inspected at the start of project by the District's testing laboratory inspector and subject to random inspections during the course of the work to inspect quality control of materials being mixed. Transit mix manufacturer shall furnish with each load of concrete delivered, a certified statement noting the approved mix design number, quantity / brand of cement, coarse and fine aggregate sieve analysis, aggregate moisture content, temperature of aggregate, quantity and temperature of water added at batch plant, total amount permitted in mix design and time that water

was first added to mixture, brand and quantity of each admixture (as applicable), additional water added after batching, etc.

1. Each batch of concrete shall mix / spin not less than fifteen minutes after batching with a minimum of five minutes of which shall be at the site.
  2. Rotate drum at slower 'mixing speed' when unloading is delayed at the site to prevent incipient set of concrete.
  3. Concrete shall only be discharged under observation of a designated deputy inspector.
  4. Concrete will be rejected if not placed in final position within a calculated time based on the time water is first added to the batch and ambient air temperature.
    - a. When the air temperature is between 85-90 degrees F, reduce the mixing and delivery time from 90 minutes to 75 minutes; when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes maximum.
    - b. When air temperature falls to or is expected to fall below 40 deg. F, uniformly heat all water and aggregate before mixing as required to obtain a concrete mixture temperature of not less than 50 deg. F or more than 80 deg. F at any time during mixing, transport or point of placement.
    - c. Do not use mix designs materials containing chemical accelerators.
    - d. Loads received after the appropriately established maximum mix time as factored above, but is determined to still be workable, and no additional water was added past the noted maximum mix time shall be acceptable if approved by the District's inspector. Accurate batch plant and on-site records shall determine concrete usage.
  5. The physical condition(s) of the concrete being placed shall be in compliance with reference standard requirements and restrictions, inclusive of hydration temperature, ability to properly pump in a cohesive manner to the project location with segregation of materials, stage of plastic condition of the mix, etc. so the concrete can be placed and finished as specified herein.
  6. Discharge all wash water from the mixing drum before the truck reloads at the batching plant.
- B. Store materials at batching site on tightly floored space protected against mixing with other types or sizes of aggregate or with ground soils.
- C. Deliver cement to batching plant in original, unbroken sacks or other suitable methods acceptable to the Architect to guarantee that only one brand / same manufacturer' product and cement type specified, as reviewed in each different design mix gets used. Store cement in weather-protected, well-ventilated storage having a floor with clearance off the ground.
- D. Control mix design proportions by accurate measurement of all course and fine aggregates. Measure proportions of aggregate from each sieve size by weight or by an equivalent approved method in which dry or moisture content is a predominant factor in order to accurately control the water-to-cement ratio.

- E. Batch plant shall be equipped with automatic and/or computerized apparatus for controlling timing, metering, measuring of water and liquid admixtures. Once dialed in apparatus shall have locks that prevent unauthorized changes.
- F. Concrete Consistency:
  - 1. Use only the amount of water established by the approved mix design.
    - a. Do not exceed the maximum quantity specified for the specific type and grade of concrete.
    - b. Use the minimum amount of water necessary to produce concrete of the workability required for placement and physical characteristics tested.
    - c. Do not add additional amounts of water for any reason.
  - 2. Measure concrete consistency by ASTM C143 method.
    - a. As part of the routine testing and inspection, test twice each day or partial day's run.
    - b. Maintain a complete and accurate record of on-site tests.

### 3.03 PREPARATION FOR CONCRETE PLACEMENT

- A. Remove all free water from forms before concrete is deposited. Remove hardened concrete debris and foreign materials from interior surfaces of forms, exposed reinforcing and from surfaces of mixing and conveying equipment.
- B. Wetting: Saturate wood forms sufficiently to minimize the amount of mix water absorption and to swell the wood grain to tighten any cracks in form surfaces. Wet other materials sufficiently to also reduce absorption and help maintain concrete workability.
- C. Earth Sub-grade: Dampen earth surfaces maximum 24 hours before placing concrete; do not muddy. Remove any loose materials observed.
- D. Sand Beds: Re-compact disturbed material bringing to the correct elevation. Sprinkle the entire sand bed with water until damp throughout the placed thickness without flooding or creating puddles.
- E. Screeds: Set screeds to provide the finished floor elevations indicated. Provide screeds at the base of walls or other vertical surfaces and at a maximum of 8'-0"oc in each direction for flat work. Check elevation levels with transit or laser level instruments before, during and after placing operations to maintain floor levels indicated and desired for proper flatness or slope desired. Coordinate with plumbing work for drainage slope elevations required. No cast in-pour screed or screed hardware is permitted.
- F. Expansion Joint Filler: Install where fresh concrete abuts an existing hardened vertical surface, unless indicated otherwise. Install expansion joint filler for full depth of joint with the top surface of the joint filler finished level with the adjacent hardened concrete surface, to use as a screed for the fresh placed concrete. Remove the appropriate depth of filler (depth = 1/2 width) once the newly placed concrete has cured to the point that work will not damage finished surfaces. Install sealant above the expansion joint filler to provide two-sided adhesion of the sealant in conformance with Section 07900 – Caulking and Sealants.

### 3.04 DEPOSITING

- A. Place each unit of the structure whenever possible, in one continuous pour operation. Place required vertical and horizontal construction joints at locations indicated. Make all construction joints straight, horizontal or vertical, coinciding with reveals or top of forms as applicable. Make surfaces of the concrete level where ever a run is stopped. Place reinforcing steel at construction joints as detailed on the Drawings. Prepare hardened concrete cold joints surfaces to promote bond and continuous surface. Bush hammer or sandblast surfaces to expose aggregate of 1/4 minimum amplitude on the previous / hardened pour. Brush or wash worked surface clean of loose dust, dirt or debris.
- B. Place concrete on inclined uphill, i.e. sloped post tensioned slabs by depositing concrete uphill (bottom up) to minimize surface tension cracking.
- C. Pour all walls and columns full story height. No horizontal joint will be allowed between floor line and top of wall, except as otherwise shown on Drawings or approved by Architect. Where deeper sections are being poured use tremies or metal chutes to limit the free fall. Place concrete by methods that prevent segregation of materials.
- D. Construction Key Joint: Finish smooth and straight with proper forming strip allowing easy removal. Tool top edges of slab construction joints to provide a seat for caulking; v-groove the bottom as detailed.
- E. Deposit concrete to inside of form walls as nearly as practicable to its final position. Deposit concrete into forms in uniform thickness horizontal layers around the building. Proceed along forms at a uniform rate of pour, placing fresh concrete from a chute onto the previously placed mass that has either formed a gravity settled or vibrator consolidated preliminary surface finish. Do not place concrete into areas where bleed water from the previous pour has formed a puddle. Do not cause conveyed concrete to flow more than the minimum distance where lateral movement might cause segregation of the coarse aggregate, mortar or water from the concrete mass.
  - 1. Do not place any subsequent concrete pours without forming a construction joint against a hardened previous pour that has set or been in place more than one hour.
  - 2. Construction joint surfaces in walls are to be rough surface of 1/4" minimum amplitude; refer also to structural details.
- F. Place concrete in forms within the allowable maximum time established, based on time water was added at the batch plant and air temperature, but in not case shall concrete be placed where records indicate that the concrete mix has been hydrated for 1-1/2 hours or more. Do not re-temper mix which has partially set. Partial set is justification for rejecting a load. Place no concrete when wind, heat or limitations of provided facilities will prevent proper and uniform placing, finishing or curing.
- G. Place only one mix design, strength or grade of concrete on the job at one time.
- H. Do not allow the use of a non-structural concrete or grout in the vicinity of pre-stressing tendons, anchors or column regions of beams and slabs.

- I. Vibration: Consolidate each layer of concrete immediately during pour as soon as it is deposited with mechanical vibrators and suitable hand tools, to work mixture into all parts and corners of forms, entirely around reinforcement and embedded items, to provide solid, continuous contact with forms. Equipment and procedures for consolidation shall conform to ACI 309, unless modified herein.
1. Place power vibrators in concrete as soon as possible to minimize entrapped air. Insert and withdraw vibrators in vertical manner at points no farther apart than visible effectiveness of vibrator. Vibrator shall penetrate rapidly to bottom of placed layer and at least 6 inches into preceding layer, where applicable. Do not insert vibrator into lower layers that have begun to set.
  2. Consolidate concrete to all points within the forms to provide solid, continuous contact. Vibrating through forms from the outside will not be permitted.
  3. Vibrate fresh concrete for sufficient time and supplement by rodding or spading with hand tamping to thoroughly compact and complete embed reinforcement and fixtures without segregation of ingredients. Slowly remove vibrator from concrete to break and release air that cavitate around impeller. Continue mechanical vibration as necessary to insure smooth surfaces, free from voids, aggregate pockets, honeycombs and formed air pockets along the stripped formwork exposed finished surface.
  4. Maintain spare vibrator on job site during concrete operations.
- J. Pour floor slabs, pavements and walks as indicated. Compact and rod the placement accurately level and to the thickness shown, within a tolerance of 1/4" from the finished floor elevation indicated, as tested with a 10-foot straight edge. Slope deck surfaces to elevations indicated and to floor drains, as applicable. Where reinforcing steel and/or welded wire mesh reinforcement, where permitted for site concrete in addition to that required for reinforcing of steel stair pan filled treads and landings was installed in a manner that the weight of workers caused deformity of the supporting chairs or bolsters during placement; lift and support to reposition the reinforcement within the concrete section profile to provide proper depth and coverage.
- K. Set top of area floor drains a minimum of 1/2" lower than surrounding concrete finish surface within a radius of 3'-0" to provide positive flow and drainage. Coordinate with plumbing work and verify proposed finish floor elevations and drain grate elevations before placing concrete. Rework fresh placed concrete as required or provide remedial procedures necessary to accomplish a positive drainage. Contractor shall retrofit in-place completed deck surfaces that demonstrate inadequate and objectionable drainage, to the extent necessary and without additional cost to the District for conditions that could have been eliminated by proper coordination prior to concrete placement.
- L. Inserts, Anchors and Embedded Items: Coordinate the required anchorage, fastening inserts, embeds, sleeves and supporting requirements of all materials, products, fabrications, manufactured items and equipment provided and installed by the work of other sections under this contract. Compile all information, diagrams, installation details and instructions provided by manufacturers, suppliers, other trades or other parties responsible for the items to be attached thereto. Prepare a comprehensive set of placement drawings of each level of the



structure accurately locating by both horizontal and vertical (depth) dimension referencing relationship to beam and column centerlines as applicable or best suited to properly locate and set the cast in-place anchorage devices that are to be set as part of the work of this section to support the work of other sections.

1. Powder-driven or drilled-in concrete fasteners may be used in flat slabs or columns or used only when in tension for support of light loads (75 lbs max.) and only as approved by the Engineer. Submit load, location, current ICC report and hardware data for review by the Engineer. Locate fasteners a minimum of 8" from located P.T. tendons with depth of penetration limited to 3/4".
2. Where 'Red Head' or similar types of concrete expansion wedge anchor bolts are required to support more significant gravity loads or for seismic anchorage, furnish location within structure, product data of the item to be anchored, proposed type, size and the ICC number for the anchor proposed for review by the Architect. Do not install any anchors, especially in post-tensioned slabs or framing members without specific written approval of the Architect.
3. Where hanger rods, bolts, wire, coil inserts or similar items are used to support, suspend or anchor temporary construction staging items or equipment, Contractor shall coordinate the insert device locations necessary during construction with all other cast-in inserts required for work of other sections and include these insert locations on the comprehensive insert, anchors and embed placement drawings generated by the Contractor prior to executing the work of this contract.

M. Conduits and Sleeves:

1. Coordinate utility and equipment locations of work to be installed by the work of all sections to resolve conflict and minimize need for penetrations through structural framing members to the greatest extent possible. Propose sleeve locations in conformance with structural contract document requirements. Indicate the exact dimensioned locations, diameter of all sleeves, path of all conduits and location of all junction boxes to be placed on the comprehensive placing and setting shop drawings generated by the Contractor.
2. Conduit up to nominal outside diameter of 25% of slab thickness may be embedded in the central one-fourth thickness of slabs when layout drawings are submitted and approved by the Architect. In no case may conduits displace reinforcing steel or post tensioning cable locations indicated.
3. Conduit shall not be placed beneath bottom reinforcing steel or over the top reinforcing bars for elevated decks or outside the rebar cages in walls and columns.
4. Conduits that are placed below the reinforcing steel of slab on grade shall be encased in 3" of extra concrete coverage located around all sides of the conduit.
5. Proposed sleeve openings in footings, foundations, floors, walls, beams and decks of sizes larger than detailed on the contract documents must be approved by the Architect.
6. Reinforcement, conduits, outlet boxes, anchors, sleeves, hangers, bolts and other embedded materials shall be properly fastened securely in correct position prior to placing concrete.

- N. Coring of columns, beams and post-tensioned members is not permitted unless specifically approved in writing by the Architect.
- O. Where electrical, plumbing or mechanical equipment are required to be mounted on raised equipment pads, reinforce additional thickness per structural drawing details.
  - 1. Pour top mounting surfaces of pads plumb level compensating for sloped finish floor elevations. Coordinate with the equipment manufacturer for pad size, thickness, load requirements, reinforcing, embeds, inserts etc that affect placement.
  - 2. Pour raised curbs horizontally level unless detailed or required otherwise by equipment manufacturer.

### 3.05 BONDING TO PREVIOUSLY PLACED CONCRETE

- A. Prepare for bonding of fresh concrete to previously deposited concrete as follows:
  - 1. Before depositing new concrete on or against previously deposited concrete which has partially or entirely set, roughen surface of concrete in manner which will expose aggregate uniformly and leave contact surface clean, free of laitance, dust, loosened particles of aggregate or damaged concrete, or other bond-inhibiting material. Intentionally roughen surface to achieve amplitude of approximately 1/4 inch.
  - 2. Prepared surface of previously deposited concrete shall be dampened (but not saturated) immediately prior to placing fresh concrete.
    - a. Apply manufacturers bonding agent solution according to manufacturer's instructions.
    - b. Hardened concrete of horizontal joints in exposed work shall be prepared as follows:
      - 1) Apply approved bonding compound to roughened and cleaned surface of set concrete.
      - 2) Mix and apply bonding compound in accordance with written instructions of manufacturer.
      - 3) Apply fresh concrete to prepared surface within time limit recommended by bonding compound manufacturer.

### 3.06 SCREEDING CONCRETE

- A. Strike off surface of concrete to predetermined grade conforming to elevations shown on Drawings shall be accomplished with use of rigid screed guides.
  - 1. Grade for strike off shall be set at predetermined distance above top surface of formwork.
  - 2. Minimum slab thickness, as specified on Drawings shall be maintained throughout slab surface.
  - 3. Pour floor slabs, concrete pavements and walks, compacted and rodded accurately to the level and thickness as shown on the Drawings within a tolerance of 1/4" when tested with a 10 foot straightedge. Slope deck surface to elevations indicated, to drains wherever they occur.
  - 4. Set top of floor drains a minimum of 1/2" lower than surrounding concrete finish surface. Dish concrete within a three (3) foot radius to drain, to provide positive drainage to drain. Coordinate with plumbing work and verify before placing concrete. Where no such positive drainage is accomplished, remove drain and rework concrete. Reinstall drain to achieve drainage as stated above.

- B. Cast-in-Place Concrete Framing System: Modify formwork camber where possible. Where over deflection of formwork occurs, maintain concrete slab design thickness at each end of affected beams and increase slab thickness at mid-span by amount of over deflection experienced.

### 3.07 CONCRETE FINISHING

- A. Concrete Finishing: Bring the concrete slabs, using screed, to the required floor level and strike off true with a straightedge. Remove excess water and laitance. Compact with a grid tamper, if desired, then float and trowel finish as specified. Test the surface with a straightedge to detect high and low spots and eliminate any that may exist. Allowable tolerance shall not to exceed 1/4" along a 10-foot straightedge in the final concrete finish surface. The stated tolerance is intended to render a slab surface that is relatively flat, without ridges or depressions which would restrict the flow of runoff and create puddles. Floor flatness shall be  $F_F$  10 min, when measured according to ASTM E1155, modified as follows:
  - 1. Measurement lines shall not cross-joints or grade breaks.
  - 2.  $F_L$  numbers do not apply in areas where warps, slopes and cambers are intended by design.
- B. Trowel finish for slabs in general which are to remain exposed or receive non-bonded finish (storage, mechanical, electric cart storage, communications and electrical rooms, etc.): Unless otherwise indicated or specified, all slabs to receive a simple steel trowel finish in two trowel operations.
  - 1. When the concrete has hardened sufficiently after floating, so that the fine particles do not work to the surface, hand or machine trowel and bring to a smooth surface, free from defects and blemishes. Do not sprinkle with dry cement, or a mixture of cement and sand directly on the surface to absorb moisture or stiffen the mix.
  - 2. After the concrete has hardened sufficiently to prevent mortar from collecting on the trowel, trowel to a hard burnished surface, free from trowel marks. Continue trowel until there is a distinct ring under the trowel, but avoid excessive trowel.
- C. Raised Cast-In-Place Curbs, Stairs and Concrete Landings: Trowel finish with final finish to be a medium sweated finish.
- D. Float Finish for Slabs Scheduled to Receive Other Bonded Finish Materials: Finish with wood floats and lightly broom and brush clean to provide proper bond for finished materials. Verify finish requirements for surfaces to receive elastomeric coating with coating manufacturer.
- E. Trowel Finish for Garage Floors, Driveways and Ramps: Provide a trowel finish by hand trowel to produce a uniform coarse/heavy "sweated" swirl rotary pattern finish. Finish is subject to Architects approval.
- F. Sidewalks: Provide a medium broom or medium sweated swirl rotary finish
- G. Pedestrian Ramps - Accessibility Compliance: At 'Path of Travel' (ramps), concrete surfaces shall be finished with a heavy broom or sweated swirl rotary finish at slopes exceeding 6%, and medium broom or sweated swirl rotary finish

at slopes up to 6%, in compliance with CBC Section 1133B.7.1. Provide with a tactile warning of 1/4" wide x 1/4" deep grooves at 3/4"oc with configurations as shown on the drawings or as required for accessibility in accordance with California Building Code with Title 24 CCR amendments.

- H. Exterior Surfaces: Finish on all exterior exposed cast-in-place concrete walls, all surfaces of beams, spandrel and all four sides of perimeter column surfaces to be "sack" finished and when completed, shall be smooth, free from air, pin or rock pockets and/or discoloration or defects; uniform color and texture, free of dust and ready to paint. All score joints and grooves shall be straight, true and uniform.
- I. Interior Beams, Girders and Columns: Finish to a smooth natural form finish with steel forms to exhibit a dense, smooth surface which is free of rock pockets, air and pin holes not exceeding 3/16" in diameter in sparse areas and free of other defects. Junctures of beams to girders and beams/girders with columns and at slab soffits shall be uniform in edge detail, true to line and of a smooth finish. Grind column corner chamfers smooth from floor slab to soffit producing clean edge lines, true and plumb. Provide a 'sacked' finish to all beams, girders and columns to achieve the specified steel form finish. Wipe surfaces clean to remove residue patching materials and dust that has accumulated from sanding and grinding operations. Leave surfaces smooth, clean and ready for paint.
- J. Interior Columns: Remove and grind all projections and fill voids larger than the allowable tolerances to render columns smooth in appearance. Grind column corner chamfers smooth from floor slab to soffit producing clean edge lines, true and plumb. Wipe surfaces clean to remove residue patching materials and dust that has accumulated from sanding and grinding operations. Leave surfaces smooth, clean and ready for paint.
- K. Interior Slab Soffits: The underside of deck slabs and beams / soffits are to have projecting fins and all protruding deck panel buttons, all nails, staples, bolts, wood form chips and other protrusions removed and ground smooth, with all voids filled full and flush, except threaded deck panel insert holes. Leave surfaces smooth and clean.
- L. Radius-Tooled Edges: Provide a minimum 1/4" radius-tooled edge typical for all slab and wall joints, tops of walls and beams, etc., unless indicated otherwise to be flushed in smooth.
- M. Pan Filled Stairs and Landings: Provide a water resistant concrete mix with a light swirl finish. Tool / screed sloped slightly from back to front of step, flush with the 3" wide abrasive aggregate contracting color stair nosing insert edge. Nosing as specified in Section 05500. Water resistant admixture as specified in paragraph 2.01 D.8.

### 3.08 CONTROL JOINTS

- A. Locate control joints on grade slabs where indicated or as follows:
  - 1. Provide saw cuts at column center lines, where block-outs (rotated on column axis) have not been formed, at uniform intervals not greater than 15 feet on center maximum lengthwise direction, or as approved by the Architect or as shown on the structural drawings.

2. Provide keyed construction joints at all slabs on grade, except as otherwise detailed on structural drawings.
- B. Approved method for saw cutting is to be by wet cut within 6 hours of concrete pour, following final trowel / finishing operations. Cut to 1/4 the depth of the slab, (1" minimum) unless otherwise indicated on structural drawings. Soft-Cut – Model 280 is not allowed.

### 3.09 PATCHING AND FINISHING OF FORMED CONCRETE SURFACES

- A. Patching Concrete: Fill all rock pockets, "honeycombs" and holes in excess of 3/16", or heavy concentrations of air holes, rod and cone ties, separators and core samples, pockets created by the removal of nails, etc. Chip away defective areas to solid concrete, forming perpendicular edges or slightly undercut edges. Drench area of patch and surrounding area with water. Pack full with mortar (sacking slurry) mix. Match surrounding concrete surfaces in color and texture using part white Portland cement, if necessary. Remove fins and irregularities in exposed concrete surfaces while concretes green. Neatly patch exposed exterior surfaces of concrete, as required; irregularities ground smooth.
- B. Finishing Formed Surfaces: Immediately after forms have been removed, examine all surfaces. Exposed surfaces shall have a smooth finish. Repair surfaces having bulges, honeycomb, voids, gravel pockets or other defects with dry pack or cement grout, as directed, and finish flush with adjoining concrete surfaces. Concrete surfaces that will remain exposed in the finished work shall have all traces of pointing, patching and surface irregularities removed by rubbing and honing with carborundum stones to produce uniformly smooth finish.

### 3.10 SACKED FINISH WHERE SPECIFIED SHALL BE AS FOLLOWS

- A. Upon special approval of the Architect, Contractor may site proportion the slurry from one part cement to 1-1/2 parts sand, passing a No. 16 sieve, by damp loose volume, mixed with sufficient water and bond enhancing acrylic admixture (polymer) for a plastic slurry / grout. Consistency shall be similar to thick paint which will adhere / bond to hardened surfaces without cracking and when cured will match the color and texture of adjoining surfaces.
- B. Prior to repair operations dampen concrete surfaces with sufficient water to prevent absorption of moisture from the patching slurry. Spread slurry with a clean rubber float or burlap pad to completely fill holes and depressed imperfections. Float surface vigorously while slurry is plastic striking flush to remove excess.
- C. Allow a short cure before rubbing with burlap to completely remove visible dry grout. Complete an entire area of sacking operation the day started. Completed surfaces shall be smooth, free from voids, defects, discoloration, uniform in cured natural color and texture, brushed free of dust and ready to paint.

### 3.09 DRY SHAKE COLOR HARDENER

- A. Contractor shall provide the elevator lobby slab area indicated. Placement and cure of the stained slab shall be in conformance with selected manufacturer's recommendations.
- B. Comply with the stain manufacturer's application standards and recommendations in printed data specifications, and the "Scofield Tech-Data Bulletins".
- C. Dry shake color hardener shall not be applied until after final floating and bleed water disappears and the process of floating in the powdered shake will not disrupt the level of the surface.
- D. Uniformly broadcast by mechanical spreaders over the field and by hand around the perimeter for an even coverage applied in two separate broadcasting operations. Two-thirds of the material shall be applied in the first shake with one-third being held for the second shake to accomplish a final touch-up and uniformity.
- E. Moisture required for wetting the color hardener shall come from the concrete substrate to develop the proper strength and monolithic bonding. Water shall not be sprinkled or otherwise added to the surface during application.
- F. After each broadcast application, thoroughly work the dry color hardener into the surface using wooden hand float or power-trowel machine equipped with float blades. Do not use long handled fresnos or not start trowel operations until after final application.
- G. After application of the final broadcast, re-float the surface and then hand or machine trowel. To prevent burning or darkening of the colored surface, hard steel trowel (burnishing) shall be minimized, especially at the edges and at joint lines.
- H. The specified course sweated swirl texture shall be applied uniformly using consistent finishing practices. Surfaces shall be finished in reasonable time after placing, floating and broadcast operations so that specified finishes will be consistent and complete.
- I. Provide soft-cut construction joints in the pattern indicated, as soon as the concrete is able to sustain the weight and action of equipment. Wipe concrete paste from colored stain surfaces and follow with recommended sealer procedures.
- J. When curing with the "Colorcure" concrete sealer, apply one light finish coat a minimum of 4 and a maximum of 24 hours following shake application, depending on relative temperature and humidity.

### 3.10 DEFECTIVE CONCRETE

Work not formed properly or not plumb, level or in alignment with adjoining surfaces or grades, that contains voids, rock pockets, sawdust, wood or other debris embedded into the surface and which does not conform to the contract documents for the required strength indicated shall be considered defective material and/or faulty workmanship.

Where directed by the Architect, non-conforming work or materials shall be removed and replaced with work that conforms to the indicated requirements without additional cost to the District.

### 3.13 CURING (Required Moisture Curing)

- A. Cure placed concrete decks for a minimum of at least seven (7) days after placement. Curing shall be done in two phases, initial and moist.
- B. Initial Moist Curing for Slabs on Grade and Elevated Decks: Provide continuous fog spray or mist operation for a minimum of 24 – 72 hours and until post-tensioned decks are stressed. Rain-birds, soaker hoses, water buckets or other hand-distributed method of water conveyance is not permitted. Begin moisture cure operations immediately after completing final float and trowel operations. Under conditions of low relative humidity, high heat and/or drying winds, begin initial moist curing procedures while finishing work is still in progress. Apply sufficient moisture to prevent crazing, cracking or "surface-dry" spots to occur. Do not apply water in excess that may pond on or flood the surface.
- C. Initial Curing for All Concrete Surfaces: Provide either a moist cure from continuous fog spray operation or an approved penetrating membrane forming curing compound applied in accordance with manufacturer's recommendations as indicated above and/or provide moisture curing by way of placement of "Visqueen", non-permeable curing blanket, or equal vapor barrier immediately after final trowel operations are completed. Retain vapor barrier in place until proper curing is achieved. Verify procedure with material manufacturer; curing compounds may not be permitted.
- D. Curing operations shall be continued and maintained for a total combined curing period of seven (7) days minimum after placement by either of the following methods:
  - 1. Continue initial moisture curing as described above or provide an approved penetrating curing compound applied in conformance with manufacturer's instructions.
  - 2. Saw cut construction joints made into the slab on-grade must receive an immediate reapplication of penetrating curing compound.
  - 3. Use of curing compound alone will not be accepted for the initial curing phase for slab on-grade or elevated decks (post-tensioned or otherwise).
  - 4. Throughout the 7-day curing period, after the required 48–72 hours of initial moist curing period for slab on-grade and elevated decks, maintain a uniform curing compound membrane (evidenced by visual appearance of a compound dye).
  - 5. Where construction operations or traffic may cause damage to visible curing compound membrane dye apply additional coats as required for uniformity. Provide a schedule for inspection of the curing membrane initial and subsequent applications to insure provisions are met.
  - 6. When an elastomeric coating is indicated for application to the concrete, cure surfaces by placement of a vapor barrier (Visqueen, blanket, or equal) immediately following final troweling and finish operations are complete. Retain vapor barrier in place until proper curing is achieved. Verify curing recommendations with elastomeric manufacturer prior to placing concrete.

### 3.14 WEATHER CONDITIONS AND PROTECTION

- A. Protect freshly placed concrete work from environmental factors that damage the pour, the set, curing or the surface finish. To protect from possible rain, cover slabs with canvas or other approved covering until properly set.
- B. Contractor shall use the ways and means required to maintain fresh placed concrete protected with a maintained temperature of not less than 50 degrees F., nor more than 80 degrees F. for not less than five (5) days when ambient temperatures are/or anticipated to be near freezing within 72 hours of the completed concrete pour placement. Concrete admixtures to prevent freezing will not be permitted for any reason. Adjustments in mix design are not a substitute for Contractor's responsibility to maintain constant cure temperatures and conditions. Methods to maintain temperature of the air, forms or materials shall be reviewed by the Architect.
- C. Cold weather concrete operations shall conform to recommendations referenced in ACI 306R and performed only upon approval of the Architect. Do not use admixtures to adjust mix designs, unless specifically permitted by the Architect.
- D. Hot weather concrete operations shall conform to the recommendations, directions and requirements of Section 9.5.2 of ACI 305 for placing of concrete during hot weather. Do not use admixtures to adjust mix designs to accommodate hot weather, unless specifically permitted by the Architect.
  - 1. When air temperature is above 80 degrees F, the guidelines for protecting the concrete from plastic shrinkage cracking and craze cracking, by providing a temperature controlled mix and protecting the concrete surface from rapid water evaporation as described in ACI 305R shall apply.
  - 2. When the rate of evaporation exceeds 0.2 pounds per square inch per hour, the contractor shall take the necessary precautions against plastic shrinkage cracking as described in ACI 305R.

### 3.15 CLEANING

- A. Clean concrete flat work and vertical walls and columns of completed concrete work, once forms are removed, joints cut and properly cured, leaving finished surfaces free from cement, concrete droppings or splatters, residue form release agents and curing compounds, oil, paint, plaster and other foreign substances leaving surfaces clean and ready to receive any scheduled coverings, toppings or paint.
- B. Where contract documents indicate that finished surfaces are to remain natural, exposed and unpainted, provide the necessary cleaning to render surfaces that are free of defects, stains, markings or other discolorations or surface irregularities of any nature that mar the visual appearance of the formed concrete finish. Contractor shall include as part of the scope of work for completion of the contract, procedures required to pay special attention to the forming, placing and cleaning of surfaces exposed to view in the finished work and specified to remain unpainted. Procedures shall include but not be limited to power water or chemical washing, wet sandblasting or other method as approved by the Architect.



### 3.16 CONCRETE STAIRS/MASONRY WALLS

Exercise care that no concrete spillage or staining of masonry work occurs at stairs or other masonry work. Construct concrete forms tight at form joints and all intersections. Remove stains from masonry surfaces by means of washing immediately following the subsequent concrete pour that creates the defacement.

### 3.17 MISCELLANEOUS CONCRETE ITEMS

- A. Grout fill holes, surface defects and openings left in concrete structures for the passage of work by other sections, unless otherwise indicated, after the work of those same other sections are in place, inspected and approved. Mix, place and cure concrete/grout as herein specified to blend with in-place construction.
- B. Provide all miscellaneous concrete / grout fill indicated or as required to complete the work. Refer to contract documents for specific grouting and dry-pack required at anchoring base plates, mounting plates and other structural or mechanical related requirements. Do not grout pipe sleeves or separations provided between different elements of the Work unless directed to do so by the contract documents or by the Architect.
- C. Steel Pan Stairs:
  - 1. Provide a water resistant transit mixed concrete fill (admixture specified hereinbefore) for steel pan stair treads and landings and associated items. Reinforce all pans at center of fill with 1 layer of WWM 4 x 4 - W1.4 x W1.4. End wires parallel to edges placed 1-1/2 inch maximum from edge of pan. Inspect edge of pan stair nosing edges to verify each step or landing has not been damaged or dented due to construction operations. Make repairs to the steel pan forms prior to concrete fill placement.
  - 2. Install stair nosing strips as specified in Section 05500 – Miscellaneous Metal as soon as possible after concrete placement. Add additional concrete as required so that once screed, the cast-in nosing edge is flush with the fill surface. When concrete fill is ready screed, tamp and finish concrete surface as scheduled. Slope stair treads 1/8 inch from base of the risers to the installed nosing, so that the resulting installation drains water down toward lower stairs without creating ponding on tread surfaces. Slope landings toward lower stairs as shown on drawings or required to avoid ponding of water. Apply a light non-slip texture float finish across stair run on treads and light broom or swirl non-slip finish on landings.

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Post-tensioning materials, including pre-stressing steel tendons, anchorage, distribution plates, and tendon enclosures.
  - 2. Placing of post-tensioning strands.
  - 3. Performing all post-tensioning operations, including jacking and anchoring.
  - 4. Cooperate in keeping records of elongations, gauge readings, etc.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 01425: Testing and Inspection (DSA)
- B. Section 03100: Concrete Formwork
- C. Section 03200: Reinforcing Steel
- D. Section 03300: Concrete and Concrete Finishes
- E. Section 05500: Miscellaneous Metal

1.03 CONDITIONS

The "General Notes" on the structural drawings are part of these specifications.

1.04 REFERENCE STANDARDS

- A. American Concrete Institute (ACI)
  - ACI 301 Standard Specifications for Structural Concrete
  - ACI 318 Building Code Requirements for Reinforced Concrete.
  - ACI 423.3R Recommendations for Concrete Members Pre-stressed with Un-bonded Tendons
- B. American Society for Testing and Materials (ASTM).
  - ASTM A416 Specifications for Uncoated Seven-Wire Stress Relieved Strand for Pre-stressed Concrete with supplement for Low Relaxation Strand
  - ASTM A421 Specifications for Uncoated Stress Relieved Wire for Pre-stressed Concrete
  - ASTM E328 Recommended Practice for Stress-Relaxation Tests for Materials and Structures.
- C. Post Tensioning Institute (PTI).
  - Guide Specifications for Post Tensioning Materials
  - Performance Specification for Corrosion Preventive Coating
  - Specification for Un-bonded Single Strand Tendons

- D. Field Procedures Manual for Un-bonded Single Strand Tendons  
Precast / Pre-stressed Concrete Institute PCI Journal
- E. California Building Code CBC Chapter 19A

#### 1.05 SYSTEM DESCRIPTION – BUILDING CHARACTERISTICS

The project building type utilizes post tensioned concrete beams, girders and slabs. The contract drawings indicate the building in its final position. Since post tensioned concrete exhibits shrinkage, creep and shortening characteristics, Contractor shall make the necessary provisions to account for such anticipated creep, shrinkage and shortening in the layout of the building including beam and column placing, casting out of plumb to account for calculated shortening, etc. No allowances will be made to the Contractor for defects caused by shortening and shrinkage of the structure that should have been calculated and its effects anticipated into all other work of this contract.

#### 1.06 QUALITY ASSURANCE

- A. Provide post-tensioning system from a fabricator with a minimum of five (5) years experience in the fabrication of post tensioning materials. Post tensioning fabricator shall be PTI Certified Plant. Upon special request, the Architect may approve a non-PTI certified fabricator if a 'Letter of Certification' from an independent testing lab states that all specified materials indicated herein conform to the referenced standards. Post tensioning product shall be of a manufacturer whose complete system has been approved by ICC certification and Division of State Architect (DSA) local Building Department.
- B. Post tension cable and anchor placement along with stressing procedures shall be performed by a company that has been successfully performing installations of a similar size and scale as the work of this Contract for a minimum period of five (5) years.
- C. All post tensioned concrete work shall be under the immediate supervisory control of a person experienced in this type of work. Exercise rigid control and documentation of all operations for full compliance with specified and referenced requirements.
- D. All work shall conform to Post Tensioning Institute (PTI) manual standards entitled "Specification for Un-bonded Single Strand Tendons" for minimum standards required. Where there is conflict between the referenced manual and the requirements specified herein, the most stringent governs.
- E. Concrete mix designs that are to be post tensioned shall conform to the requirements of Section 03300 – Concrete and Concrete Finishes.
  - 1. Calcium chloride or admixtures that contain chloride ions shall not be used in design mixes that are in contact with post tensioning steel.
  - 2. Minimum design mix concrete strength shall be as indicated on the contract documents.
  - 3. Maximum drying shrinkage of the mix design shall not exceed that indicated per Section 03300, 2.02.

#### 1.07 REQUIREMENTS

- A. Stressing (post tensioning) shall commence when concrete cylinders manufactured and cured under the same conditions as member to be stressed indicates a compressive strength as required for anchorage bearing, but not less than 2500psi.
- B. Contractor shall not drill into PT. slabs, beams or girders unless approved by the Engineer. When the project specific request and the proposed means and methods are approved, the Contractor shall x-ray the surfaces of completed post tensioned concrete members where drilling is necessary in order to exactly locate tendon locations, prior to executing the work.

#### 1.08 TESTING AND INSPECTION

- A. Refer to Section 01425
- B. Material Tests: District's testing laboratory will provide all material tests specified herein and indicated in the contract documents, as required by the (DSA) governing Building Department. Conform to ACI Section 18 CBC Chapter 19 Section 1916A and as specified herein.
  - 1. Samples for testing shall be accompanied by vendor's certification that submitted samples are representative of material being furnished for the project.
  - 2. Pre-stressing steel shall be tested for tensile strength and elongation at rupture.
- C. If inadequate product data and test results are provided by the manufacturer or the installer, regarding performance characteristics of the pre-stressing system, the Architect may require additional tests performed on individual components or the entire system to test material suitability and their conformance to project requirements.
- D. District will arrange and pay for the services of a Special Registered Deputy Building Inspector for continuous inspection of all post tensioning work. Inspector will inspect the placing of post tensioning materials and be continuously present during concrete placement and post tensioning operations. Inspector shall provide written report at completion of the work of this section stating that placement of cable and anchors and that the means and methods of installation and jacking procedures have been performed in compliance with CBC requirements, contract documents and as specified herein.
- E. Field Quality Control: Contractor shall furnish the following samples to Testing Laboratory for testing:
  - 1. One sample of wire strand from each heat of wire to be used:
    - a. Submittal of samples shall be accompanied by a transmittal and vendor affidavit that all samples submitted are from and representative of the materials that will be furnished and installed in the work.
    - b. Pre-stressing steel shall be tested for modulus of elasticity and tensile strength, elongation at rupture and relaxation unless indicated otherwise. Each coil / size of strand shipped to the site shall be tagged with the assigned individual lot number and heat number classification for identification purposes.

- c. Both test pieces of each broken sample shall be fastened together and tagged with the job name, heat number, coil number, date tested and ultimate load, and shall be retained for inspection at any time.

## 1.09 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340. Prepare all submittals in compliance with the current edition of ACI 301.
- B. Product Data:
  1. Submit manufacturer's technical data for post tensioning products including certification that each product complies with specified requirements. Include instructions for handling, storage, installation and protection of each product.
  2. Material Data: Contractor shall furnish the following information to Architect, and Testing Laboratory.
    - a. Certified mill test reports for each coil pack of strands containing as a minimum the following information.
      - Identification of each coil by heat number
      - Diameter and net area of the strand
      - Standard mill chemical analysis for each heat of steel
      - Record of the test strand stressing results to determine the
        - Ultimate tensile strength
        - Yield strength at 1% extension under load
        - Elongation at failure
        - Modulus of elasticity
        - Low relaxation evidence
      - Stress-strain curves for each heat – Location used in the structure
    3. Contractor shall furnish the following data prior to executing the field stressing procedures:
      - a. Gauge calibration chart/curve data sheet for each piece of stressing equipment with each numbered to the report. Calibration shall be performed and dated just prior to use of equipment.
      - b. Proposed field stressing procedure to be used.
  3. Contractor shall furnish the following data prior to executing the field stressing procedures:
    - a. Gauge calibration chart/curve data sheet for each piece of stressing equipment with each numbered to the report. Calibration shall be performed and dated just prior to use of equipment.
    - b. Proposed field stressing procedure to be used.
- C. Shop Drawings:
  1. Show tendon layout and dimensions locating tendons in horizontal plane at all points. Detail horizontal curvature of tendons at block-outs and tail anchorages. Show all openings in slabs and beams.
  2. Provide tendon profiles showing chair heights, locations and any required placement steel that is required. Clearly indicate the location of each individual tendon or bundled tendons and the method of support.
  3. Detail post tensioning and reinforcement at column and beam intersections around stressing pockets and closures, or where interference with post-tension tendons or anchors may occur. Coordinate any conflicts with reinforcing and conduit placement.
  4. Show required elongation of each tendon at jacking point.
  5. Complete pre-stressing procedure report to include the following:
    - a. Jack force and jacking pressure.
    - b. Maximum temporary jacking force and jacking pressure.
    - c. Certified gauge calibrations and method of jack identification.

**NOTE:** Non-calibrated jack and pump combination units shall not be used on the job.

- d. Method of determining anchor force or force remaining in tendons after anchorage.
  6. Furnish method of burning-off excess tendons after anchorage.
  7. Indicate the method of sealing tendons ends and sealing of stressing pockets.
- D. Calculations - Anchorage and Bearing Stress: Include calculations signed by a California Registered Civil Engineer of friction losses, initial stresses and anchorage stresses on the shop drawings to determine that design forces are obtainable. Design, proportion, and space anchors to allow prestressing at 2,500psi concrete strength. Submit calculations and details.
- E. Samples: Provide for review, one sample tendon (uncoated and sheathed) from each heat of wire as required for testing and proposed for use, complete with tendon and anchoring system end components.
- F. Warranty: Provide manufacturer's written guarantee that post-tensioning materials and components of the specified system proposed to be furnished and installed into the work of this project conform to the strength indicated and requirements specified.
- G. Review of shop drawings by the Architect / Structural Engineer will be for general consideration only. Compliance with requirements for materials, fabrication, installation and performance of post-tensioning work is the Contractor's responsibility.
- H. When shop drawings and data sheets are reviewed for materials to be furnished without any exceptions noted, Contractor shall not change materials nor shall construction operations be deviated unless either / or both are resubmitted and re-reviewed.

#### 1.10 PRE-INSTALLATION CONFERENCE

Prior to commencement of the work the Contractor shall convene a meeting at the job site to review and discuss post tensioning work of this Section and all related work. Attending the meeting shall be the Architect's Representative, Engineer's Representative, District's Representative, post tensioning installer, rebar subcontractor, electrical subcontractor, General Contractor and contractors of related work and inspection personnel. Review and coordinate related requirements and procedures to be followed in performing the work of this Section in conformance with the approved shop drawings. Discuss the sequencing, layout and installation procedures to determine and anticipate conditions of conflict prior to start of work. Notify all responsible parties a minimum of 48 hours before conducting meeting.

#### 1.11 DELIVERY, STORAGE AND HANDLING

- A. Package the same heat lot and sized tendon/coils to be placed within the same area of the structure within the same labeled package of tendon coils that are bundled and wired together or plastic stretch wrap banded clearly marked with manufacturer's labels to positively identify where in the structure they are to be

installed. Protect sheathing from being cut by binding materials. No part of the tendon shall be unprotected against moisture. Use of corrosion preventative coated on bare strand is unacceptable as a substitute for sheathing.

- B. Do not deliver cables or anchors to the site prior to date of scheduled start of installation. Protect from damage during transit and storage. Store tendon coils under cover, off ground, in a dry location to prevent damage from weather, moisture, soiling, corrosion or construction activities.

## 2.00 PRODUCTS

### 2.01 MATERIALS

- A. Pre-stressing Steel: Pre-stressing steel shall be plastic sheathed, or as otherwise approved, low relaxation, high tensile cold drawn wire 7 wire strand of 1/2" diameter minimum (area = 0.153 sq. in. min.), approximate modulus of elasticity of 28,000,000psi. Yield load shall be 35,000 lbs. at 1% extension with initial load of 4,130 lbs. and shall conform to requirements of CBC and to the following:

#### SEVEN-WIRE STRAND

ASTM Designation	A416/E328
Ultimate Strength	270 KSI
Temporary Stress to Overcome Friction	216 KSI
Anchor Stress	189 KSI
Relaxation	2% Max. @ 1000 hours

- B. Concrete - As indicated on contract documents and as specified in Section 03300 – Concrete and Concrete Finishes.
- C. Design and configuration of bearing plates, anchorage devices, stressing grippers, slippage sheathing and related materials shall be standard for the ways and means methods of post-tensioning to be used, and shall conform to the reviewed shop drawings, product data and ICC ES approval.
- D. Distribution Plates and Anchorages: Pre-stressing steel shall be secured at ends with approved non-corrosive anchoring devices.
  1. Provide ICC ES approved anchoring devices that will not kink, neck down or otherwise be damaged. Devices shall hold the pre-stressing steel without exceeding anticipated set at loads equal to 100% of the minimum ultimate tensile strength of the pre-stressing strand and conform to requirements of ACI Title 66-8.
  2. Distribution plates shall conform to ASTM A36 and be either welded steel, cast steel or cast steel bearing assemblies that permanently support and distribute the load from anchoring devices. Bending stress failure in anchor plates induced by pull of pre-stressing steel shall not exceed 27,000psi for structural steel or 15,000psi for cast steel. Castings shall be non-porous and free of sand, blowholes, voids or other defects.
  3. Wedge grippers shall be designed to preclude premature failure of the pre-stressing steel due to notch or pinching effects under the static and/or dynamic test load conditions as outlined in Post-Tensioning manual for static and dynamic test requirements.



- a. Finish of the anchorage wedge-seating zone shall not exceed micro-finish of 125 for stressing end anchorages or 250 for fixed anchorages.
4. Special reinforcement required for the performance of the anchorage shall be designed, supplied and installed by the Contractor. Such reinforcement shall not be less than (2) No. 4 bars unless shown otherwise on the Drawings.
5. Maximum concentrated bearing stresses in concrete shall not exceed that permitted by PTI bearing stresses.
6. Installation design shall conform to latest AISC and AWS standards, including qualification testing and certification of welders.
7. End bearing forces and grouting shall be provided as specified herein.
8. Anchorages shall be recessed to provide the minimum grout or concrete coverage of the steel reinforcing indicated on the contract documents or as required by Code, but in no case less than 1-1/2" concrete cover over anchors.

E. Sheathing:

1. The tendon sheathing shall be made of material with the following properties:
  - a. Sufficient strength to withstand un-repairable damage during fabrication, transport, installation, concrete placement and tensioning.
  - b. Water tightness over the entire sheathing length.
  - c. Chemical stability, becoming brittle, damage or softening over the anticipated exposure temperature range and during the service life of the structure.
  - d. Non-reactive with concrete, steel or the tendon corrosion preventive coating.
2. Minimum thickness of the sheathing shall not be less than 0.040 inches for medium or high-density polyethylene or polypropylene.
3. Sheathing shall have an inside diameter at least 0.010 inches greater than the maximum diameter of the strand.
4. Sheathing shall be continuous and watertight between anchor faces. Any area of exposed steel strand shall be covered with a water resistant tape.

F. Corrosion Preventive Coating:

1. Corrosion preventive coating material shall be lithium based, containing corrosion inhibitors, wetting agents, less than 50 parts per million of chlorides, sulfides or nitrates and have the following properties:
  - Corrosion protection for the duration of the service life of the building.
  - Lubrication between the strand and the sheathing.
  - Resist flow from the sheathing with the anticipated temperature range of exposure.
  - Continuous non-brittle film at the lowest anticipated temperature of exposure.
  - Chemically stable and non-reactive with the pre-stressing steel, sheathing material and the concrete.
2. Protective film shall be an organic coating with appropriate polar moisture displacing and corrosion preventive additives.

3. Minimum weight of coating material shall be not less than 2.5 pounds of coating material per 100 feet of 0.5-inch diameter strand. The amount of coating material used shall be sufficient to ensure essentially complete filling of annular space between the strand and the sheathing. The coating shall extend over the entire tendon length. The minimum thickness shall be 0.005-inch over the crest of the strands.

4. Corrosion preventive coating material shall comply with following performance specifications:

TEST	TEST METHOD	ACCEPTANCE CRITERIA
1. Dropping Point Deg. F (Deg. C)	ASTM D566 or ASTM D2265	Minimum 300(148.9)
2. Oil Separation @ 160 deg. F (71.1 deg. C) % by weight	FTMS 791B Method 321.2	Maximum 0.5
3. Water, % Maximum	ASTM D95	0.1
4. Flash Point, deg. F (deg. C) (Refers to oil component)	ASTM D92	Minimum 300(148.9)
5. Corrosion Test 5% Salt Fog @ 100 deg, F (37,8 deg, C) 5 mils, min. hours (Q Panel Type S)	ASTM B117	Rust grade 7 or better after 1000 hours of exposure according to ASTM D610
6. Water Soluble Ions (2)	ASTM D512	10
a. Chlorides, ppm max.	ASTM D992	10
b. Nitrates, ppm max.	APHA 427D	10
c. Sulfides, ppm max.	(15th Ed)	
7. Soak Test 5% Salt Fog at 100 deg. F (37.8 deg. C) 5 mils coating Q panels, Type S. Immerse panels 50% in a salt solution and expose to salt fog	ASTM B117 (Modified)	No emulsification of the coating after 720 hours of exposure
8. Compatibility with sheathing		Permissible change hardness 15%
a. Hardness and volume change of polymer after exposure to grease, 40 days @ 150 deg. F.	ASTM D4289	Permissible change in volume 10%
b. Tensile strength change of polymer after exposure to grease, 40 days @ 150 deg. F.		Permissible change in tensile strength 30%

- G. Broken strands or strands showing fabrication defects shall be removed and replaced, otherwise the member may be rejected.
- H. All pre-stressing steel tendons or anchors within a specific tagged group shall be of the same type and size of members, shall be of the same heat, where practicable and tagged accordingly.
- I. All pre-stressing steel shall be protected from rust or other corrosion or defects prior to placement and shall be free from deleterious substances when tensioned.

## 2.02 TENDON ANCHORAGES AND COUPLINGS

- A. Anchorages and couplings shall be designed to develop static and dynamic strength requirements per CBC and PTI requirements. Castings shall be non-porous and free of sand, blowholes, voids and other defects. Seal barrel end on stressing side of anchor with specified non-corrosive coating. For wedge type anchorages, wedge grippers shall be designed to preclude premature failure of pre-stressing steel due to notch or pinching effects under static and dynamic test load conditions stipulated for low relaxation pre-stressing steel materials.
- B. Block Outs: Use plastic pocket formers at stressing ends to provide a minimum 2 inch recess to anchor casting and 3 inch minimum width to allow access to cut off excess strands. Provide grommets at intermediate stressing ends to prevent moisture leaks into anchor casting or tendon sheathing.

## 2.03 OTHER MATERIALS

- A. Provide all other materials required for a complete installation but not specifically described, as subject to review by the Architect.
- B. Tape: 3M Tape No. 226, or equal.
- C. Tendon Tail and Anchor Coating Material:
  - 1. Bituminous: Tnemec 46-465 High Bolt Tnemecol, Farbertite Bituminous Coating by Briggs Bituminous Composition Co., or equal.
  - 2. Epoxy: Dayton Superior Rebar Epoxy Spray (J-62), or equal.
- D. Resin Bonding Agent for Anchor Pockets: Sikadur 32 High-Mod epoxy as manufactured by Sika Corporation, or equal.
- E. Provide non-ferrous or plastic tipped chairs for supports of cables.
- F. Grout: Refer to requirements of Section 03300.

## 3.00 EXECUTION

### 3.01 EXAMINATION OF SUBSTRATE

Examine areas and conditions which post tensioning work is to be performed and correct conditions detrimental to proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected.

- D. Hydraulic stressing rams used to stress un-bonded single strand tendons shall be equipped with stressing grippers that will not notch the strand more severely than normal anchoring wedges.
- E. Stressing rams and gauges shall individually be identified and calibrated against known standards and prior to their use. Calibration certificates shall accompany each gauge.
- F. Adequate provision shall be made for access of stressing equipment when placing strands. The minimum stressing equipment space of 3 ft. normal to the stressing edge of any member shall be kept clear of construction material, equipment or other obstructions until stressing operations are completed.
- G. Inserts in concrete work shall be accurately installed and secured in place including pre-stressing items such as enclosures, spacer bars, anchorages, etc., as well as all inserts required for attaching electrical, mechanical, steel studs and other items of equipment. Use of powder driven studs shall not be permitted. Embedded inserts, conduits, etc., shall not be attached to pre-stressing strands.
- H. All pockets required for anchorage shall be adequately reinforced so not to decrease the strength of the structure.
- I. Holes other than those shown on plans are not permitted within 24 inches of pre-stressing anchorage.
- J. Strands shall be stressed by hydraulic jacks equipped with accurate reading, calibrated, hydraulic gauges of at least 6 inches diameter and having a fine pointer to permit stress in pre-stressing steel to be computed at any time. A certified calibration curve shall accompany each gauge / jack combination. Jack gauges shall be immediately recalibrated, if inconsistencies between the measured elongation and the jack gauge reading occur.
- K. Stressing procedure for each strand in general, shall be as follows:
  - 1. Stress to the required elongation. Stress may be increased to, but not exceed 216ksi, 80% of ultimate, to overcome friction.
  - 2. Gradually reduce load and set grippers to transfer full force to anchorage at 189ksi, 70% ultimate strength.
  - 3. Elongation measurements shall be made at each stressing location to verify that the tendon force has been properly achieved.
  - 4. Elongation of strands shall be recorded on an approved form. A variation of plus or minus 7% is acceptable for any one strand provided that sum of initial force in any three adjacent strands is no less than the sum of the required force for these three strands. Cumulative negative tolerance that would result in an overall reduction of initial force exceeding 3% will not be permitted.
  - 5. Discrepancies exceeding above variations shall be resolved with the Architect.
  - 6. Cut tendon tails (per requirements hereafter) when stressing is approved by the structural engineer / inspector. No tendon tail shall be cut off from a member whose attained force is not within 7% of the required force without written permission of the Architect or Structural Engineer.

7. Coat the anchorage and inside pocket prior to grouting the wall-stressing pocket flush with adjoining surfaces.
- L. Stressing operations shall be per approved sequence. Uniformly distributed tendons shall be stressed before banded tendons and uniformly spaced slab tendons shall be stressed before beam tendons, or band tendons. Beam tendons shall be stressed before girder tendons.
- M. Stressing records shall be compiled during the tensioning operation, with the following data recorded as a minimum:
  - Tendon mark or identification
  - Required elongation
  - Gauge pressure to achieve required elongation
  - Actual elongation achieved
  - Actual gauge pressure
  - Date of stressing operation
  - Signature of the stressing operator or inspector
  - Serial or identification number of jacking equipment and calibration dateStressing records shall be submitted to the Architect and Structural Engineer for review.

### 3.08 ALLOWABLE STRESSES FOR PRESTRESSING STEEL

- A. Maximum stress (jacking stress): Tendons may be temporarily stressed to a value higher than the anchoring stress in order to overcome stressing friction. In no case shall temporary stress exceed 80% of the guaranteed ultimate tensile strength of the strand ( $0.8f_{pu}$ ).
- B. Initial stress (anchoring stress): Maximum stress in strand at anchorage immediately after seating shall not be greater than 70% of the guaranteed ultimate tensile strength of the strand ( $0.70f_{pu}$ ). Maximum stress anywhere in strand shall not exceed 74% of the guaranteed ultimate strength of the strand ( $0.74f_{pu}$ ). Jacking force shall be decreased and elongations adjusted as required to meet these criteria.

### 3.09 TENDON FINISHING

- A. Stressing End – Wall Pocket: Trim excess tendon tail length only after approval of tensioning. The tendon tail length protruding beyond the seating wedge after cutting shall be between 3/4 and 1-1/4 inches and in no case less than 1/2 inch. Minimum concrete cover over tendon tail shall be 3/4 inch. Cut tendon tail by means of either, oxyacetylene torch cutting, abrasive wheel or hydraulic shears. Avoid directing the flame from the oxyacetylene torch toward seating wedges when cutting / burning off tendon tails.
- B. Pour Strips: Strands in delayed cast pour strips shall be left uncut / extended, but not longer than the width of the pour strip.
- C. Stressing pockets shall be filled with non-shrink grout after tendon stressing and cutting. Under no circumstances shall the grout used for pocket filling contain chlorides or other chemicals known to be deleterious to the pre-stressing steel tendon.

1. The exposed strands and wedge areas shall be coated with bituminous tendon coating material or equal protective coating. Coat the inside concrete pocket surfaces including steel wedge with a heavy coat of resin bonding agent, prior to installing the pocket grout. Place grout fill while bonder is still wet. Install per manufacturer's printed instructions.
2. Grouting operations, per manufacturer's instructions with products as specified under Section 03300 - Concrete and Concrete Finishes.
3. When adjoining concrete is indicated as being left exposed (unpainted), the grout pocket fill shall be smoothed and rubbed to match and blend in with adjoining surfaces.

### 3.10 SAFETY PRECAUTIONS

- A. Take precautions to prevent workers from standing directly behind, above or in front of the stressing jacks.
- B. Comply with requirements issued by CAL-OSHA Industrial Relations Department, State of California.

### 3.11 CHANGES OF POST TENSIONING STEEL

- A. Shop Drawings for post tensioning steel and supports for same shall be as indicated on the contract documents. No changes shall be made or submitted without prior approval of the Architect. A letter of request noting specific recommended changes must be submitted to the Architect prior to preparation and issuance of shop drawings. Shop drawing approval shall not suffice as approval for changes in the absence of an itemized letter of request.
- B. Post tensioning steel is shown in U.S. dimensions. If metric sized steel is supplied the equivalent poundage of steel must be provided, subject to District's and Architect's acceptance.

END OF SECTION

1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Concrete block masonry work.
  - 2. Reinforcing steel for concrete block masonry and dowels including steel projecting into subsequently placed concrete.
  - 3. Setting of anchors, frames and other work to be embedded into masonry.
  - 4. Grouting of block cavity walls.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 03200: Reinforcing Steel
- B. Section 03300: Concrete and Concrete Finishes
- C. Section 05500: Miscellaneous Metal
- D. Section 07180: Clear Waterproof Coating
- E. Section 08100: Hollow Metal Doors and Frames

1.03 CONDITIONS

The "General Notes" on the structural drawings are part of these specifications.

1.04 REFERENCE STANDARDS

- A. Comply with California Building Code CBC, Chapter 21A
- B. International Code Council, ICC
- C. American National Standards Institute (ANSI)
- D. American Society for Testing and Materials (ASTM)
- E. National Concrete Masonry Association (NCMA)
- F. Portland Cement Association, "Concrete Masonry Handbook"
- G. Concrete Reinforcing Steel Institute (CRSI) "Manual of Standard Practices".
- H. Concrete Masonry Association of California and Nevada (CMACN)
- I. American Concrete Institute (ACI), Building Code requirements for Masonry Structures (ACI 530-08/ASCE 5-08/TMS 402-08)  
Specification for Masonry Structures (ACI 530.1-08/ASCE 6-08/TMS 602-08)

- J. Masonry Standards Joint Committee (MSJC) and The Masonry Society (TMS)

#### 1.05 SUBMITTALS

- A. Provisions: Comply with Section 01340.
- B. Materials list of items proposed to be provided under this section, inclusive of all special shapes, accessories and other manufactured products.
- C. Manufacturer's product literature, installation instructions and material certificates.
- D. Manufacturer's masonry test reports and certifications for material compliance with the specified requirements. Samples and tests to be in accordance with ASTM C140 and comply with requirements of ASTM C90 for mortar, grout mixes and masonry units. Approved manufacturers shall also provide their Q block test program certificates.
- E. Submit mortar and grout mix designs for approval prior to use. Submit all mix designs to Architect and Division of State Architect (DSA) for review prior to their use.
- F. Samples:
  - 1. Each different type / standard sized exposed masonry block unit, inclusive of each different shape, texture and color, to show full range of colors and texture
  - 2. Cured dry mortar showing finished color
  - 3. Cured sealant colors for control joints
  - 4. Expansion and Control Joints: Provide 12" long pieces of each type of material to indicate size, type and configuration.

#### 1.06 QUALITY ASSURANCE

- A. Contractor Qualifications: Skilled, first class masons, with a minimum of six (6) years experience in masonry work of the type indicated for this project.
- B. Single Source Responsibility
  - 1. Masonry:
    - a. Obtain masonry materials from a single source / manufacturer, whose materials / products have been tested and approved throughout the project.
    - b. Manufacturer must be an active participant in the Q block test program. Refer to submittals for required certificate.
  - 2. Mortar Materials: Obtain mortar and grout ingredients of uniform quality from one manufacturer for each cementitious component and from one source or producer for each type of aggregate.
- C. Preconstruction Testing: Perform preconstruction testing to establish compliance of proposed materials and construction with specified requirements as specified hereinafter.
  - 1. Concrete Masonry Units: Test units for strength, absorption and moisture content per ASTM C140 and CBC 2105 (A) .2.2.1.



2. Prism Tests: Test masonry prisms per ASTM E447 Method B and CBC 2105 (A) 2.2.3
  3. Evaluate mortar and grout composition and properties per ASTM C780 and CBC (A) 2105.2.2.1.
  4. Verify f'm of all materials prior to construction.
- D. Fire Resistance Ratings: Provide materials and construction identical to those of assemblies with fire resistance ratings determined per ASTM E119 by a testing and inspection agency, by equivalent concrete masonry thickness, or by another means as acceptable to authorities having jurisdiction, where required.
- E. Coordination with Other Trades: Coordinate masonry work with other trades that interface with the work of this section or that require penetration through or attachments to the masonry.

#### 1.07 INSPECTION AND TESTING

- A. Refer to Section 01425.
- B. Masonry work and depositing of grout shall be continuously inspected by the Deputy Inspector to verify building code conformance and project drawing requirements, unless noted otherwise.
1. Contractor shall arrange and pay for all mortar and grout mix designs. Composition and properties evaluated per ASTM C780 and CBC Section 2105 (A).
  2. Sample and test grout cylinders and mortar prisms. Preconstruction prism tests shall be performed to verify compliance with these requirements. F'm shall be determined by the Unit Strength Method per CBC Section 2105 (A), ASTM E447 Method B and these specifications. Compressive strength of block unit and mortar and grout component materials shall have a total assembly F'm of 1500psi minimum or higher as specified on the drawings. Ultimate compressive strength of individual components of the CMU assemblage shall meet the requirements of CBC 2105.2.2.1.2. and/or be equal to that specified and therefore exceed F'm.
  3. Core Tests: Required for questionable workmanship, materials or test results; sample and test not less than two cores. Diameter and length shall be per code requirements.
- C. Evaluation of Quality Control Tests: In absence of other indications of noncompliance with requirements, masonry will be considered satisfactory if results from construction quality control tests comply with minimum requirements indicated herein.

#### 1.08 PROJECT CONDITIONS

- A. Stain Prevention: Prevent grout, mortar and soil from staining face of masonry to be left exposed or painted.
1. Prevent base of walls from rain-splashed mud and mortar splatter using coverings spread on ground and over wall surface.
  2. Protect surfaces of window and door frames, as well as similar products with primed, painted or integral finishes from mortar droppings.

- B. Hot-Weather Requirements: Comply with referenced concrete unit masonry standards for hot weather construction and the following:
1. Protect masonry work when temperature and humidity condition produces excessive evaporation of water from mortar and grout.
  2. Provide artificial shade, wind breaks and / or use cooled materials as required.
  3. Do not apply mortar to substrates with temperatures of 100 deg F (38 deg. C) and above.

#### 1.09 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver all masonry units on pallets and store above ground on level platforms that allow air circulation under the stacked units. Cover and protect against wetting prior to use. Handle by methods to prevent cracking, chipping or defacing. Store masonry units and all other materials covered and in a dry location.
- B. Store cementitious materials in unopened factory packaging / containers on elevated platforms. Store packaged materials in a manner that prevents deterioration or contamination. Store aggregates or other required graded materials in a manner that characteristics can be maintained and contamination avoided. Do not use materials which are caked, lumpy, partially set or otherwise deteriorated.
- C. Protect accessories including metal items to prevent corrosion and accumulation of dirt and oil.

#### 2.00 PRODUCTS

##### 2.01 MATERIALS

##### 2.01 MANUFACTURER

Provide products as manufactured by Orco Block Co. Inc. (714) 527-2239; Angelus Block Co., or approved equal.

##### 2.02 MATERIALS

- A. Concrete masonry units shall be medium (115pcf) hollow load-bearing units, conforming to ASTM C90, (CBC-21-4), Grade N, Type I, with minimum net compressive strength of 1900psi. (Mpa) and a maximum linear shrinkage of .065% from standard oven dry condition. Units shall be steam or yard cured for 28 days meeting the Quality Control Standards of the Masonry Institute. Comply with CBC Section 2103 (A) and requirements specified herein for strength of individual units and for total CMU assemblage.
1. Provide required matching block configurations such as, jamb, corner, end units, radius bases, bond beams, U-lintels, wall caps, etc., with units open one or both ends, or other special shape, type or sizes as required.
  2. Base on project specifics regarding plan, provide any special block shapes required, i.e. column, bull-nose, caps, Y-block/chevron, miter bond beam, miter corner, or miscellaneous shapes. Provide square edged units for outside corners, except as noted otherwise.

3. All openings shall be provided with lintel U-beam blocks to match surrounding block.
  4. Wall Caps: Exposed (parapet) walls shall be capped with inverted U-lintel blocks to obtain a finished cap color / texture to match the face(s) of the wall. Refer to execution for project specifics of installation.
  5. Precision Block: Provide standard natural gray cement colored smooth faced precision units, unless otherwise indicated.
  6. Split-Face Concrete Block: As noted above, with split texture on all exposed exterior faces and ends and integrally colored, color as selected from manufacturers full range of standard colors.
  7. Provide special masonry units as required to meet the aesthetic project requirements, as indicated on the drawings and as specified on the Finish Schedule. Special units shall be integrally colored, split faced are to be special units as required with finished sides and ends as needed per construction details.
- B. Dimensions:
1. Provide units of the dimensions shown on the drawings.
  2. Where dimensions are not shown on the drawings, provide units having nominal face dimensions of 16" long by 8" high by 8", unless otherwise required.
- C. Reinforcement and Accessories: Provide accessory shapes indicated or otherwise required. Comply with the following minimums:
1. Bars: ASTM A615, Grade 60, using deformed bars for No. 3 and larger.
  2. Bending: ACI 318 and ACI 315.
  3. Wire reinforcement: ASTM A82 #9 wire ties.
- D. Cement: Conform to ASTM C150, Type I, II or III low alkali. (CBC 19-1) Do not use masonry cement.
- E. Hydrated Lime: Conform to ASTM C206 and C207, Type S, or Quicklime, or equal complying with ASTM C51. Contain no additives for the purpose of entraining air in accordance with the requirements of Test Method ASTM C110. Conform to the chemical composition requirements of ASTM C25.
- F. Aggregates:
1. Sand: ASTM C144 for mortar / fine granular material, uniformly graded with not less than 4% passing No.100 sieve, composed of hard, strong, durable mineral particles, free from injurious amounts of saline, alkaline, organic or other deleterious substances.  
 Passing No.4 sieve 100%  
 Passing No.8 sieve 95% to 100%  
 Passing No.16 sieve 70% to 100%  
 Passing No.30 sieve 40% to 75%  
 Passing No.50 sieve 10% to 35%  
 Passing No.100 sieve 3% to 15%
  2. Pea Gravel: ASTM C404 for grout / graded with 100% passing 3/8" sieve and no more than 5% passing No.8 sieve.
- G. Water: Clean, potable, domestic supply, free from deleterious substances.

- H. Admixtures: Do not use unless specifically accepted in advance by the Architect and Division of State Architect and included as part of mix designs.
  - 1. Mortar Admix: Red Label Suconem, Anti-Hydro, or equal
  - 2. Grout Admix: Sika Chemical GA Grout Aid, type as required.
- I. Masonry Cleaners: Provide job mixed detergent solutions recommended by the block manufacturer by Sure Kleen No. 600 Detergent; ProSoCo, Inc. or approved equal.

## 2.02 SCAFFOLD AND PROTECTION

Provide, install and maintain scaffolding, staging and forms of protection necessary to execute the work of this section.

## 2.03 SHORES AND CENTERING

Provide and install shores and centering for the work constructed to the required shape, size and form, well braced and made rigid and capable of supporting and sustaining the loads imposed. Leave shores and centering in place until the masonry is sufficiently strong to safely carry its own weight and the added loads of construction or retained earth.

## 2.04 MORTAR

- A. (DSA) Type "M" as designated on the drawings in accordance with ASTM C270 / C780, average compressive strength at 28 days shall be 2500psi per CBC Section 2105.
- B. Proportions:
  - 1. Composed (by volume) of 1part Portland cement, 1/4 to 1/2 part lime putty or hydrated lime, and sand 2-1/4 to 3 times the sum of the volumes of cement and lime used, and admixture in the proportion recommended by the manufacturer. Use measuring box to measure materials by volume.
  - 2. Do not use admixtures including air entraining agents, accelerators, retarders, water repellent agents, or other admixtures unless otherwise indicated.
  - 3. Mortar for block walls shall match color of block.
- C. Mechanically mix in a batch mixer from three to five minutes using only sufficient water to produce a mortar that is of a workable consistency. Continuous mortar mixing will not be permitted.
- D. Re-temper mortar with water to maintain high plasticity.
  - 1. Re-temper only by adding water within a basin formed with mortar on mortarboards and by working the mortar into the water.
  - 2. Discard mortar which is unused after 30 minutes after leaving mixer or 1-1/2 hours after adding water to initial mixing.

## 2.05 GROUT

- A. Provide "fine grout" or "coarse grout" as hereafter specified, in accordance with ASTM C476 and CBC Section 2103A.12, minimum 2000psi compressive strength at 28 days or higher as required by specified fm.

1. Proportions: (by volume)
    - a. "Fine Grout": Provide 1part Portland cement to 2-1/4 parts minimum to 3 parts maximum of damp loose sand with sufficient water to achieve fluid consistency.
    - b. "Coarse Grout": Provide 1part Portland cement to 2-1/4 to 3 parts maximum of damp loose sand to 1 to 2 parts coarse aggregate with sufficient water to achieve fluid consistency.
    - c. Include grout admix of the correct type, proportioned per manufacturers directions. Do not use admixtures including air entraining agents, accelerators, retarders, water repellent agents, or other admixtures unless otherwise indicated.
    - d. Grout for exposed block cells shall match color of block.
  2. "Sufficient water" or "Fluid consistency" is interpreted as meaning as required to make a workable / fluid mix that will flow into joints of masonry without separation or segregation.
  3. When grout is to be placed in masonry units with typical rates of absorption the slump of the grout should be approximately 8 to 10 inches depending on temperature and humidity conditions.
  4. Use one (1) cubic foot measuring box at mixer for accurate measurement of sand. No shoveling of sand into mixer is allowed.
- B. Use "fine grout" where the grout space is less than 2" in its least dimension where directed by the Architect or required by (DSA) Building Department.
- C. When drawings indicate grout in excess of 2,000psi, provide laboratory design mix prepared as required for design mixes of concrete under Section 03300.
- D. Grout not used within 30 minutes after leaving mixer shall not be permitted on the work. Re-tempering of mixture will not be allowed.

### 3.00 EXECUTION

#### 3.01 ENVIRONMENTAL CONDITIONS

- A. Do not place masonry units when air temperature is below 40 degrees F. during or within 24 hours of installation.
- B. Protect masonry construction in direct exposure to wind or sun when erected in ambient air temperature of 90 degrees F in the shade, with relative humidity less than 50%.
- C. Comply with all hot weather and/or cold weather mortar preparations.

#### 3.02 CONSTRUCTION TOLERANCES

- A. Variation from Plumb: For vertical lines and surfaces of walls and arises, do not exceed 1/4 inch in 10 feet, nor 3/8 inch in 20 feet, nor 2 inch in 40 feet or more. For external corners, expansion joints, control joints, and other conspicuous lines, do not exceed 1/4 inch in 20 feet, nor 2 inch in 40 feet or more. For vertical alignment of head joints, do not exceed plus or minus 1/4 inch in 10 feet, nor 2 inch maximum.

- B. Variation from Level: For bed joints and lines of exposed lintels, sills, parapets, horizontal grooves and other conspicuous lines, do not exceed 1/4 inch in 20 feet, nor 1/2 inch in 40 feet or more. For top surface of bearing walls, do not exceed 1/8 inch in 10 feet, nor 1/16 inch within width of a single unit.
- C. Variation of Linear Building Line: For position shown in plan and related portion of walls and partitions, do not exceed 1/2 inch in 20 feet, nor 3/4 inch in 40 feet or more.
- D. Variation in Mortar-Joint Thickness: Do not vary from bed joint thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch. Do not vary bed joint thickness of adjacent course by more than 1/8 inch. Do not vary from head joint thickness indicated by more than plus or minus 1/8 inch. Do not vary head joint thickness from adjacent head joint thickness by more than 1/8 inch. Do not vary from collar joint thickness indicated by more than 1/4 inch.

### 3.03 INSTALLATION OF REINFORCED MASONRY WALLS

- A. Field Conditions: Verify drawing dimensions with actual field conditions. Inspect related work and adjacent surfaces. Report to the Architect any conditions that prevent proper execution of this work.
- B. Construct masonry in accordance with Code and Concrete Masonry Association for reinforced masonry.
- C. Clean off encrustations, laitance, oil and coatings that would reduce bond to previously placed concrete or masonry, and the top surface free from dirt, debris and laitance for slabs or foundations. Wash mating surfaces thoroughly with water leaving surfaces damp where masonry units connect with earlier placed work. Provide a starter bed joint as required by code.
- D. Thoroughly clean masonry units of dust, grease, oil or other matter that would reduce bond. Do not wet concrete block units before installation. Lay masonry units dry.
- E. Clean reinforcement of mill scale, loose rust, oil and coatings that would reduce bond.
- F. Cut masonry units with motor driven saws to provide fractional masonry units with clean, sharp, un-chipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Use full size units without cutting where possible. Install cut units with cut surfaces concealed.
- G. Lay out walls in advance to minimize cutting of units and for accurate spacing of surface bond patterns with uniform joint widths and for accurate locating of openings, movement type joints, returns and offsets. Fractional parts of masonry units are prohibited where whole units can be used. The chinking of interstices with fragments will not be allowed. Provide special units as necessary to form openings and lintels. Coordinate location of openings both vertical and horizontal with block modules.

- H. Set units plumb, true to line and with level courses accurately spaced. Lay up walls to comply with specified construction tolerances with courses accurately spaced and coordinated with other construction.
- I. Place units in mortar with bed joints flattened, furrowing of bed joint mortar will not be permitted. Head joints solidly filled with mortar for a distance in from the face of the wall or unit not less than the thickness of the longitudinal face shell. Shove blocks into place to compact the head joint mortar and improve the bed joint, and to prevent leakage of grout. Mortar joints around masonry unit cells shall be struck smooth. Keep the walls continually clean, preventing grout and mortar stain. If grout does run over, clean immediately.
- J. Lay units with 1/2-unit running bond, vertical joints aligned and plumb. Align vertical cells of hollow units to maintain a clear and unobstructed system of continuous flues for grouting. Hold racking to an absolute minimum.
- K. No part of any masonry wall may be carried more than six (6) feet higher than adjoining portions.
- L. Place and embed in masonry the anchors, bolts, reglets, sleeves, conduits and all other items required by other trades fully grouted in place. Work out the details and be responsible for size, position and arrangement of embedded items and necessary openings. As construction progresses, build in items specified or required. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.
- M. Accurately fit the units to plumbing, ducts, openings, and other interfaces, neatly patching all holes. Coordinate openings for equipment to be installed under other sections.
- N. Comply with structural details to maintain clearances from structural concrete.

### 3.04 PLACING REINFORCEMENT

- A. Accurately place and tie reinforcing steel. In spaces containing reinforcement, except small rods or mesh one-quarter inch or less in diameter, the minimum clear distances between masonry and the reinforcement shall be one-half inch.
  - 1. Vertical Bars: Hold continuous vertical bars in position at top and bottom of wall and at intervals not exceeding 192 bar diameters for centering in cells. Hold vertical bars securely in place with wood frames or similar devices for correct alignment. Where indicated otherwise, bars may be overlapped provided splices are of the dimension indicated. Provide required metal accessories to ensure adequate alignment of steel during grout filling operations.
  - 2. Horizontal Bars: Use deep-cut bond beam units for horizontal bars. Provide continuous horizontal reinforcement 16"oc. Install horizontal reinforcing as erection progresses, laps wire tied. Maintain minimum 3/4" clear distance between masonry and bars. Make laps and splices in bars not less than 40 bar diameters unless otherwise indicated. Install entire length of longitudinal side rods in mortar. Lap reinforcing of bars where indicated on drawings.

- a. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- b. Install horizontal reinforcing in the first and second bed joint above and below openings extending beyond each side of opening, as indicated by structural drawings.
- c. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, pipe enclosures and other special conditions.

### 3.05 BEDDING, JOINTS AND COURSING

- A. Set Concrete Masonry Units as follows:
  1. Provide full bed mortar coverage on horizontal face shells and cross web / vertical face shells.
  2. Bed webs in mortar in starting course on footings and in course piers, pilasters and where adjacent to cells or cavities to be filled with grout.
  3. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.
  4. Fill header or end joints solid with mortar for a distance in from face of wall or unit not less than thickness of longitudinal face shells.
  5. Build walls to preserve the unobstructed vertical continuity of the cells to be filled.
  6. Provide corner bond by lapping units in successive vertical courses.
  
- B. Joints:
  1. Make mortar joints straight, clean and uniform in thickness. Tool joints in masonry to a tight, dense, smooth surface and well bonded to edges.
  2. Joints that are not tight at time of tooling shall be raked out, pointed and then tooled.
  3. Tool when the mortar is partially set (thumb print firm) but still sufficiently plastic to bond.
  4. Finish joints that are to remain exposed with tool slightly larger than width of joint to form concave surface.
  5. Tool vertical joint first.
  6. Maintain joint width of 3/8 inch unless otherwise indicated.
  7. Provide the following joints:
    - a. Concave tooled joints, horizontal and vertical, at exposed masonry.
    - b. Flush tooled joints, horizontal and vertical, at masonry below grade against dirt, or where bonded finish is specified for a concealed flush finish.
  
- C. Provide running bond with vertical joints located at center of masonry units in the alternate course below, unless indicated otherwise.

### 3.06 CLEANOUT OPENINGS

Provide openings at bottoms of cells containing reinforcing, and at each lift or pour of grout exceeding 48" height. Remove all overhanging mortar and other obstructions or debris from interior of cells. Do not close the cleanouts until they have been cleaned,



inspected and approved by the Project Special / Deputy Inspector. Seal cleanouts with matching whole units and mortar joints.

### 3.07 ANCHORING MASONRY TO STRUCTURAL MEMBERS

- A. Adjoin masonry to structural members where indicated on drawings to comply with the following:
1. Provide an open space not less than 1" in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar or other rigid materials.
  2. Provide anchors only as indicated on the drawings. Where permitted, but not more than 24"oc vertically and 32"oc horizontally.

### 3.08 LINTELS

Provide prefabricated or built-in-place masonry lintels. Use specially formed bond beam units with reinforcement bars placed as indicated and filled with grout. Provide a minimum bearing of 8" at each jamb, unless otherwise indicated.

### 3.09 HOLLOW METAL FRAMES

Accurately locate, erect plumb and securely attach to the floor and brace in position as required to start of masonry erection. Adjust anchors to coincide with horizontal joints in masonry. Fill frames solid with mortar as the erection progresses. Provide temporary spreaders and shores to support frames and prevent deflection.

### 3.10 BOLTS, ANCHORS AND FRAMES

Set bolts, anchors, frames and inserts necessary for the attachment of subsequent work and items furnished under other sections. All vertical bolts in masonry shall be centered in cells.

### 3.11 GROUTING

- A. Perform grouting procedures in strict accordance with the provisions of ACI 530.1-08/ASCE 6-08/TMS 602-08 Section 3.5.
- B. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them. Fill the cells containing reinforcement with grout except where grout filling of all cells is indicated
- C. Vertical cells to be filled shall have vertical alignment sufficient to maintain a clear, unobstructed continuous vertical cell measuring not less than 3 inches by 4 inches.
- D. Low Lift Grouting Procedures: Conform to CBC Section 2104 (A) .6.1.2.2
1. Units may be laid to a height not to exceed 4 feet. If the height exceeds 4 feet, cleanouts shall be used. Pour in 4-foot lifts, waiting about 1-hour between lifts. Pour the full height in each section of the wall in one shift.

Consolidate grout by puddling or internal vibration then reconsolidate about 10 minutes later before plasticity is lost.

2. Place vertical steel into cells with enough steel extending to provide lap splice as required by structural drawings.
  3. Grout cell stopping grout 2 inch below top of unit or over horizontal steel which shall be fully embedded in grout to form a horizontal construction joint.
  4. Expanded metal mesh or other material that will not interfere with bond may be laid on top of unit to permit bond beams and horizontal members to be grouted in without fully grouting the wall.
- E. High Lift Grouting Procedures: High lift grouting may be used at Contractor's option as approved and according to Code. Conform to DSA IR 24-2 & CBC Section 2104 (A) .6.1.2.2
1. Cleanout openings shall be provided at the bottom of cells to be filled at each pour of grout where such grout pour is in excess of 4 feet in height. Any overhanging mortar or other obstruction or debris shall be removed from the insides of such cell walls. The cleanouts shall be sealed after inspection and before grouting.
  2. Vertical reinforcement shall be held in position at top and bottom and at intervals not exceeding 100 diameters of the reinforcement.
  3. Cells containing reinforcement shall be filled solidly with grout. Grout shall be consolidated at time of pouring by puddling or mechanical vibrator and then reconsolidated by again puddling later, before plasticity is lost. When total grout pour exceeds 8 feet in height the grout shall be placed in 4-foot lifts. Minimum cell dimension shall be 3 inches.
- F. When grouting is stopped for one-hour or longer, form horizontal construction joints by stopping the pour not less than 1/2 inch or more than 2 inch below the top of the uppermost unit grouted. Do not form construction joints within beams Horizontal steel shall be fully embedded by grout in an uninterrupted pour. Grout-fill all cells unless otherwise noted.

### 3.12 FLASHING, WEEP HOLES AND VENTS

- A. Install embedded flashing and weep holes in masonry at lintels, ledges, other obstructions to the downward flow of water in the wall and where indicated.
- B. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Place through-wall flashing on a sloping bed of mortar and cover with mortar. Seal penetrations in flashing with adhesive, sealant or tape as recommended by flashing manufacturer before covering with mortar.
- C. Install flashing as follows:
  1. Extend flashing at lintels, a minimum of 4" into masonry at each end. At heads and sills, extend flashing 4" at ends at ends and turn up not less than 2" to form a pan.
  2. Cut off flashing flush with face of wall after masonry wall construction is completed.

- D. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashing. Head joints shall be kept free of mortar, to form weep holes, spaced 24"oc.
- E. Trim wicking material used in weep holes flush with outside face of wall after mortar has set.
- F. Install vents in vertical head joints at the top of each continuous cavity. Space vents and close cavities vertically and horizontally with blocking. Install through wall flashing and weep holes above horizontal blocking.
- G. Install reglets and nailers for flashing and other related construction where shown to be built into masonry.

### 3.13 CURING

- A. Damp cure masonry work for a period of not less than 7 days after the work is completed. Make provisions to cure completed work on Saturdays, Sundays and Holidays.
- B. Cure using a regulated fog spray of water sufficient only to moisten faces of masonry but not in an amount as to cause water to flow down over masonry. Do not saturate with water for curing or any other purposes and protect from rain or flooding during curing period.
- C. Top of grout pour should be kept damp to prevent too rapid of drying during hot or drying winds.

### 3.14 REPAIRING, POINTING AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained or otherwise damaged. Replace whole block modules that do not match adjoining units. Install new units or full veneer module to match adjoining units and in fresh mortar or grout, pointed to eliminate evidence of replacement. Replace block faces cut when cylinders are removed.
- B. During tooling of joints, enlarge voids or holes and completely fill with mortar. Point-up joints including corners, openings and adjacent construction to provide a neat, uniform appearance, prepared for application of sealants.
- C. Leave exposed surfaces clean and free of surplus mortar, mortar stains, cement runs, soil or foreign material to be left exposed or for proper application of specified painted finishes. Exercise care to keep grout and mortar droppings off finished surfaces.
- D. Staining and Excess Mortar: Protect exposed masonry against staining. Where grout or mortar does contact the faces of masonry, remove it immediately by dry brushing to remove mortar fins and smears prior to tooling joints. Should accidental spillage occur, wash and clean surfaces immediately.
- E. Test hand cleaning methods on a sample panel. Obtain Architect's approval of sample cleaning before proceeding with production cleaning of the masonry.

- F. Protect adjacent non-masonry surfaces from contact with cleaners by covering with liquid strippable masking agent, polyethylene film or waterproof masking tape.
- G. Wet wall surfaces with water prior to application of cleaners. Remove cleaners promptly by rinsing thoroughly with clear water.
- H. Provide final protection and maintain conditions that ensure unit masonry is without damage and deterioration at time of Substantial Completion.

3.15 PARGE COAT

Apply mortar parge coat on all masonry to receive built-up membrane waterproofing, troweled smooth. Keep the parge coat continuously damp for three days or spray apply a black bituminous curing compound conforming to ASTM C309.

3.16 CLEANUP

- A. Undamaged excess masonry materials are Contractor's property and shall be removed from the project site.
- B. Remove excess debris and legally dispose off District's property.

3.17 FIELD QUALITY CONTROL

- A. The District will employ and pay a qualified independent testing agency / special deputy inspector to perform the testing for field quality control. Retesting of materials failing to meet specified requirements shall be done at the Contractors expense. Refer to Section 01425, Testing and Inspection.
- B. Evaluation of Quality Control Tests: In absence of other indications of noncompliance with requirements, masonry will be considered satisfactory if results from construction quality control tests comply with minimum CBC requirements and as approved by DSA.

END OF SECTION

## 1.00 GENERAL

### 1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Hot-dip galvanizing of structural and miscellaneous steel material and fabricated items, where specified.

### 1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 05100: Structural Steel
- B. Section 05300: Metal Decking
- C. Section 05500: Miscellaneous Metal
- D. Section 09870: Steel Coating System

### 1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM):
  - A123 Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - A143 Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.
  - A153 Zinc Coating (Hot-Dip Galvanized) on Iron and Steel Hardware.
  - A348 Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies.
  - A385 Providing High-Quality Zinc Coatings (Hot-Dip).

### 1.04 SUBMITTALS

- A. Provisions: Comply with Section 01340.
- B. Submit samples 3" long on rolled steel sections demonstrating quality and smoothness of galvanize coating.
- C. Test reports from finisher showing coating thickness result of tests made on random production samples.

### 1.05 QUALITY ASSURANCE

- A. Qualifications
  - 1. Galvanizer: Firm regularly engaged in application of hot-dip galvanized coatings for at least 5 consecutive years prior to this work.
  - 2. Applicators must be and able to provide proof of good standing as a member of the American Galvanizers Association (AGA).

3. Workers: Experienced and knowledgeable in preparation and application of hot-dip galvanized coatings.
- B. Quality of Work:
1. Standard rolled or extruded shapes as well as plate or welded / woven fabric panels that show signs of warp or twist not permitted and are grounds for rejection.
  2. Work / assemblies that are fabricated with panels that will not accept the same rate of expansion and contraction of base metals and that are likely to warp or twist shall not be subjected to the same galvanizing process as the remaining assembly.
- NOTE:** 3. Fabricated work shall not be galvanized where weep / ventilation holes are drilled and exposed to view when installed in the completed work

## 1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect finishes provided under this Section before, during and after installation from any type of damage.
- B. Handle products to be galvanized to avoid mechanical damage, to minimize distortion, and to prevent wet storage stains.
- C. Storage: Load and store galvanized products to prevent formation of wet storage film.
- Wet storage stain:
1. When galvanized articles are packed loosely together for periods of time, take adequate precautions against wet storage stain. Minimize wet storage stains by maintaining a low humidity environment around the material and by providing adequate ventilation between stacked pieces.
  2. If outdoor stacking is unavoidable, raise the articles from the ground and separate with strip spacers to provide air circulation to all surfaces of the galvanized piece.
  3. Incline to provide maximum drainage.
  4. Do not leave uncovered material standing where it may be exposed to rain, mist, condensation, and frost.
  5. If galvanized components must be stacked or stored in humid environments, apply an after-galvanized treatment to inhibit wet storage stain.

## 2.00 PRODUCTS

### 2.01 SURFACE PREPARATION

- A. Pre-clean steel with an alkaline cleaner, acid pickle, and flux. Alternatively, the steel may be blast cleaned and fluxed.
- B. Remove black lacquer mil coating, paint, crayon marks, grease and oil-based marks from steel before galvanizing. Where permanent identification of an item to be galvanized is required, provide stamped or seep stencil markings.

- C. When joining steel components of different melts and age, such as castings, malleable iron and rolled steel, abrasive blasting is required prior to pickling.
- D. Reject excessively pitted and rusted components.

## 2.02 GALVANIZING

- A. Comply with the American Galvanizing Association publication "The Design of Products to be Hot Dip Galvanized After fabrication," and reference standards.
- B. The thickness of coating shall conform to the requirements of Table I of ASTM A123 for the thickness of the material being galvanized. The specified thickness is an average of specimens tested.
  - 1. Hot Dip Coating, G90 thickness of at least 2.0 mils or 2.0 ounces psf on actual surface and 1.8 ounce psf minimum on any specimen.
- C. The coating shall be continuous, and reasonably smooth and uniform in thickness. Coated surface for components such as handrails shall be smooth, without pits, craters, dross and other imperfections.
- D. Excessive dross, rough surfaces, blisters, lumpiness, runs, edge tears, spikes, and chromate quenching are unacceptable.
- E. Use caution to avoid warpage and distortion in galvanizing fabricated steel in the following types of assemblies:
  - 1. Assemblies constructed of sheets or plates from 20-gage to 1/4 in. thick, assembled by welding or riveting to bar-size shapes, angles. Channels, Tees, etc., commonly distort and warp and shall not be provided for the Project.
  - 2. Warpage is accentuated by use of nonsymmetrical sections such as channels. Channels require straightening after galvanizing. Avoid using channels and other nonsymmetrical sections for the framework of a sheet metal assembly to be hot-dip galvanized where symmetrical shapes or sections can be used.
  - 3. The use of wide radii bends in corners is recommended for sheet metal work.
  - 4. Avoid unequal thickness of metal wherever possible due to the different rates of heating and cooling during the galvanizing operation and the effect of unequal expansion and contraction.
  - 5. Continuously weld joints using balanced welding techniques to reduce uneven thermal stresses.
  - 6. Provide temporary bracing and/or reinforcing to minimize or prevent warpage and distortion during galvanizing.
  - 7. Place vent holes where they will drain by gravity in the finished assembly. Plug vent holes with lead or silicone sealant after galvanizing.
  - 8. If required to prevent humid storage staining, quench freshly galvanized steel in a passivating solution.
  - 9. Safeguard products against steel embrittlement in compliance with ASTM A143.

10. Assemblies that incorporate a wide range of various sized stock, such as tubes, channels and plate stock, as well as welded wire panels shall have assemblies fabricated out of galvanized stock prior to fabrication.

### 3.00 EXECUTION

#### 3.01 GENERAL

Refer to Sections of Division 5 for scope of work and the application of galvanizing to fabricated items.

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. All structural steel framing including shapes, channels, tubes, pipe, plates, angles and rods.
  - 2. Bolting and/or welded connections, shop or field executed.
  - 3. Base and bearing plates, templates, connections, shims and wedges.
  - 4. Furnishing of anchor bolts.
  - 5. Shop priming and field touch-up to extent specified
  - 6. Hoisting of metal decking
  - 7. Temporary bracing of the erected structural framing during construction to protect against movement due to construction operations, wind loads, etc.
  - 8. Galvanize fabricated work / components prior to transport / erection. Items shall include and not be limited to the following:
    - a. Required as a minimum for all exterior exposed metal and sleeves and embeds in direct contact or embedded within concrete / masonry.
    - b. Stair and elevator lobby trellis structures, elevator shaft framework, bus stop fabrication, framework above entry / exits, ornamental channel attachments at concrete columns and all miscellaneous tubes, channels, anchors, supports, plates and embeds indicated and/or required.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 03300: Concrete and Concrete Finish
- B. Section 05030: Hot Dip Galvanizing
- C. Section 05300: Metal Decking
- D. Section 05500: Miscellaneous Metal
- E. Section 07255: Cementitious Fireproofing

1.03 REFERENCE STANDARDS

- A. American Institute of Steel Construction (AISC)  
"Specification for the Design, Fabrication and Erection of Structural Steel for Buildings."  
"Code of Standard Practice for Steel Buildings and Bridges."  
"Manual of Steel Construction, Allowable Stress Design"
- B. American Welding Society (AWS) -AWS D1.1 Structural Welding Code
- C. American Society for Testing and Materials (ASTM)

Structural Joint Reference Specification: ASTM A325 or A490 Bolts established by the Research Council on Riveted and Bolted Structural Joints of the Engineering Foundation, hereafter referred to as "Reference Standard"

D. California Building Code (CBC)

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Shop Drawings: Prepare under the direct supervision of a California licensed Civil or Structural Engineer. Provide complete detailed drawings of all members including all erection and bracing plan, diagrams and procedures, all bolted or welded connections, schedules for fabrication and assembly. All parts of the work not specifically detailed on the Contract Drawings shall be detailed in accordance with standard practice.
1. Indicate details of cuts, connections, camber, holes and other pertinent data. Indicate welds by standard AWS symbols and show size, length and type of each weld.
  2. Provide setting drawings, templates and directions for installation of anchor bolts and other anchorage to be installed as work of other sections.
  3. Contractor shall not assume that all dimensions, quantities or details are correct.
  4. Miscellaneous metal shop drawings shall not be included in structural steel shop drawings.
  5. All shop drawings used on site must bear the Architect's shop drawing review stamp.
  6. Provide erection drawings clearly indicating which members are considered as AESS Architecturally Exposed Structural Steel members.
  7. Include details that clearly identify all of the requirements listed in sections 2.03 "Fabrication of AESS" and 3.04 "Erection of AESS" of this specification. Provide connections for exposed AESS consistent with concepts shown on the architectural or structural drawings.
- C. Welding Procedure Specifications: Submit welding procedure specifications and related documentation, including:
1. A signed letter certifying that the WPS's comply with AWS and Construction Documents and are suitable for job conditions.
  2. Procedure Qualification Records.
  3. Test reports and manufacturer's technical data for weld stick and wire electrodes.
  4. Electrode manufacturer's electrode with certification that required welding variables are current.
  5. Operator Qualification: Documentation stating that the welding operators are qualified for work on this Project. All welders shall be certified in accordance with NCPWB, ASTM or AWS.
  6. WPS's shall identify their intended application (i.e., beam flange complete flange weld, moment frame shear tab fillet weld, general fillet welds in shop).

7. A diagram indicating weld profile, bead placement and sequence, backup bar removal, reinforcing welds, base preparation and weld grinding shall accompany each WPS.
  8. WPS's shall, as a minimum, indicate the electrode manufacturer and model, electrode diameter and associated current type, amperage and volts. Heat input and travel speed shall be included on WPS's for full penetration welds.
  9. Clearly identify welding procedure specifications for shop welds, field welds, seismic critical welds and non-seismic critical welds.
  10. For Special requirements at Seismic Critical Welds see the Structural Drawings.
- D. Product Data: Provide manufacturer's specifications and installation instructions. Include laboratory test reports and other data to show compliance with specifications for the following products:
1. Structural steel (each type), including certified copies of mill reports covering chemical and physical properties, which can be identified readily by means of heat or melt numbers marked at the mill.
  2. Bolts, nuts, washers and filler material for welding
  3. Structural steel primer(s) and/or paint, where applicable (not galvanized)
  4. Non-shrink grout.
- E. Mill Test Reports: Submit manufacturer's certified test reports to the testing laboratory and Architect showing chemical analysis and results of tensile and bending tests. Tests shall meet the requirements of ASTM A6.
- F. Test reports conducted on shop and field bolted and welded connections. Include data on type(s) of tests conducted and test results.
- G. Record Drawings: After the structural steel has been erected and the shop and erection drawings have been corrected to correspond with field conditions, deliver a complete set of "As-Built" prints and printable transparencies of the Drawings to the Architect for review and forwarding to the District.

#### 1.05 REQUIREMENTS

- A. Fabrication of the structural steel shall be performed in a licensed shop to AISC standards and approved by (DSA) the Architect, the District and the building official. All tolerances shall conform to the applicable requirements of the reference standards referred to above. Exposed steel shall have appropriate factory applied rust-inhibitive primer. Do not fabricate until shop drawings and product data submittals are approved.
- B. Fabricate steel in the exact sections, shapes, sizes, weights and details of construction indicated on the Drawings. Proposed changes shall be made only with the specific written consent of the Architect.
- C. The structural steel anchor bolts and anchor bolt setting drawings shall be delivered to the Contractor for setting. The structural steel contractor shall verify the position of the bolts prior to the delivery of the steel and report any errors or deviations in the work to the Contractor.

- D. Contractor shall be responsible for furnishing the design and placement of any / all required temporary bracing of the erected structural framing during construction to protect against detrimental movement or failure of steel framing by construction operations, anchorage / attachment defect, wind loads, etc. Contractor shall be liable for all subsequent damages on the site and to other work caused by failure of the temporary shoring / bracing erected / required to maintain structural integrity of the framing during construction.
- E. The work of this Section shall include all cutting, punching, drilling and tapping of the structural steel work required by other trades so that the work of the other trades will properly connect with the work of this Section, provided that the details as to location and the requirements for such work are supplied to the structural steel contractor at the time the shop drawings are being prepared.  
NOTE: It is not permitted to field cut or do any other modifications to the structural steel without written approval by Architect.
- F. Furnish bearing plates, connection stiffeners, gussets, shelf angles, angle clips and other miscellaneous structural steel items shall be provided as necessary for the work indicated on the Drawings, whether individually detailed or not.
- G. Holes for Other Work: Provide holes required for securing other work to structural steel framing and for passage of other work through steel framing members.  
1. Provide threaded nuts welded to framing and other specialty items as indicated to receive other work.  
2. Cut, drill or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning. Drill holes in bearing plates.
- H. Weld filler shall have a notch toughness not less than 20 foot-pounds at 0 degrees F as measured by a standard Charpy Vee notch test ASTM E23 in accordance with the applicable filler metal specification referenced in AWS D1.1. See special requirements for seismic critical welds on the structural drawings.
- I. All welds shall be started and ended on runoff tabs where practicable. Remove all tabs and grind smooth.
- J. If backer bars are used at flanges of rolled beams, remove bar at bottom flange, back-gouge the root weld and repair and reinforce with a fillet weld per AWS D1.1.
- K. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence that will expedite erection and minimize field handling of materials.
- L. Welding and special inspection requirements of AWS D1.1 as incorporated into and modified by the California Building Code shall be strictly enforced.  
1. Special visual inspection shall be continuous throughout the approved welding procedure from fit-up through weld completion.  
2. Fabricator shall be certified per CBC Chapter 17 (A) and shall provide as part of shop drawing submittal, Welding Procedure Specifications (WPS) containing the information required by AWS D1.1. Each WPS shall be acceptable to the Engineer of Record furnished to the Building Department (DSA) and shall be part of the basis for special visual inspection.

- \*\* If the fabricator cannot demonstrate certification by a jurisdiction acceptable to the Engineer and the building official, the Contractor shall notify the Engineer upon receipt of Notice to Proceed. Contractor shall pay for special inspection and testing as required by CBC (DSA).
3. Each WPS shall list the welding position, electrode stick / wire size, type; travel speed, stick out voltage and amperage within acceptable limits, head size, weld sequence, stress relieving and other pertinent data.
  4. The certified welder and the special deputy (project) inspector shall maintain the appropriate WPS at hand for reference during the fabrication process.
- M. Provide weld tabs for temporary bracing and safety cabling only at points concealed from view in the completed structure or where approved by the Architect. Methods of removing temporary erection devices and finishing the AESS members shall be approved by the Architect prior to erection.

#### 1.06 QUALITY ASSURANCE

- A. Qualification of Fabricator: Fabricate structural steel in shop of a licensed fabricator approved by the Building Department. Shop shall conform to their Quality Certification Program as approved by the District.
1. Engage a firm experienced in fabricating AESS similar to that indicated for this Project with a record of successful in-service performance, as well as sufficient production capacity to fabricate AESS without delaying the Work.
- B. Erector Qualifications: Engage an experienced Erector who has completed AESS work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance
- C. Design, materials, fabrication and erection of structural steel shall be accordance with reference standards and approved plans.
- D. Provide certification that welders employed in the work passed AWS qualification testing.
- E. Source Quality Control:
1. Materials and fabrication procedures are subject to inspection and tests in mill, shop and field conducted by a qualified testing and inspection agency. Such inspections and tests will not relieve the Contractor of responsibility for providing materials and fabrication procedures in compliance with specified requirements.
  2. Promptly remove and replace materials or fabricated components that do not comply.
  3. Details shown are typical; similar details apply to similar conditions, unless otherwise indicated. Verify dimensions at site whenever possible without causing delay of the work. Promptly notify the Architect whenever design of members and connections for any portion of structure are not clearly indicated.
  4. Identified Structural Steel: Tests are waived for steel identified by heat number, accompanied by mill analyses, mill test reports and properly tagged with 'Identification Certificate' so as to be readily identified for

conformance with applicable ASTM. One copy of such reports shall be sent to the Structural Engineer for record purposes.

5. Unidentified Steel: If structural steel cannot be identified or its source is questionable, not less than one tension and one bend test shall be made for each (10) tons or fractional part thereof. Additional tests may be required when deemed necessary by the Architect, Structural Engineer or Building Department. Contractor shall bear test costs.

- E. Erection and Bracing Plan and Procedure: Refer to Section 1710, Title 8, CCR and Building Code. Employ a registered Civil Engineer licensed in the State of California to prepare an erection and bracing plan and erection procedure for structural steel including columns and beams who is solely responsible for its compliance. Follow the plan and procedures exactly. Keep a copy at the job site as required by the California Division of Industrial Safety. Contractor shall pay involved costs. File copy of stamped erection and bracing plan and procedure with Contractor and Architect for record purposes only, not for review or approval.

#### 1.07 TESTS AND INSPECTION

- A. Refer to Section 01425.
- B. Identified Material: If material is properly identified (heat number), the mill analysis / report will be accepted and testing is not required.
- C. Unidentified Material: One tension and bend test for every (10) tons or fractional part thereof. Submit copies of all test reports to the Architect for review in reasonable time before start of fabrication.
- D. Tests and Inspections: Contractor shall arrange for and schedule testing and inspections of all materials and fabrication at source of supply, fabrication and at site.
- E. Testing agency shall provide special certified deputy inspectors, (project inspectors) to inspect all shop and field welding. Testing and inspection shall comply with all regulations of (DSA) the CBC / Building Department having jurisdiction. Testing agency shall certify in writing upon completion of Work, that the welding has been performed by fully certified welders and in accordance with Drawing and Specification requirements and with all applicable requirements of regulatory agencies having jurisdiction. District to pay testing costs.

#### 1.08 JOB CONDITIONS

- A. Site Measurements: Take such field measurements as may be required. Report any major discrepancy between Drawings and field dimensions to the Architect.
- B. Protection of Floors: Exercise caution to protect floors and adjacent work from damage. Do not overload floors. Use rubber tired equipment to handle and move steel. Do not place steel members directly on floor; use pads of timber or like material for cushioning.

#### 1.09 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to site at such intervals to ensure uninterrupted progress of work. Deliver anchor bolts and anchorage devices that are to be embedded in cast in place concrete or masonry in ample time to not delay work.
- B. Transporting and handling the fabricated or partially fabricated members shall be performed with equipment of adequate size to accomplish the intended work safely. All assembled members shall be tied and bridled. Use wood blocks in stacking and transporting the steel to insure that no part of a member will be subject to damage that will impair its strength, durability or accuracy of fit.
- C. Store materials to permit easy access for inspection and identification. Keep steel members off ground by using pallets, platforms or other supports. Protect steel members and packaged materials from erosion and deterioration.
- D. Protect materials from damage during shipping, handling, and storage on the site. Steel showing dents, creases, deformations, weathering or other defects is not acceptable.
- E. Welding Electrodes: Deliver to the site in unbroken packages bearing manufacturers name and label identifying the contents.

#### 1.10 MOCKUP

- A. Prior to erection of AESS members, the contractor shall construct a mockup to demonstrate the aesthetic effects of materials and execution.
  - 1. Mockup shall be a full-size member with connections to the elevator shaft unless the Architect requires smaller models.
  - 2. Notify the Architect one week in advance of the date and time when mockup(s) will be available for review.
  - 3. Demonstrate the proposed range of aesthetic effects regarding joining, welding and bolted connections.
  - 4. Mockup(s) shall have finished surface, including surface preparation and galvanizing
  - 5. Obtain Architect's approval of mockup(s) before starting fabrication / erection of final units.
  - 6. Retain and maintain mockup(s) during construction in an undisturbed condition as a standard for judging the completed work. Approved mockup(s) in an undisturbed condition at the time of Substantial completion may become part of the completed work

### 2.00 PRODUCTS

#### 2.01 MATERIAL

- A. Use new tested stock of domestic manufacture complying with standard specifications hereinafter referenced. If foreign material is used, it shall meet or exceed the requirements of all authorities having jurisdiction.
- B. Structural Steel: Wide flange sections shall conform to ASTM A992 or A572 Grade 50. Steel plate and bars 3/8" or greater shall conform to ASTM A572 Grade 50. All other steel shall conform to ASTM A36 unless noted otherwise on the structural plans.

- C. Steel Tubes: Conform to ASTM A500 / A501, Grade B for structural purposes. ASTM A120 and A501, Standard weight for general purpose, min fy = 35 ksi.
- D. Steel Pipe: Conform to ASTM A120 standard weight for general use; A53 Grade B where used for structural purpose.
- E. Unfinished Steel Machine Bolts, Nuts and Washers: Conform to ASTM A307, Grade A, low carbon steel bolts and nuts.
- F. High Strength Bolts: Heavy hexagon, quenched and tempered medium carbon, structural bolts nut and washers. Conform to ASTM A490 tension controlled bolts unless noted otherwise. Where indicated as galvanized, provide A325 bolts that are zinc coated, either mechanically deposited complying with ASTM B695, Class 50, or hot dip galvanized complying with ASTM A153.
- F. Anchor Bolts: ASTM F1554
- G. Filler metal and flux for welding: Conform to the applicable requirements of the following articles in the AWS Code referred to above:
  - 1. Welding electrodes for manual shielded metal-arc welding shall conform to AWS A5.1, or A5.5 E70XXX. Use low hydrogen electrodes for A572 steel.
  - 2. Electrodes for manual shielded metal-arc welding: Article 408, in the series recommended by the electrode manufacturer for the specific type of welding work being performed.
  - 3. Electrodes and flux for submerged arch welding: Article 412, Grade F80. Welding electrodes and flux used in submerged arc process shall conform to AWS A5.17 F7X-EXXX
  - 4. Welding MIG wire feed electrode for mild-steel shall be ER 70S-3
  - 5. See structural drawings for special requirements for seismic critical welds.
- H. GALVANIZING - Required as a minimum for all exterior exposed metal and sleeves and embeds in direct contact or embedded within concrete / masonry. Refer also to the scope of work of this section of work to see components that are required to be galvanized. Coordinate the work of this section with the work of Section 05500 – Miscellaneous Metal.
  - 1. Galvanizing: ASTM A123, ASTM A153 as applicable, hot dip after fabrication with a coating G90 thickness of at least 2.0 mils or 2.0 ounces-psf on actual surface and 1.8 ounces-psf minimum on any specimen.
  - 2. Galvanizing Repair Material: Z.R.C. "Cold Galvanizing Compound", All States Galvanizing Powder, "Drygalv" by American Solder and Flux or equal anodic zinc-rich galvanizing repair paint.
- I. Non-shrink Grout: Master Builders "Embeco" or equal, non-gas-forming type, free of oxidizing catalysts and inorganic accelerators, performance characteristics when mixed to fluid consistency meeting CRD-C-79 and CRD-C-588, non-staining type in exposed areas.

2.02 FABRICATION REQUIREMENTS - Conform to the approved submittals, reference standards as applicable to the work and the requirements herein. Fabricate and frame the work to meet actual installation conditions as verified at the site.



- A. Cleaning and Straightening: Before fabrication (not a substitute for preparation before priming), all the structural steel members shall be thoroughly wire brushed, cleaned of all loose mill scale and rust and be straightened by methods that will not injure the steel prior to fabrication. Remove twists or bends after punching or working the component parts of a member before the parts are assembled. Produce finished members free from twists, bends and open joints when erected.
- B. Contact: Pin component parts of built-up members and rigidly maintain in close contact using clamps or temporary bolting during welding operations. Accurately mill compression bearing surfaces of joints depending on contact bearings or saw cut square to axis or as detailed. Cut other joints straight and true.
- C. Joining: Provide members of sizes, weights, shapes and arrangements indicated, closely fitted and finished true to line and in precise position as necessary to allow proper joining of parts in the field. Drifting to enlarge unfair holes is not allowed without prior approval.
- D. Drilling, Punching, and Reaming: Hole burning to make or enlarge previous holes is allowed only with prior approval. Prepare required holes in structural steel members for attachment or passage of Work of other trades. Where allowed, steel may be punched 1/16" larger than the nominal diameter of the bolt when thickness of the steel is equal to or less than the diameter of the bolt plus 1/8", the holes shall be sub-drilled or sub-punched and reamed. The diameter for sub-drilled or sub-punched holes shall be 1/16" smaller than the nominal diameter of bolt to be installed. Precisely locate finished holes to ensure passage of all bolts through steel assemblies without drifting. Enlarge holes only be reaming. Poor matching of holes is cause for rejection.
- E. Holes for Anchor Bolts: Punch or drill the holes in base and bearing plates. Do not make or enlarge the holes by burning except for grouting holes in column bases.
- F. Base Plates: Press or mill column base plates for a straight contact bearing between plate and column.
- G. Gas Cutting: Use of a cutting torch is allowed where the metal being cut is not stressed during the operation and provided stresses are not transmitted through a flame-cut surface. Make gas cuts with a smooth regular contour. Deduct 1/8" from the width of gas cut edges to determine the effective width of members that are gas cut. Make the radius of reentrant gas cuts as large as possible; 1" minimum.
- H. Welding: Conform to AWS D1.1, as modified by referenced AISC Standards and as indicated or noted on the Drawings. Weld structural steel joints by the shielded electric-arc method unless otherwise shown / specified or MIG approved.
  - 1. The welders and welding operators shall be thoroughly trained and experienced in arc / MIG welding and be certified within the preceding 12-month period in accordance with the procedures specified in the AWS Code. Appropriate evidence of such certification shall be submitted to the Architect. Employ certified welding operators who are thoroughly trained to produce uniformly reliable groove and fillet welds in flat, vertical and overhead positions and make neat and consistent welds.

2. Weld Finishing: Grind exposed welds subject to contact to smooth surfaces free of holes, slag or other defects, flush with the adjoining surfaces. No finish treatment is required for permanently concealed welds and other exposed welds.
3. Storage and Care of Electrodes: Coatings of low-hydrogen type electrodes shall be thoroughly dry when used. Use electrodes as taken from hermetically sealed packages within 4 hours of the time the package is opened. Electrodes not used within this 4 hour period and electrodes that have been exposed more than one hour to air having a relative humidity of 75% or greater shall be dried for at least two hours at a temperature of 200 to 250 degrees F before they are used or shall be reconditioned according to the manufacturer's recommendations. Electrodes so dried or reconditioned not used within 4 hours after drying is completed shall be re-dried before use. Electrodes of any class that have been wet shall not be used under any conditions.
4. Cutting:
  - a. A cutting torch may be used where the metal being cut is not carrying stress and where such cuts are smooth and regular in contour. To determine the effective width of the members so cut, 1/8" shall be deducted from the width of the gas-cut edges. Make the radius or re-entrant of the gas-cut fillets as large as possible but never less than 1". A gas-cutting torch shall not be used to cut bolt holes or to align unfair holes.
  - b. Members and connection pieces that are to be coped, trimmed, shaped or otherwise cut in the field to permit welding shall be done with a gas-cutting torch by workers experienced in accurate flame cutting. Care shall be taken to avoid cutting or damaging adjoining metal that is not intended to be cut, to avoid burning the metal along the cut face. No flame cutting shall be done without the approval of the Architect.
5. Shop Lamination Testing: Prior to welding, ultrasonically test column materials greater than 1-1/2" in thickness for laminations within 12" (6" on each side) of a direct groove weld from column splices and girder flange connections. Conform to the ultrasonic testing procedures specified under "Field Quality Control" hereinafter.
6. Preparation: Clean surfaces to be welded of paint, grease, oil, mill scale and all foreign matter. Clean weld each time the electrode is changed. Chip entire surface of hand guided and controlled flame cut edges before welding. Surfaces prepared with automatic or mechanically guided and controlled equipment need not be ground or chipped before welding.
7. Procedures: During assembling and welding, hold components of a built-up member with adequate clamps or other means to keep parts straight and in close contact. Do no welding in wind until adequate protective screening has been set up. Cut out defective welds or parts of welds with a chisel or air arc and replace. Completed members shall be straight and free of twists, bends, buckling and open joints.
8. Characteristics of Welds: Completed welds shall be wire brushed and shall show uniform section, smoothness of welded metal, feather edges without undercuts or overlays and freedom from porosity and inclusions. Visual inspection at edges and ends of fillet welds shall show good fusion and penetration into base metal.

9. Hold residual stresses and distortions from any cause to a practical minimum by the application of proper procedures and sequences to the welding operations. Do no welding in wind until adequate protective screening has been set up. Cut out defective welds or parts of welds with a chisel or air arc and replace.
10. The effective length of any segment of intermittent fillet welding shall be at least 4 times the weld size or at least 12" long. The size of all structural fillet welds shall be at least 3/16".
11. Spot welding will be permitted for minor details in which the welds do not transmit working stresses.
12. Cut out and replace defective welds or the rejected parts of welds.
13. All welds upon completion shall be wire brushed to clean off flux and spatter, leaving welds clean and bright for inspection.

### 2.03 FABRICATION REQUIREMENTS - Architecturally Exposed Structural Steel (AESS)

- A. Fabricate and assemble AESS in the shop to the greatest extent possible. Locate field joints in AESS assemblies at concealed locations or as approved by the Architect. Detail AESS assemblies to minimize field handling and expedite erection.
- B. Fabricate AESS with exposed surfaces smooth, square and of surface quality consistent with the approved mock up. Use special care in handling and shipping of AESS both before and after galvanizing.
- C. In addition to special care used to handle and fabricate AESS, employ the following fabrication techniques
  1. Fabrication Tolerance: Fabricate steel to one half the normal tolerances as specified in the "Code of Standard Practice Section 10".
  2. Welds ground smooth: Fabricator shall grind welds of AESS smooth. For groove welds, the weld shall be made flush to the surfaces each side and be within +1/16", -0" of plate thickness.
  3. Contouring and blending of welds: Where fillet welds are indicated to be ground-contoured, or blended, oversize welds as required and grind to provide a smooth transition and to match profile on approved mock-up.
  4. Continuous Welds: Where welding is noted on the drawings, provide continuous welds of a uniform size and profile.
  5. Minimize Weld Show Through: At locations where welding on the far side of an exposed connection occurs, grind distortion and marking of the steel to a smooth profile with adjacent material.
  6. Coping and Blocking Tolerance: Maintain a uniform gap of 1/8" ± 1/32" at all copes and blocks.
  7. Joint Gap Tolerance: Maintain a uniform gap of 1/8" ± 1/32".
  8. Piece Marks Hidden: Fabricate such that piece marks are fully hidden in the final structure or made with such media to permit full removal after erection.
  9. Mill Mark Removal: Fabricator shall deliver steel with no mill marks (stenciled, stamped, raised etc) in exposed locations. Mill marks shall be omitted by cutting of mill material to appropriate lengths where possible. Where not possible, the fabricator can fill and/or grind to a surface finish consistent with the approved mock up.

10. Grinding of sheared edges: Fabricator shall grind all edges of sheared, punched or flame-cut steel to match approved mockup.
11. Rolled Members: Member specified to be rolled to a final curved shape shall be fully shaped in the shop and tied during shipping to prevent stress relieving. Distortion of the web or stem, and of outstanding flanges or legs of angles shall be visibly acceptable to the Architect from a distance of 20' under any lighting condition determined by the Architect. Tolerance for the vertical and horizontal walls of rectangular HSS members after rolling shall be the specified dimension +/- 1/2".
12. Seal weld open ends of round and rectangular hollow structural section with 3/8" closure plates. Provide continuous, sealed welds at angle to gusset-plate connections and similar locations where AESS is exposed to weather

#### 2.04 SHOP CONNECTIONS

- A. Bolted Connections: Provide bolt type and finish as noted herein and align bolt heads as indicated on the approved shop erection drawings.
- B. Weld Connections: Comply with AWS D1.1. Appearance and quality of welds shall be consistent with the mock up. Assemble and weld built-up sections by methods that will maintain alignment of members without warp exceeding the tolerance of this section.

#### 2.03 SHOP PRIMING AND TOUCH-UP

Do not prime concealed structural steel or steel to be embedded in concrete or mortar. Do not paint surfaces scheduled to receive sprayed-on fireproofing.

#### 2.04 GALVANIZING

Items shown on the plans to be galvanized and bolts for the same shall be hot dip zinc coated after fabrications. Galvanizing shall be done in accordance with ASTM A123. Any zinc coating that is damaged during erection and/or welding shall be touched up in conformance with cold galvanizing compound

### 3.00 EXECUTION

#### 3.01 FIELD CONDITIONS

Verify drawing dimensions with actual field conditions. Inspect related work and adjacent surfaces. Report to the Architect all conditions that prevent proper execution of this Work.

#### 3.02 EXAMINATION

The erector shall check all AESS members upon delivery for twist, kinks, gouges or other imperfections which might result in rejection of the appearance of the member. Coordinate remedial action with fabricator prior to erecting steel.

#### 3.03 ERECTION OF STRUCTURAL STEEL

- A. General:
1. Employ qualified riggers and plan erection to require minimum cutting. Erect members plumb, true to line and level, in precise positions and erected in its proper sequence. Provide temporary bracing and guying to resist loads and stresses to which the structure may be subjected, including those due to erection equipment and its operation. Brace and secure structural steel completely plumb until permanent connections are completed. Provide accessories and fasteners to secure steel in place as indicated and required. Conform to Code, AISC Standards and the erection and bracing plan and procedure.
  2. Remove all temporary bracing when field connections of structural members are complete and are properly supported by other portions of the structure.
  3. The equipment used on the work of this Section shall be of sufficient capacity and suitable design to erect properly, easily and safely all parts of the structural steel frame without overloading any parts of the equipment of stressing or deflecting any structural steel member.
  4. Remove all protecting weld back-up, erection clips, lifting tabs and similar items so as to extend no more than 2" past the main member to which they are attached.
- B. Temporary Shoring and Bracing: Provide temporary shoring and bracing members with connections of sufficient strength to bear imposed loads. The temporary bracing shall be designed and erected to fully accommodate all erection loads and stresses, all construction loads, all dead and live loads and all wind loads. Shoring shall be provided where noted on the structural drawings, and as required. Remove temporary members and connections when permanent members are in place and final connections are made. Provide temporary guy lines to achieve proper alignment of structures as erection proceeds.
- C. Damaged Members: During erection, straighten or replace members which are bent, twisted or damaged as directed. If heating is required perform the heating by methods that ensure a uniform temperature throughout the entire member. When directed, remove the members that are damaged to an extent impairing appearance, strength or serviceability and replace with new members at no extra cost to the District.
- D. Anchor Bolts: Furnish and deliver with setting drawings and templates. Verify position of bolts prior to delivery of steel; report all errors or deviation for correction.
- E. Setting Bases and Bearing Plates: Clean concrete and masonry bearing surfaces of bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of base and bearing plates.
1. Set loose and attached base / bearing plates for structural members / columns in their exact position, both as to alignment, height, plumb and straight, supported on adjustable bolt supports, shims, wedges or other adjusting devices. Set center of base true to column center within 1/16" and adjust height exactly.
  2. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush

- with edge of base or bearing plate prior to packing with grout. Maintain bases at exact position and level during grouting.
3. Pack non-shrink grout solidly between bearing surfaces and base plates to ensure that no voids remain. Finish exposed surfaces, protect installed materials and allow to fully cure.
- F. Holes:
1. Install all bolts in punched or drilled holes accurately spaced to the centers indicated on the Drawings. Any slight inaccuracy in matching the holes may be corrected by careful reaming; drifting of unfair holes shall not be allowed.
  2. Poorly matched, drifted or carelessly drilled holes in a member shall be cause for the rejection of the material. Each finished bolt hole shall be 1/16" larger in diameter than the nominal diameter of the bolt.
  3. Should the thickness of the steel not exceed the bolt diameter by more than 1/8", the holes may be punched. In thicker materials, the holes shall be drilled from the solid or be sub-punched and carefully reamed to the required size. All sub-punched holes shall be punched with a punch 1/4" less in diameter than the finished hole.
- G. Connections: Maintain steel in correct position during welding and bolting and provide for dead loads, wind and all erection stresses. Do no welding or final bolting until members have been aligned and plumbed within specified AISC tolerances. Splice members only where indicated and accepted on shop drawings.
1. Erection Bolts: On exposed welded construction remove erection bolts, fill holes with plug welds and grind smooth at exposed surfaces. Do not enlarge holes in members by burning or by using drift pins, except in secondary bracing members. Ream holes that must be enlarged to admit bolts.
  2. Field Welding: Conform to requirements hereinbefore specified.
  3. Common Bolts: Unfinished bolts may be used for connections where indicated on the Drawings, using required sizes with nuts drawn tight. Edge distance shall conform to reference standards. Tighten and upset bolt threads to preclude loosening or use approved self-locking nuts.
  4. High-Strength Steel Bolting: For joints connected by high strength steel bolts, hardened washers and nuts tightened to high tension, conform materials, methods of installation and tension control, type of wrenches, and inspection to the reference standards and the following requirements:
    - a. High-strength bolts shall have a suitable identifying mark placed on top of the head before leaving the factory.
    - b. Tightening of nuts shall be done by turn-of-the nut method. Minimum bolt tension for the size of bolt used shall conform to tables listed in reference specification.
    - c. Fully tightened bolts shall be marked with identifying symbol.
    - d. Hardened washers shall be installed as per AISC Standards.
    - e. Clean all contact surfaces of bolted parts and threads free of scale, slag, burrs, and pits, or dirt, paint, or other foreign material or defects which would prevent solid seating of parts. Bolt and nut threads shall be slightly oiled at installation.
    - f. Bolt lengths shall be the grip plus 1-1/4".

5. Load Indicator Washers: These washers shall conform to ASTM F959 and be manufactured and licensed by Cooper and Turner or Bethlehem Steel and may be used for the field installed high-strength bolts. Load indicator washers may not be substituted for any required washer but may be used in conjunction with the required washers. Conform tightening to Paragraph 5e of the Joint Reference Spec. After sufficient bolts in a joint are snugged to bring the members into close contact, tightening shall progress from most rigid part to the free edges until the load indicators on all bolts are closed to the required gap of 0.015" under bolt heads or 0.010" under nuts. Do not completely close the gap to prevent over-tightening and damage to the bolts.
  6. Tension Set Bolts, Nuts, and Washers: These assemblies manufactured by Cold Form Specialties or Bethlehem Steel may be used for the field installation of the high-strength bolts. In multi-bolt joints, the nuts shall be tightened in stages (a little at a time) without breaking the spline in any of them until final stage, to minimize slackening of the installed bolts. Bolt and nut threads shall be clean, oiled and free of rust.
- H. Tolerances: Erect members to tolerances conforming to referenced AISC Standards and Code.
1. Vertical Dimensions: Measured from top of beams at their connections at any column, variation not more than 1/4" plus or minus per story or when variations are accumulative from floor to floor, not exceeding 3/8" per story exclusive of column shortening due to dead load.
  2. Plumb Displacement: Center line of columns from established column line, no more than 1" toward or away from established center line.
  3. Floor Elevation: Will be considered level if floor framing members on any one floor measured from top of column connections do not vary more than 1/2" plus or minus.
  4. Horizontal Dimension Variance: Governed by column plumb displacement.
- I. Gas Cutting: Do not use gas-cutting torches in field for correcting fabrication errors in primary structural framing. Cutting will be permitted only on secondary members that are not under stress, as acceptable to the Architect. Finish gas-cut sections equal to a sheared appearance when permitted.
- J. Touch-up Galvanizing: Immediately after erection / welding, clean field welds, bolted connections and abraded areas hot dip galvanized by wire brush to remove all burned off hot dip zinc coating and all weld scale and splatter. Apply cold galvanizing compound to exposed areas using specified material or approved equal repair compound that will match in appearance and protection, as the shop galvanizing. Apply by brush or spray to provide the same minimum dry film thickness of adjoining surfaces.

#### 3.04 ERECTION – Architecturally Exposed Structural Steel (AESS)

- A. Set AESS accurately in locations and to elevations indicated, and according to AISC specifications referenced in this Section.
- B. In addition to the special care used to handle and erect AESS, employ the following erection techniques

1. AESS Erection tolerances: Erection tolerances shall meet the requirements of standard frame tolerances for structural steel per Chapter 7 of the AISC Code of Standard Practice.

OR

1. AESS Erection Tolerances: Erection Tolerances shall meet the requirements of Chapter 10 of the AISC Code of Standard Practice.
  2. Welds ground smooth: Erector shall grind welds smooth in the connections of AESS members. For groove welds, the weld shall be made flush to the surfaces of each side and be within + 1/16", -0" of plate thickness.
  3. Contouring and blending of welds: Where fillet welds are indicated to be ground contoured, or blended, oversize welds as required; grind to provide a smooth transition and to match profile on approved mock-up.
  4. Continuous Welds: Where noted on the drawings, provide continuous welds of a uniform size and profile.
  5. Minimize Weld Show Through: At locations where welding on the far side of an exposed connection occurs, grind distortion and marking of the steel to a smooth profile with adjacent material.
  6. Bolt Head Orientation: All bolt heads shall be oriented as indicated on the contract documents. Where bolt-head alignment is specified, the orientation shall be noted for each connection on the erection drawings. Where not noted, the bolt heads in a given connection shall be oriented to one side.
  7. Removal of field connection aids: Run-out tabs, erection bolts and other steel members added to connections to allow for alignment, fit-up, and welding in the field shall be removed from the structure. Field groove welds shall be selected to eliminate the need for backing bars or to permit their removal after welding. Welds at run-out tabs shall be removed to match adjacent surfaces and ground smooth. Holes for erection bolts shall be plug welded and ground smooth.
  8. Filling of weld access holes: Where holes must be cut in the web at the intersection with flanges on W shapes and structural tees to permit field welding of the flanges, they shall be filled.
- C. Field Welding: Weld profile, quality, and finish shall be consistent with mock-ups approved prior to fabrication.
- D. Splice members only where indicated.
- E. Obtain permission for any torch cutting or field fabrication from the Architect. Finish sections thermally cut during erection to a surface appearance consistent with the mock up.
- F. Do not enlarge unfair holes in members by burning or by using drift pins. Ream holes that must be enlarged to admit bolts. Replace connection plates that are misaligned where holes cannot be aligned with acceptable final appearance.

### 3.05 FIELD CONNECTIONS – Architecturally Exposed Structural Steel (AESS)

- A. Bolted Connections: Install bolts of the specified type and finish.
- B. Welded Connections: Comply with AWS D1.1 for procedures, and appearance.



1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without warp. Verify that weld sizes, fabrication sequence, and equipment used for AESS will limit distortions to allowable tolerances.
2. Obtain Architects approval for appearance of welds in repaired or field modified work.

### 3.06 QUALITY CONTROL

- A. The District will engage an independent testing and inspection agency to inspect high strength bolted connections, welded connections, including grouting under base plates and perform tests and prepare test reports.
  1. Testing agency shall conduct and interpret tests, state in each report whether test specimens comply with requirements and specifically state any deviations.
  2. Provide access for testing agency to places where structural steel work is being fabricated or produced so that required inspection and testing can be accomplished.
  3. Testing agency may inspect structural steel at plant prior to shipping.
  4. The Testing Laboratory shall inspect all shop multi-pass welds and all welds of rigid frames or braced frame connections, and inspect all field welding and high-strength bolting. Completed work shall conform to requirements of AISC and CBC and Building Department.
- B. Correct deficiencies in structural steel work that inspections and laboratory test reports have indicated to be not in compliance with requirements. Perform additional tests at Contractors expense as necessary to reconfirm any noncompliance of original work and to show compliance of corrected work.
- C. Shop Bolted Connections: Inspect and test in accordance with specifications. (with DSA approval) Verify that gaps of installed Direct Tension Indicators are less than gaps specified in ASTM F959, Table 2.
- D. Shop Welding: Verify welding certifications or provide certification of welders, conduct inspections and test as required. Record types and locations of defects found in work. Record required work and perform correction to noted deficiencies. Perform visual inspection of all welds. Perform Magnaflux inspection on MIG welding. Perform tests of welds by Ultrasonic Inspection in compliance with ASTM E164.
- E. Inspection of Field Bolted Connections / High-Strength Bolts: The Testing Laboratory shall check the bolt tightness on a minimum 10% of bolts selected at random for each high-strength bolted joint. Inspect all bolts of rigid frame or braced frame connections. Inspect in accordance with AISC specifications.
- F. Inspection of Field Welding: Verify welding certifications, provide certification of welders, conduct inspections and tests as required. Record types and locations of defects found in the work. Record work required and performed to correct deficiencies. Perform visual inspection of all welds. Perform Magnaflux inspection on MIG welding. Perform tests of welds by Ultrasonic Inspection in compliance with ASTM E164.

- G. Inspection of Groove Welds: Testing Laboratory shall inspect all groove welded connections of column to column, girder to column, girder to girder and like connections by ultrasonic or other approved non-destructive tests. Conform to Building Department requirements for re-inspection of welds after installation.
1. Ultrasonic Testing shall be performed by a specially trained and qualified technician who shall operate the equipment, examine welds, and maintain a record of welds examined, defects found and disposition of each defect. All defective welds shall be repaired and costs for retesting defective welds shall be paid by the Contractor.
  2. Ultrasonic Instrumentation shall be calibrated by a technician to evaluate the quality of the welds in accordance with AWS D1.1, Sections 5 and 6.
  3. Special Requirements: See drawing for special requirements at seismic critical welds.
  4. Rate of Testing: All welds requiring ultrasonic testing shall be tested at a 100% rate.
  5. Backing Strips: Contractor shall remove backing strips and shall bear the cost of backing strip removals.
- H. AESS Acceptance: The Architect shall observe the AESS steel in place and determine acceptability based on the mockup(s). The Testing Agency shall have no responsibility for enforcing AESS requirements.

### 3.07 ADJUSTING AND CLEANING

Cleaning and touchup field welds, bolted connections, and abraded areas of galvanizing shall be completed to blend with the adjacent surfaces of AESS. Touch up work shall be done in accordance with cold galvanizing compound manufacturer's instructions.

END OF SECTION

1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division 1 apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Roof steel deck units.
  - 2. Bearing plates, angles and supports at columns.
  - 3. Bent plate closures at decking edges, openings and pour spots.
  - 4. Openings through decking including reinforcing.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 03300: Concrete and Concrete Finish
- B. Section 05100: Structural Steel
- C. Section 05500: Miscellaneous Steel
- D. Section 07255: Cementitious Fireproofing

1.03 REFERENCE STANDARDS

- A. American Iron and Steel Institute (AISI)
- B. American Society for Testing and Materials (ASTM)
  - ASTM A36 Standard Specification for Structural Steel.
  - ASTM A570 Hot-Rolled Carbon Steel Sheet and Strip, Structural Quality.
  - ASTM A611 Carbon, Cold Rolled Sheet, Structural Quality.
  - ASTM A653 Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
- C. American Welding Society (AWS)
  - AWS D1.1 Structural Welding Code.
  - AWS D1.3 Specification for Welding Sheet Steel in Structures.
- D. Steel Deck Institute (SDI)
- E. California Building Code (CBC)

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Shop Drawings:
  - 1. Indicate type of deck units, anchorage, details, conditions requiring closure strips, supplementary framing, cut openings, special joining, finish, gage of metal where located, arrangement of sheets, necessary fabrication to incorporate decking into project and correlation with other

2. required openings and flashings.
  2. Prepare decking shop drawings using approved shop drawings of the supporting members showing supporting structural members.
  3. Show locations and details of all deck accessories and closures.
  4. Submit welding procedure specifications
- C. Calculations and Data: Provide comprehensive manufacturer's descriptive data including specifications and installations recommendations. If steel decking is of type differing from that indicated or specified, submit the proposed manufacturer's calculations and supporting data showing conformance to requirements. Include all technical product data, physical properties, load tables and copies of code approvals. Obtain approval prior to fabrication and delivery.

#### 1.05 QUALITY ASSURANCE

- A. Qualification of Welders: Certify in compliance with CBC / DSA code requirements and testing laboratory certification.
- B. Fire Ratings: Obtain UL, (DSA) and Building Department approval of the decking when used as part of an assembly when fire resistive construction ratings are required / indicated on the drawings.
- C. FM: Loss Prevention Data Sheet 1-28.
- D. Tests and Inspections:
1. Procedures: Refer to Section 01425
  2. Fabricator's identification:
    - a. Steel identified by the fabricator will be acceptable without further testing provided the identification system has been previously established and on record prior to fabrication.
    - b. The fabricator shall furnish sufficient evidence to DSA and to the testing laboratory, and the testing laboratory shall file with the District an acceptable affidavit attesting to compliance.
  3. Unidentifiable Steel: Testing is required for steel which is not readily identifiable as to grade from markings and test records to determine conformity to specified standards. If testing is required, provide all specimens required by testing laboratory as part of work of this Section.
  4. Contractor shall pay all costs in connection with inspection of identifiable and unidentifiable steel.
  5. Welding:
    - a. Testing laboratory shall verify welding operator qualifications, welding operations and welds. Welders shall be currently qualified by tests as prescribed in AWS D1.1.
    - b. Continuous inspection of all welding will be performed by DSA project inspector the District's testing laboratory special / deputy inspector. Contractor will be required to remove and re-weld questionable / defective connections.
    - c. Visually inspect all connections in field to determine quality, size and compliance with reviewed erection drawings.
    - d. Testing laboratory / special inspector shall certify in writing to the District and DSA at completion of Work, that welding is complete and performed in accordance with contract / code requirements

and applicable standards.

## 1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

Deliver, store and handle metal decking in such a manner that will not damage or deform. Do not damage or overload decking during construction, or use decking for storage or as a working platform until sheets have been welded in position. Stack decking at site before installation on platforms or pallets and protect from weather.

## 2.00 PRODUCTS

### 2.01 MANUFACTURE

Provide product as manufactured by Verco, per ICC #ER 2078P, or equal, by members, in good standing, of Steel Deck Institute (SDI).

### 2.02 DESIGN CRITERIA

Compute the properties of deck sections on the basis of the effective design width as limited by the provisions of AISI specifications. Provide not less than the deck section properties specified, including modulus of elasticity and moment of inertia per foot of width.

### 2.03 MATERIALS

- A. Metal Decking: Roll-formed sheets conforming to ASTM A653, Grade 33 with G90 zinc coating, minimum yield strength of 33,000psi.
  - 1. Provide smooth finish metal decking without indentations, embossments or venting slots on flanges and webs.
  - 2. Refer to Drawings for structural requirements and types.
- B. Bearing Plates and Angles: ASTM A36 steel welding materials.
- C. Metal Flashing and Closures: Provide minimum 22-gage sheet metal (unless indicated otherwise) with G90 galvanized zinc coating conforming to ASTM A653, unless indicated otherwise.
- D. Shear Connectors: Headed stud type, ASTM A108 Grade 1015 or 1020, cold finished carbon steel with dimensions complying with AISC specifications and drawing details.
- E. Galvanizing Repair Material: Z.R.C. "Cold Galvanizing Compound", All States Galvanizing Powder, "Drygalv" by American Solder and Flux, 74-S27 by the Sherwin-Williams Co., Tneme-Zinc by Tnemec Co., or equal, repair material, or anodic zinc-rich galvanizing repair paint. (Conform to Mil Spec DOD-P-21035.)

### 2.04 FABRICATION

- A. Fabricate metal decking in accordance with the SDI to accommodate maximum working stress of 20,000psi and maximum span deflection of L/360.
- B. Wherever practicable, provide decking in lengths to span over three or more

supports, with flush telescoped or nested 2 inch laps at ends and interlocking or nested side laps of metal thickness, depth and width as indicated.

- C. Except as detailed otherwise, provide all decking with interlocking side laps, 2-1/4" minimum end bearing and 1-1/4" minimum side bearing.
- D. Steel deck manufacturer shall supply decking free of lubricants, oils or metal shaving.
- E. Priming: None required.

### 3.00 EXECUTION

#### 3.01 FIELD CONDITIONS

Verify drawing dimension with actual field conditions. Inspect related work and adjacent surfaces. Report to the Architect all conditions that prevent proper execution of this Work.

#### 3.02 ERECTION

- A. Erect metal decking in accordance with the decking manufacturer's recommendations, requirements of the Drawings, approved shop drawings and specifications.
- B. Place metal decking on the supporting steel framework and adjust to final position permanently fastening in place.
  - 1. Bring each unit to proper bearing on the supports.
  - 2. Place units in straight alignment for entire length of run of cells with close registration of the cells of one unit with those of abutting unit.
  - 3. Place deck units flat and square, secured to adjacent framing without warp or deflection.
  - 4. Stagger end joints of adjoining sheets.
  - 5. Coordinate and cooperate with structural steel erector in locating decking bundles to prevent overloading of structural members.
  - 6. Do not use deck units for storage or working platforms until permanently secured.
- C. Cut and reinforce units to provide openings which are located and dimensioned on the Drawings.
- D. Provide openings required for work of other trades and which are not indicated on Drawings only upon approval of the Architect and DSA as to size, location and reinforcement.
- E. Fasten decking to supports at ends of units and at intermediate supports. Weld as shown on the structural drawings. Make all plug / puddle welds with 1/2 inch effective diameter at 12"oc, minimum.
- F. Fasten side laps between supports as indicated on Drawings.
- G. Perform all field cutting parallel with the cells in the area between the cells taking

care to leave sufficient horizontal material to permit satisfactory welding to supporting steel. Clean all other galvanized surfaces that are damaged or abraded by welding during erection. Coat damaged surfaces with a zinc-rich coating.

- H. Metal Flashings and Closures
  - 1. Weld in position all sheet metal closure flashings, closure angles, closure plates, profile plates and shear plates.
  - 2. Close open ends of all cell runs at openings, walls, similar interruptions and terminations.
- I. Welding:
  - 1. Make welds which are to be watertight continuous and free from voids or cracks. Take precautions when welding to prevent heat blisters, burn-through and surface distortions.
  - 2. Use electric shielded-arc process in strict accordance with AWS standards as modified by referenced AISC standards. Use only welding operators trained and skilled in arc welding and qualified as per AWS. Grind smooth all welds exposed to view. Weld shall be free of holes, slag or other defects and flush with adjoining surfaces. No finishing treatment is required for concealed welds. Cut out and replace any defective welding.
  - 3. Clean or grind off mill scale, rust and pitting prior to any galvanizing.
- J. Shear Connections: Weld shear-connectors to supports through decking units in accordance with manufacturer's instructions. Do not weld shear connectors through two layers (lapped ends) of decking units. Weld only on clean, dry deck surfaces.
- K. Field Galvanizing Repair: Wire brush welds and damaged coating to clean bright metal. Apply one coat of galvanizing repair paint. Use the specified galvanizing repair compound where surfaces remain exposed and unpainted.
- L. Corrosion Protection of Dissimilar Materials: Protect surfaces that are in contact with concrete or masonry, or contact surfaces of dissimilar metals for all interior and exterior work and decks by coating the contact surfaces of each with two heavy coats of bituminous paint or by suitable isolation gaskets as approved and as applicable for each condition. Do not extend coating onto exposed surfaces.

END OF SECTION





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## 1.00 GENERAL

### 1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to the work of this section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Load bearing light steel stud framing systems for support of exterior cladding.
  - 2. Component framing members including runners, tracks, clips, angles, stiffeners, backing, furring and bracing.
  - 3. Framing attachments, accessories, screws, anchor bolts

### 1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 05300: Metal Decking
- B. Section 05500: Miscellaneous Metal
- C. Section 09235: Exterior Sheathing

### 1.03 REFERENCE STANDARDS

- A. California Building Code, CBC Chapter 22 (A)
- B. American Society for Testing and Materials (ASTM).
  - ASTM C645 Standard Specification for Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.
  - ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process.
  - ASTM C955 Standard Specification for Load Bearing (Transverse and Axial) Steel Studs, Runners (Track) and Bracing or Bridging for Screw Application of Gypsum Board and Metal Plaster Base.
  - ASTM C1007 Standard Specification for the Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories.
- C. American Iron and Steel Institute (AISI)  
"Specification for the Design of Cold-Formed Steel Structural Members."
- D. American Welding Society (AWS) - Structural Welding Code (D1.1)  
Specification for Welding Sheet Steel in Structures (E1.3)
- E. Steel Stud Manufacturer's Association SSMA
- F. International Code Counsel (ICC) Evaluation Report (ER) 4943P
- G. Federal Specifications (Fed Spec.)  
FF-P-395 Pin, Drive, Guided and Pin Drive, Power Activated (Fastener for

FF-S-325 Power Activated and Hand Activated Fastener Tools)  
Shield, Expansion; Nail, Expansion; and Nail, Drive Screw  
(Devices, Anchoring Masonry).

#### 1.04 SUBMITTALS

- A. Provisions: Comply with Section 01340.
- B. Submit manufacturer's technical product data indicating all materials, gages, sizes, strength and protective coating / finishes for all framing and furring members. Include ICC evaluation report (ER-4943P) approval or current test data and manufacturers recommended load capacity table charts for each different section profile proposed. Submit fastener manufacturer's current ICC report. Power or power driven fasteners shall not be used, except as detailed on the plans.
- C. Shop Drawings: Indicate selection of framing components and accessories, shop coatings and steel thickness. Indicate details of fabrication, details of attachment, fasteners, spacing and installation of accessories.
- D. Samples: Framing component parts and accessory pieces shall be 12 inches long and tagged with name of part and manufacturer.
- E. Submit welding procedure specifications

#### 1.05 REQUIREMENTS

- A. Steel stud wall systems shall be designed to resist the basic load combinations specified in the referenced standards. The nominal shear value used to establish the allowable shear value or design shear value (Load and Resistance Factor Design), for wind and seismic loads shall be determined using established load and safety factors as set forth in Section 2219A Tables 22A –VIII-A-C.
  - 1. All boundary members, chords, collectors and connections thereto shall be proportioned to transmit the induced forces. Design to develop the full tensile strength of the member, or factor of safety times the otherwise prescribed seismic force.
  - 2. Framing members shall be of a minimum size, shape and of a minimum specified yield stress as listed.
  - 3. Fasteners between framing members and between the panels and the framing members shall be as specified. The fasteners along the edges in shear panels shall be placed not less than 3/8 inch in from panel edges. Screws shall be of sufficient length to ensure penetration into the steel stud by at least two full diameter threads.
  - 4. Vertical and diagonal members of the braced bay shall be anchored so that the bottom track is not required to resist uplift forces by bending of the track web.
  - 5. Both flanges of studs in a bracing panel shall be braced to prevent lateral torsional buckling. Wire tied bridging shall not be considered to provide such restraint.
  - 6. Screws shall not be used to resist lateral forces by pullout resistance.
  - 7. Provisions shall be made for pretensioning or other methods of installation of tension-only bracing to guard against loose diagonal straps.

8. Welded attachment connection / fastening of stud wall systems to previously placed steel embeds in the structure or continuous structural steel member(s) shall be fully detailed on the shop / erection drawings and perform by AWS certified welders.
- B. Steel studs, tracks and accessories shall be manufactured by a SSMS member. See ICC ER 4943-P for allowable joist spans, stud heights and general framing load characteristic requirements.

#### 1.06 QUALITY ASSURANCE

- A. Metal framing system design and installation must conform to AISI Specifications and in conformance with CBC Sections 1612 A/1613 A, 2209 A and 2210 A . Coordinate referenced design data and tables for structural properties and strength determination considerations for load, shear, tension, spacing, bracing and fastening criteria. Nominal shear values shall be multiplied by the appropriate strength reduction factor, to determine design strength or divided by the appropriate safety factor to determine allowable shear values as set forth in the code.
- B. Steel studs shall be installed plumb and true with full bearing of the proper gage, size and spacing as designed in conformance with drawings and calculations. Framing tolerances in excess of 3/16 inch in 10'-0" from square are not acceptable.
- C. Bearing of studs, use of reinforcement clip angles, stiffeners, bridging, bracing, etc. shall be aligned, anchored, fastened, connected, etc., to insure that proper uniform distributed concentrated, compressive, axial or lateral and construction loads are anticipated and specifically addressed in the design calculations.
- D. Steel studs shall not be spliced unless specifically detailed. Bridging shall be installed per manufacturer's recommendations. Tracks shall be deep-leg and unpunched.
- E. All fasteners shall be as designed for the specific applications. Verify number and size of fasteners. Connections shall be accomplished with self-drilling screws or welding so that the connection meets or exceeds the design loads required at that connection.
- F. Welding shall be in conformance with CBC Section 2204 and AWS D1.3. Field abrasions and welds shall be touched-up with approved galvanizing repair
- G. Attachments of ornaments such as precast concrete and veneer shall not cause the exterior stud wall framing to deflect more than the specified tolerances.
- H. Fire Rated Assemblies: Where framing units are components of assemblies indicated for a fire-resistance rating; provide units which are listed in the current UL "Fire resistance Directory" and that have been approved by the State Fire Marshall.
- I. Pre-installation Conference: Before beginning installation of the metal framing systems hold a conference with representatives of the installers of metal framing

systems, door frames, plaster, gypsum board, mechanical and electrical construction, Contractor, District's representative and Architect in attendance. The conference shall assure a clear understanding of the drawings and specifications to resolve any possible conflicts and establish coordination between all parties involved.

#### 1.07 ANCHORAGE TO CONCRETE REQUIREMENTS

- A. Power Driven Shot Pins – Low Velocity:
  - 1. Powder-activated fasteners / anchors may not be shot or drilled into slabs without the prior written permission by the Architect/Structural Engineer, as to type and size of fastener and proposed location, unless indicated otherwise on the drawings. Operators shall be certified in accordance with California Industrial Safety Orders.
  - 2. Shot pins may be used for shear loads and they may be used in tension to support loads less than 100 pounds for minor loads. Any shot anchors must have ICC approval for the type of concrete used on the job. Shot pins may not be used in concrete curbs.
  - 3. The allowable loads shall be 100 pounds or 80% of ICC approved values, whichever is less. Qualification for use of all power-actuated tools must meet ANSI A10.3 standard as required by the manufacturer and all OSHA requirements.

#### 1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials with manufacturers identifying labels intact, affixed and legible. All steel sections shall have permanent recognized labeling.
- B. Store materials off ground in a dry and well ventilated area covered and protected from physical damage. Support in a manner that will prevent deflection set.
- C. Remove rejected items from the site that are bent, warped, dented or otherwise damaged and/or units exhibiting rusting or other damage to the finish not repairable by minor and conventional field touch-up procedures.

### 2.00 PRODUCTS

#### 2.01 STEEL STUDS

- A. Products of Cemco, ClarkWestern Building Systems, Consolidated Fabricators, Design Shapes In Steel, Dietrich Industries, NEXFRAME, Steeler Inc, United Metal Products, United Steel Manufacturing, or equal.
- B. All studs, runners (track), bracing and bridging shall be manufactured per ASTM C955. Studs shall be a minimum 1-5/8" by 3-1/2" with a 3/8" return lip. Track shall be a minimum 1-1/4" by 3-1/2". Both studs and track shall have a minimum uncoated base metal thickness of 0.033 inch.
- C. Minimum stud size shall be 4" x 18 gage galvanized 'C' stud at maximum 16"oc except as noted on the structural drawings. All assembly studs shall be minimum 16 gage galvanized material.

- D. All galvanized studs and track 12, 14, and 16 gage shall be formed from steel that conforms to the requirements of ASTM A446 Grade D/50 (50ksi), except 16 gage track and all other members shall be formed from Grade A/33 (33ksi).
- E. All galvanized 18 gage studs, joists and all other members shall be formed from steel that conforms to ASTM A653, Grade B/37 with a minimum yield of 37ksi. All galvanized 18 gage track and 20 gage studs, joists and track, bridging, end enclosures and accessories shall be formed from steel conforming to ASTM A653, Grade A/33 with a minimum yield of 33ksi.
- |                   |                               |        |
|-------------------|-------------------------------|--------|
| 18GA and lighter  | ASTM A653 SS or ASTM A1011 SS | 33 KSI |
| 16 GA and heavier | ASTM A653 SS or ASTM A1011 SS | 50 KSI |
- F. All galvanized studs, tracks, bridging and accessories shall be formed from steel having a G60 galvanized coating meeting the requirements of ASTM A653.
- G. Top Runner Slotted Track: Provide a deep legged slotted track with slots that allow for both upward and downward overall movement (minimum 1 inch, 2" plus/ 2" minus) of the structure without adversely affecting the positive attachment of the framing members up to one inch of deflection. Member shall be used in lieu of a double track system. Track shall be provided in standard widths and gage sheet steel thickness as required by project conditions. Down standing legs shall be nominally 2-1/2 inches and shall be provided with 1/2" slots at 1 inch on center. Fire tested assemblies shall have U.L. and Warnock Hersey report approvals and conformance with reference standards. Manufactured by Slip-Track Systems, Inc., Fire Trak Corp. or approved equal.
- H. Backing Plates: Galvanized 3/16" thick steel, of proper size to accommodate fastenings, welded to steel studs. Verify exact requirements with work of other sections.
- I. Furring channels 1/2" and 3/4", as required, cold rolled steel weighing not less than 475 lbs. and 300 lbs. per 1,000 lineal feet, respectively.
- J. Screws: (Hilti Fastening Systems, Ramset Fastening Systems, or equal) Self-tapping screws with 0.08 – 0.25inch diameter. Screws shall be thread forming or thread cutting, with or without a self-drilling point. Screws shall be installed and tightened in accordance with the manufacturer's recommendations. Framing screws shall be No. 8 by 5/8 inch (16 mm) wafer head self-drilling. Structural I sheathing screws shall be approved and shall be a minimum No.8 x 1-inch (25 mm) flat head with a minimum head diameter of 0.292inch (7.4 mm).
1. Minimum Spacing: The distance between centers of fasteners shall not be less than 3d.
  2. Minimum Edge and End Distance: The distance from the center of a fastener to the edge of any part shall not be less than 3d. If the connection is subjected to shear force in one direction only, the minimum edge distance shall be reduced to 1.5d in the direction perpendicular
  3. Shear capacity, tension / tensile loads and pullout force of the screws shall not be less than that tested / indicated in conformance with CBC.
- K. Weld Electrodes: AWS A5.1 or 5.5, E70 conforming to ASTM A36 or A283 Series as required for intended use. Comply with AWS D1.1 for base metal / filler metal combinations unless noted otherwise in drawings, and in conformance with code

and industry requirements in order to provide the type, size and strength weld engineered.

## 2.02 FRAMING COMPONENTS

- A. Wall Framing Members: Fabricate studs and runners in accordance with ASTM C 955-88 from hot dip zinc coated steel, of thickness and depths indicated with minimum flange width of 1-1/4 inches at non-load bearing walls and 1-5/8 inches at walls with structural sheathing. Steel Stud Manufacturers Association (SSMA) "S" Studs
- B. Bridging: Un-punched channel shaped members designed for use with the studs, formed from hot dip zinc coated steel, of thickness indicated.
- C. Strapping, Lateral Bracing, Clip Angles and other Accessories: Manufacturer's standard components formed from hot dip zinc coated steel.
- D. Backing Plates: Steel, 3/16 inch thick, of proper size to accommodate fastenings.

## 3.00 EXECUTION

### 3.01 INSTALLATION

- A. General:
  - 1. Conform to rules and practices set forth in the CCR Title 2 Part 2 and AISI "Specifications for Design for Cold Formed Steel Structural Members," and with the manufacturer's printed instructions and recommendations, as applicable.
  - 2. Cut stock neat and square. Provide members free of kinks and twists. Do not use damaged or distorted materials.
  - 3. Erect straight, plumb, square, true to lines, levels or elevations indicated, free from twist or bend and braced against racking.
- B. Runner Tracks:
  - 1. Furnish in 8 feet minimum lengths except where wall lengths are shorter than 8 feet. Make tracks continuous by splicing / evenly butting in accordance with manufacturer's recommended details and as indicated on the reviewed shop drawings. Where splicing of track is necessary between stud spacing, a piece of stud shall be placed in the track fastened with two screws or welds per flange to each piece of track. Align runner tracks accurately to the partition layout at both base and tops of studs.
  - 2. Secure runner tracks as recommended by the stud manufacturer in ICC report for the floor and ceiling construction involved. Provide fasteners at all corners and ends of runner tracks. When drilled in concrete anchors or powder driven inserts are approved for use, fasten runner tracks to concrete floors with 7/32" dia. by 3/4" long Ramset stud bolts spaced 32" on center and no more than 6" from each end.
  - 3. Comply with CBC Chapter 19, for load requirements (tension / shear) performance testing and inspection criteria when anchoring to concrete.
- C. Studs:

1. Provide full-length studs in one piece, track to track without splicing. Where indicated and approved otherwise, splice studs by nesting with a minimum lap of 8 inches and fasten laps with 2 screws through each flange.
2. Frame both sides of expansion and control joints with separate stud and track configurations to accommodate the anticipated movement that the structure will experience. Do not bridge the joint with components of stud system.
3. Provide joints in support structure at all locations where there is a change in substrate materials as required by the covering finish materials in conformance with best industry standards.
4. Friction fit studs to runner tracks by positioning and rotating into place. Provide positive attachment to tracks.
5. Secure each stud to runner track at 16"oc with the proper number of stud shoes at top and bottom with either self-tapping screws or crimped to stud at both inside and outside flanges or tack-welded to runner track. Wire tying of framing components will not be permitted.
6. Studs spaced 16"oc or as required by design. Provide double studs welded together at ends, where not abutting other building parts, cased ends and at jambs and/or openings. Provide triple studs at corners. Tack-weld multiple studs together.
7. Install supplementary framing, blocking, and bracing in metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishings, and similar work requiring attachment to the wall or partition. Use backing plate of thickness specified herein and of proper size to accommodate fastenings.
8. Frame wall openings larger than 2 feet square with double stud at each jam of frame except where more than two are either indicated or recommended by the manufacturer. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with stud shoes or by welding and space jack studs same as full-height studs of wall.
9. Lateral Bracing:
  - a. Provide lateral bracing for studs as required by design. Reinforce and stiffen stud framing with 3/4" (or larger as necessary) steel channels placed horizontally not more than 4'-6" apart. Bolt stiffeners to inside surfaces of studs.
  - b. Insert and splice channels into cutouts of studs and weld at each stud.

### 3.02 FASTENING AND ATTACHMENTS

- A. Anchorage of the tracks to the structure shall be with methods designed for the specific application. Size, penetration, type and spacing of anchorage shall be determined by design per CBC Chapter 19 A. Sizing and gage of stud tracks to comply with approved shop drawings in conformance with CBC Chapter 22 A.
- B. Welds to conform to AWS D1.3 requirements and CBC Chapter 22 A. Welds may be butt, fillet, spot or groove type, determined by design calculations. Undercut shall not exceed 0.01 inch. Welding operators shall be previously certified for the welding to be done.

- C. Steel drill screws shall be of the minimum diameter indicated by design. Penetration through joined materials shall not be less than 2 full diameter exposed threads.
- D. Screws shall have a protective coating equivalent to cadmium or zinc plating ASTM A165 - Type NS for use in exterior assemblies.

### 3.03 ANCHORAGE TO CONCRETE

- A. Bolts and Studs Anchors:
  - 1. All bolts and headed stud anchors shall be accurately and securely set prior to placement of concrete, except as indicated in Section 1916.7.1. The strength of headed bolts and headed studs solidly cast in concrete shall be taken as the average of 10 tests with approved results for each concrete strength and anchor size.
  - 2. Drilled-in expansion bolts or chemical-type anchors:
    - a. When used in lieu of cast-in place bolts, the allowable shear and tension values and test loads shall be acceptable to building code requirements.
    - b. For sill plate applications, 10 percent of the anchors shall be tension tested.
    - c. All expansion anchors used for structural application shall be tension tested.
    - d. Expansion anchors shall not be used as hold-down bolts.
    - e. Expansion bolts used for non-structural applications such as equipment anchorage, 50 percent or alternate bolts in a group, including at least one-half the anchors in each group, shall be tension tested.
    - f. Tension testing shall be performed by the District's special inspector in the presence of the project inspector and a report of the test results submitted to the District and Architect. If any anchor shall fail the tension testing requirements, the additional testing requirements shall be acceptable to the Architect. These requirements shall also apply to bolts or anchors set in concrete with chemical if the long term durability and stability of the chemical material and its resistance to loss of strength and chemical change at elevated temperatures are established to the satisfaction of the Architect.
- B. Powder Driven Shot Pins – Low Velocity:
  - 1. The operator, tool and fastener shall be pre-qualified by the Owner's inspector. Inspector shall observe the testing of the first 10 fastener installations. A test "pull-out" load of not less twice the design load shall be applied to the pin in such a manner as not to resist the spalling tendency of the concrete surrounding the pin. Thereafter, random tests under the project inspector's supervision shall be made of approximately 1 in 10 pins.
  - 2. If any pin fails testing, test all pins of the same category not previously tested until twenty (20) consecutive pass, then resume the initial testing frequency.

### 3.04 COATING REPAIR



Touch up abrasions, burns, and welding, including construction activities of other trades with approved galvanizing compound. Removed oil, grease, rust, loose scale, loose coatings, weld slag and other deleterious material before touch-up.

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
1. Steel stairs and stringers, complete, including supports and accessories.
  2. Stair handrails and stair guardrails
  3. Guardrails at ramp barrier walls.
  - ++ 4. Steel rung ladders.
  - ++ 5. Steel pipe bollards
  6. Trench and area drain, frames and grates.
  7. Grating and frame for sump pit at elevator pit.
  - ++ 8. Elevator shaft support beams, separator beams, hoisting beam, bearing plates, rail supports, sill support angles, etc.
  - ++ 9. Elevator shaft divider screen
  - ++ 10. Barrier beams with supports.
  - ++ 11. Clearance barriers
  - ++ 12. Standpipe and storm drain guard barriers.
  13. Fire hose cabinet supports at roof.
  14. Stair nosing inserts.
  15. Exit sign posts at roof.
  16. Miscellaneous angle or tube jamb supports for roll-down doors
  17. Guardrailing fabrication at the roof above Stair No.2
  18. Emergency generator enclosure gates / frames
  19. Stair No. 2 enclosure and gate
  20. Site and ramp fencing, guardrails and gates
  21. Miscellaneous plates and angles for attachment of ornamental precast panel at south end of police station
  22. Decorative channel reveals attached to concrete columns
  23. Decorative channel reveals mounted to north entry fin column
  24. North and south entrance / exit screen and logo \*\*\*
  25. Miscellaneous embeds required for anchorage of ornamental structural steel channels
  26. Pipe sleeves
  27. Formed sheet and bent plates, 11 gage and heavier.
  28. Clip angles, anchors, bolts, plates, tubes and miscellaneous supports.

NOTES:

1. The work / fabrications of this section are to receive hot-dip galvanized coating, unless indicated otherwise.
- ++ 2. Indicates items that are not required to be galvanized
3. Elevator, stair and bus stop trellis / canopies, and ornamental channel framing at the elevator shaft and north and south entries shall be considered structural steel and covered under the work of Section 05100 & 05300.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 03300: Concrete and Concrete Finish
- B. Section 05030: Hot Dip Galvanizing
- C. Section 05100: Structural Steel
- D. Section 05300: Metal Decking
- E. Section 09870: Steel Coating System
- F. Section 14240: Hydraulic Passenger Elevators

### 1.03 CONDITIONS

#### DSA Requirements:

- A. Gates: Gates in path of travel must comply with exit door requirements (CBC Section 1133B.1.1.4 / ADAAG 4.13.3) Specify hardware that does not require pinching, grasping, or twisting motion to operate and provide solid kick plates 10" minimum high. Clear space below gate shall be 3" maximum above paving on both sides of the gate. The maximum effort to operate the gates shall not exceed 5 lbs.
- B. Railings and Handrails:
  - 1. Handrails for stairs and ramps shall be 1-1/4" to 1-1/2" diameter (1-1/2" nominal) and mounted 1-1/2" clear from side walls. CBC Section 1133B.4.2.5 and 1133B.5.5.1.
  - 2. All welded joints and surfaces shall be ground smooth, no sharp or abrasive corners, edges or surfaces. Wall surfaces adjacent to handrail shall be smooth. CBC 1133B.4.2.6 and 1133B.5.5.1.
- C. Treads and Nosings: Provide 2" contrasting color (70% recommended) warning stripe of material at least as slip resistant as the treads of the stairs, 1" max. from edge of nosing and top landing. At interior stairs, provide warning stripe at top landing and bottom tread nosing only. At exterior stairs, provide warning stripe at top landing and all tread nosings. CBC Section 1133B.4.4.

### 1.03 REFERENCE STANDARDS

- A. American Institute of Steel Construction (AISC)  
Standard Practice for Steel Buildings and Bridge  
Specification for Design, Fabrication and Erection of Structural Steel for Buildings  
Steel Construction Manual  
Architecturally Exposed Structural Steel (AESS) Guidelines
- B. American Society for Testing and Materials (ASTM)
- C. American Welding Society (AWS) - D1.1 Structural Welding Code
- D. California Building Code (CBC) - Chapter 22 (A).

### 1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. List of Materials: Review all related work to compile several comprehensive lists to address the requirements requested herein. First, provide a list of all items & materials proposed under this Section, whether shop fabricated or are related materials supplied by others under the work of other sections. Include the name

of the subcontractor(s), if any fabricated or manufactured item is by that other than the contracted fabricator, include the product name or number, shop drawing sheet and detail number locations where each item can be found, the type of surface preparation and shop primer system that is to be used. Where other fabricated items are required to be galvanized a separate list is required and is to include the detailed shop drawing location of these items.

- C. Product Data: Provide manufacturer's product data and specification sheets for all related items / materials that are purchased outside the fabricators shop and required for incorporation into the work of this section for compliance review to that specified.
- D. Shop Drawings: Shop drawings will be returned and not reviewed unless verified by the Contractor that the entire submittal is complete as required and stamped attesting to this claim and also is in conformance with the specified contract document requirements.
  - 1. Drawings shall fully detail the fabrication, welding and installation of anchorage required for interface of work of this section with work by others. Include connections and fastenings not indicated or specified in the contract documents to meet project conditions. Indicate on each and every drawing detail the required surface preparation and surface finish / procedure to be supplied. Cross-reference all items back to the required materials list numbering system.
  - 2. Shop drawings reviewed by the Architect and any requested revisions noted therein will become the basis for accepting or rejecting actual fabrication of items, acceptance of materials used and details used for installation of the work.
- E. Mock Up: To be fabricated, reviewed and kept on site as a standard of quality for the balance of work to judge the quality of welding, grinding, surface preparation, and galvanizing procedures to be used in the work.
  - 1. Provide a minimum 6'-0" wide section (3'-0" wide with return) of the detailed stair stringer railing / guardrail system taken at the inside stringer of a typical landing juncture. Fabrication shall include posts, top rail inboard handrails to demonstrate the typical post / plate connection and radii bending at landings and a typical capped termination end. Include welded wire infill panel with surrounding angle framework and rod bar connectors
  - 2. Provide a sample 2'-0" square corner section of the north / south entry screen with a 2'-0" long section of the steel / stainless steel plate laser cut college emblem logo, to demonstrate thickness of the emblem, quality of cut, edge treatment, finish, and proposed attachment of the components to the supporting screen / framework.
- F. Letter of Certification - Elevator Screen Panel: Fabricator / manufacturer's letter attesting to coordination / verification of building and elevator codes and with the contract documents that screen indicated complies with requirements.

#### 1.05 QUALITY ASSURANCE

- A. Testing and Inspection: Owner-selected testing laboratory shall inspect finished welds and bolted connections used in the work. Any welds showing deviations from accepted standards shall be field-tested. Repairs shall be performed at the

Contractor's expense. (DSA) Cooperate with the project inspector to perform continuous inspection of all welding, as required by building authorities.

- B. Qualifications of Fabricator/Erector: The firm manufacturing and installing the work of this section shall have had not less than five (5) years successful experience in work of similar nature and complexity to that required under this Contract.
- C. Qualification of Welders: All welders shall be certified per current AWS D1.1 Standards. In the absence of code requirements pertaining to certification, welders shall be certified in compliance with standards by an independent testing agency at the Contractors expense.
- D. Miscellaneous metal attachments, weld plates, embeds and sleeves that set into concrete or masonry, whether exposed in the finished work or not shall be hot-dip galvanized after fabrication.
- E. Miscellaneous Metal that is part of interior / exterior 'Architecturally Exposed Structural Steel' (AESS) fabrication(s) shall conform to AISC/AESS Category 2, Finish B.

#### 1.06 REQUIREMENTS

- A. Coordinate project requirements to verify which areas / locations that require protection by bollard from vehicular intrusion and damage. Coordinate placement of pipe guards for protection at vulnerable freestanding equipment and at exposed stairway and elevator lobbies.
- B. Steel Stairs: Conform to details indicated. If proposed detailing and fabrication is to differ from the intent indicated, Contractor shall detail the proposed differences for Architect review before incorporating into the required shop drawing plans.
- C. Coordination for Hot Dip Galvanizing: Coordinate the work of this section with the work of Section 05100 – Structural Steel for all components as part of an overall / complete assembly that is to be galvanized, and / or meeting the other requirements regarding contact / exposure listed herein.
  - 1. Coordinate the work of this section for all components as part of an overall / complete assembly that is to be galvanized, and / or meeting the other requirements regarding contact / exposure listed herein.
  - 2. Vent holds provided for hot-dip galvanizing is to be clean drilled holes and not torch burned.
  - 3. Erection / assembly of galvanized fabrications shall be made so that vent holes are non-exposed, concealed from view, and not exposed to moisture / weather.
  - 4. All field welds on galvanized surfaces are to be made to substrate surfaces that have had hot-dip finish burned-off or mechanically ground clean prior to welding. All subsequent welds are to be ground visibly smooth and repaired with cold-galvanizing field touch-up paint.
- D. Elevator Screen Panel: Coordinate with building and elevator code requirements regarding guarding of adjoining elevator shaft interior. Changes required after fabrication or installation and/or additional panels required because of site inspection that could have been resolved prior to construction shall be provided

without additional cost to the District.

- E. Conform to 'Architecturally Exposed Structural Steel' reference standards, as noted in Section regarding appearance quality requirements for miscellaneous steel items associated with (AESS) fabrication used in exposed locations.

#### 1.07 PERFORMANCE

- A. Contractor shall fabricate and install metal fabrications that have been tested to withstand the specified code required loads without exceeding the allowable working stress of the fabricated materials, including required anchors and connections.
  - 1. Apply load(s) to produce the maximum stress in each component and at the detailed connection.
  - 2. Allow for thermal movement resulting from 100 deg F, change (range) in ambient temperatures, to prevent buckling, opening up of joints and overstressing of welds and fasteners.
- B. Handrails and Guardrails:
  - 1. Erection shall conform to the following ASTM standards:
    - ASTM E894 Standard Test Method for Anchorage of Permanent Metal Railing Systems and Rails for Buildings
    - ASTM E935 Standard Test Method for Performance of Permanent Metal Railing Systems and Rails for Buildings.
    - ASTM E985 Standard Specification for Permanent Metal Railing Systems and Rails for Buildings
  - 2. Fabricate and install solid without shake or wobble to withstand the required loads:
    - a. Concentrated load of 250 lbs. applied at any point non-concurrently, vertically or horizontally at the top rail.
    - b. Concentrated load of 250 lbs. applied horizontally over any 1-foot square area of infill panels.
    - c. Uniform load of 50 lbs. per linear foot applied horizontally at the top rail, and a simultaneous load of 100 lbs. per linear foot applied vertically.
    - d. Concentrated and uniform loads need not be assumed to act concurrently.
- C. Ladders: For lengths up to 10 feet, ladders including attachments shall support two loads of 250 lbs. each concentrated between any two consecutive attachments. For each 10 feet additional length or fraction thereof, ladders including attachments shall support an additional concentrated load of 250 lbs. Each step or rung in each ladder shall support a single concentrated load of 250 lbs. minimum.

#### 1.08 FIELD MEASUREMENTS

- A. Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements and survey before fabrication and indicate measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

- B. Secure all field measurements prior to fabrication and installation of all work covered in this Section. Field alterations that become necessary as a result of the inexact dimensions are not permitted.
- C. Where field measurements cannot be made without delaying the work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

#### 1.09 COORDINATION

Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates for installing embeds, anchorages, including sleeves, concrete inserts, anchor bolts and items with integral anchors that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

#### 1.10 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect items from damage during shipping, storage and handling. Work showing dents, creases, deformations, weathering or other defects are not acceptable.
- B. Deliver welding electrodes to the site in standard manufacturers unopened packages identified with manufacturer's name and contents.

### 2.00 PRODUCTS

#### 2.01 MATERIALS

- A. Structural Steel Shapes, and Plates: ASTM A992 or A36, smooth surfaces free of defects.
- B. Structural Tubing: ASTM A500, Grade B, 46ksi.
- C. Architectural and Miscellaneous Steel Items: ASTM A283, Grade C to be bent or cold formed.
- D. Iron Casting and Shapes: Malleable iron casting shall be ASTM A47, Grade 32510. Gray iron casting shall be ASTM A48. Class 30 unless another class is indicated or required by structural loads.
- E. Steel Sheets: ASTM A611 Grade C
- F. Steel Pipe and Pipe Columns: ASTM A500, Grade B or A53
- G. Stair Steel Tube Railing Posts: AWHR/AWCR mechanical tubing ASTM A513, Grade 1020 or ASTM A500 Grade A or B.
- H. Steel Bars: ASTM A108.
- I. Fasteners (General):
  - 1. For exterior exposed surfaces provide zinc-coated fasteners.
  - 2. Provide fasteners of type, grade and class required for the particular use.



3. Furnish lugs, clips, bolts, nuts, screws, washers, concrete inserts, anchors and any other fastenings necessary for proper erection of various items. Design fastenings to alleviate vandalism and theft.
- J. Unfinished Bolts and Nuts: Regular low-carbon steel hexagon head bolts externally and internally threaded standard fasteners, ASTM A307 Grade A with case hardened nuts, ASTM A576 GR 1015.
- K. Structural Framing Bolted Connections: High strength bolts, nuts and washers conforming to ASTM A325 slip critical type.
- L. Machine Bolts: Conform to ASTM A307 with malleable washers. All structural bolts shall be 3/4" diameter unless noted otherwise. Stainless steel bolts conforming to A164.
- M. Anchor Bolts / Rods: ASTM F1554 for hooked, headed, thread and nut in Grades 36, 55 or 105 with a special weld supplement for 55ksi.
- N. Machine Screws: Provide cadmium plated steel type complying with Federal Spec. FF-S-111.
- O. Washers:
  1. Plain Washers: Comply with Federal Spec FF-W-92 round carbon steel.
  2. Lock Washers: Comply with Federal Spec FF-W-84 helical spring type carbon steel.
- P. Concrete Inserts: Threaded or wedge type galvanized ferrous castings either malleable iron or cast steel ASTM A47. Provide bolts, washers and shims hot dip galvanized per ASTM A153.
- Q. Anchorage Devices: Provide expansion shields complying with Federal Spec FF-S-325.
- R. Welding Electrodes: ASTM A36 or A283 Series as required for intended use. Comply with AWS D1.1 for base metal / filler metal combinations unless noted otherwise in drawings.
- S. Non-Shrink Grout: Master Builders "General Construction Grout" Sika "SikaGrout 212", Cormix "Gilco Construction Grout", Sonneborn "SonogROUT G.P.", or equal, min 5000psi at 28 days complying with ASTM C827.
- T. Stainless Steel Sheet, Strip, Plate and Flat Bars: ASTM A666 Type 304. Stainless Steel Bars and Shapes: ASTM A276 A314 or A484 Type 304, as required.

## 2.02 OTHER MATERIALS

Provide other materials not specifically described but required for a complete installation as selected by the Contractor subject to the review and acceptance by the Architect.

- 2.03 GALVANIZING - Required for all interior and exterior exposed metal and sleeves and embeds in direct contact or embedded within concrete / masonry. Refer to 2.06 A.10 for

fabrication requirements. Coordinate with the work of Section 05100 – Structural Steel and for all components that are part of the same assembly required to be galvanized.

- A. Galvanizing: ASTM A123, ASTM A153 as applicable, hot dip after fabrication with a coating G90 thickness of at least 2.0 mils or 2.0 ounces-psf on actual surface and 1.8 ounces-psf minimum on any specimen.
- B. Galvanizing Repair Material: Z.R.C. "Cold Galvanizing Compound", All States Galvanizing Powder, "Drygalv" by American Solder and Flux or equal anodic zinc-rich galvanizing repair paint.

#### 2.04 PRIMERS

- A. Steel Coating System: Tnemec "90-97 Tneme-Zinc"; Ameron – 68H Amercoat Urethane / Epoxy Zinc Rich Primers or equal of same manufacturer as finish coating system. Refer to Section 09870.
- B. Paint Finish: Fast drying universally modified-alkyd primer lead and chromate free, white or gray colored complying with performance requirements in FF TT-P-664; resistance to normal atmospheric corrosion, compatibility with finish paint systems and compatibility with finish coats specified; Tnemec V10 Gray, Ameron, 'Amercoat 5105; Dunn-Edwards IP 507; Rust-Oleum 1280; or equal. Use same manufacturer as used for alkyd finish paint system. Refer to Section 09900.

#### 2.05 FINISHES

- A. All items of miscellaneous metal, where not otherwise indicated, shall be hot dip galvanized after fabrication, unless otherwise specified, to produce specified galvanized finish coating free of burrs, roughness, whiskers, unsightly spangles, icicles, runs, barbs, sags, droplets and other surface blemishes.
- B. Where indicated or specified to be galvanized, all items of miscellaneous metal shall be hot dip galvanized after fabrication where hereafter specified to produce specified galvanized finish coating free of burrs, roughness, whiskers, unsightly spangles, icicles, runs, barbs, sags, droplets and other surface blemishes.
- C. All items of miscellaneous metal shall be free from burrs, rust, scale, and rough surfaces, and shop primed after fabrication with the appropriate primer noted in Article 2.04, where hereafter specified.
- D. Certification: Verify type and manufacturer of finish painting system to be utilized in selection of proper primer and manufacturer before application. Contractor shall coordinate with each different sub-contractor to verify that the primer and painting shall be of same manufacturer. Submit to Architect certification that proper surface preparation and priming has been accomplished per requirements of Section 09900.

#### 2.06 DESIGN AND FABRICATION REQUIREMENTS

- A. Design and fabricate work to support any normally imposed loads. Fabricate and form the Work to meet actual installation conditions as verified at the job site. Obtain necessary templates and information and provide all holes, cutting, punching, threading, tapping and drilling indicated or required for securing work of

other sections to metal fabrications. Coordinate metal work with adjoining work for details of attachment and fittings. Verify hardware and weather stripping requirements if any, for proper cutouts, fittings and attachments.

1. Except as otherwise shown on the Drawings or the approved shop drawings, use materials of size, thickness and type required to produce reasonable strength and durability to complete the entire work of this Section unless otherwise indicated, comply to code as minimum standard.
2. Provide all metal fabrications indicated, specified and required to complete the work, including all anchors and supports. Include all parts necessary to complete metal fabrication work whether or not specifically indicated.
3. Fabricate with accurate angles and surfaces which are true to the required lines and levels, grinding all exposed welds smooth to the touch and flush, forming exposed connections without unsightly ridges and with hairline joints, and using concealed fasteners whenever possible. Ease exposed edges to radius of approximately 1/32" unless otherwise indicated. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
4. Fabricate steel work in shop including welding. Assemble at site with bolted connections only. All bolted connections shall be from the same side. No field welding of galvanized metal is permitted, unless field weld is cleaned, galvanized, primed and encased in concrete or approved otherwise by Architect. No torch cutting is permitted unless specifically authorized in writing by Architect.
5. Miter all corners and angles of moldings or frames unless otherwise noted.
6. For fabrication of metal work that will be exposed to view in finished work, use only materials that are smooth and free of surface blemishes including pitting, seam marks, roller marks, mill scale, rolled trade names and roughness.
7. Close fit exposed joints to hairline joints. Cut off exposed bolts and screws flush with adjacent metal.
8. Form metal work with anchorage when built into concrete or masonry or provide with suitable anchors, expansion shields or other anchoring devices indicated or required. Provide such metal work in ample time for setting and securing in place.
9. Bolt with proper size bolts; draw nuts tight so threads are entirely concealed; upset threads. Counter sink heads of rivets and bolts. Provide Phillips flat head countersunk bolts and screws in exposed work and elsewhere as required unless otherwise indicated.
10. Fabrications that are indicated or required to be hot dip galvanized shall be constructed in conformance with the best standard practices of the American Galvanizing Institute. Provide tubes and pipe of closed ends with weep holes to allow the molten zinc to flow in/out/around sections with the least amount of surface tension and avoid expansion. Plate stock of all sizes shall be confined to permit the bath process from getting so hot that the sectional shape distorts beyond acceptable tolerances. Completed process shall render galvanized material finishes in conformance with 2.05 A. / B.

- B. Steel Stairs Criteria: Drawings indicate design, general arrangement, aesthetic requirements and minimum sizes of principal members. Contractor shall provide

stairs of the design indicated, constructed to support the minimum design loads for stair and ships ladder fabrication, installation and supports:

1. Stair Tread: 100 lbs. live load per square foot with minimum 300 lbs. point load.
2. Handrails: 50 lbs./l.ft. or 250 lbs. concentrated load whichever produces higher stresses, applied horizontally both ways and vertically to the top rail.
3. Provide required reinforced openings for electrical conduit, lighting fixtures and connections.

C. Welding:

1. Make welds which are to be watertight continuous and free from voids or cracks. Take precautions when welding to prevent heat blisters, burn-through and surface distortions.
2. Use electric shielded-arc process in strict accordance with Welding Specifications of American Welding Society as modified by Referenced AISC Standards. Use only welding operators trained and skilled in arc welding and qualified as per AWS. Grind smooth all welds exposed to view. Welds shall be free of holes, slag or other defects and flush with adjoining surfaces. No finishing treatment is required for concealed welds. Cut out and replace any defective welding.
3. Clean or grind off mill scale, rust and pitting prior to any galvanizing repair or priming.

D. Shop Priming and Surface Preparation:

1. Prior to shop priming, clean metal surfaces as required for the specified finish and per manufacturer's printed instructions as follows:
  - a. Commercial blast clean per (Steel Structure Painting Council) SSPC-SP6 all bare metal surfaces prior to priming for all metal receiving steel coating system finish.
  - b. Use solvent and hand tool cleaning (SSPC-SP1) on surfaces previously galvanized to remove all soluble contamination and zinc oxides, prior to priming.
  - c. Hand tool / power tool clean per (SSPC-SP2 / SSPC-SP3) as a minimum all metal surfaces prior to priming for all metal receiving paint finish primers.
2. Apply shop coat of specified metal primer to 2.5-3.5 mils DFT to all surfaces receiving steel coating system (refer to Section 09870) and 1.0-1.5 dry mil thickness to all surfaces receiving paint finish. Refer to applicable section for scope of work items.
3. Work primer into joints. Do not prime galvanized items or items embedded in concrete or masonry. Shop-prime all ferrous items not to be galvanized unless otherwise indicated or specified.
4. On surfaces that are not galvanized and are inaccessible after assembly or erection, apply two coats of the specified shop primer. Change color of second coat to distinguish it from the first.

- E. Galvanizing: Hot-dip galvanize the work of this section, where indicated in the largest sections possible to minimize welded connection and damage to the galvanized coating at the site. Galvanize work shall meet the quality control requirements of Section 05030 and be without warp, twist or other deformity.

### 3.00 EXECUTION

### 3.01 INSPECTION

Report in writing to the Architect conditions that prevent or interfere with correct installation of work of this section.

### 3.02 INSTALLATION

- A. Grouting: Provide grouting for work of this section as shown, specified and required. Use non-shrink grout and conform to manufacturer's directions.
- B. Field Galvanizing Repair: Wire brush welds and damaged coating to clean bright metal. Apply one coat of galvanizing repair paint where surfaces are concealed or are to be finish painted. Use the specified galvanizing repair compound where surfaces remain exposed and unpainted and apply the correct number of coats required to obtain the same thickness of zinc protection as adjoining surfaces.
- C. Shop Prime Coat Repair: Do not apply metal primer in wet weather unless steel is protected from dampness and is dry. Clean field weld, field bolts and all damaged shop primer after erection and apply a spot coat of the same primer as used for the shop coat.
- D. Fasteners: Provide fasteners and connectors of approved types as required for the installations, whether or not indicated. Provide galvanized fasteners for galvanized items. Fasten metal work to solid masonry with expansion bolts. Provide screws threaded full length to screw head.
- E. Corrosion Protection of Dissimilar Materials: Protect surfaces that are in contact with concrete or masonry, or contact surfaces of dissimilar metals for all interior /exterior work and work to be built into exterior and below grade walls and decks, by painting/coating the contact surfaces of each with two heavy coats of bituminous paint, or by suitable isolation gaskets, as approved and as applicable for each condition. Do not extend coating onto exposed surfaces.
- F. Provide all loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting. Provide plates flat, free from warps or twists and of required thickness and bearing area. Galvanize plates after fabrication.

### 3.03 SCHEDULE OF ITEMS

The following list of specific items is not necessarily complete. Check drawings and all other sections, and provide miscellaneous metal fabrications as required to complete the entire work:

- A. Stair handrails / guardrails shall be fabricated from 1-1/2" x 1-1/2" x .180 tube steel posts and top rail framing with 1-1/4 nominal (1-5/8"od) x .156 interior handrail. Handrails are to be anchored to the guardrails using 5/8" diameter rod at supports and 3/16"x 2" steel plate handrail brackets at extended ends of infill panels. Provide 6 gage welded wire mesh 3"oc each way spot-welded to 3/4" x 3/4" x 1/8" angle framework. Mesh to be in true vertical and horizontal alignment. Orientation of infill panel finished side to be within the path of travel. Support infill panels using 3/8" diameter rods continuously welded around. Railings are to be mounted 1-1/2" minimum clear from sidewalls. All joints to be continuously

welded and ground smooth. All joints to be continuously welded and ground smooth. Galvanize completed fabrications in largest sections possible.

- B. Spandrel Railings at CIP Ramp Vehicle Barrier Walls: Provide 1-1/2" x 1-1/2" x .180 square tube railing atop the concrete spandrel panel as detailed on the drawings. Steel tube is to have ends mitered, continuously welded and ground smooth. Interim horizontal rails are to be 1-1/4" x 1-1/4" x .120". Sleeve concrete wall with a 3" x 3" x .156" x 6" long steel tube with the bottom capped. Weld minimum (2) 12' long #4 rebar each side. Galvanize sleeve fabrication.
- C. Sleeves for handrail/guardrail posts where installed into concrete shall be 3" square x .120 tube, 6" minimum length, unless otherwise indicated on Drawings, with closed bottoms and provided with a #4 x 12" anchor rod welded to each side. Sleeves installed 3" and closer to edge of concrete shall be provided with #4 U-shaped anchor rod with 12" legs, welded to sleeve. Set sleeves in concrete true and level to permit plumb installation of guardrail posts. Top of sleeve shall be flush with surface of concrete.
- D. Embeds for handrail/guardrail posts, installed into concrete, galvanized after fabrication:
1. Stair Treads and Landings: Provide a steel weld plate(s) consisting of a minimum 4" x 4" x 3/8" steel plate embed with four (4) 1/2" diameter x 3-1/2" Nelson studs, 3" each way welded to the bottom for anchorage.
  2. Slab Edge / Stair Shaft Opening: Contractor may elect to provide a continuous 3" x 3" x 1/4" steel angle to be mitered / welded at corner transition. Provide 3-1/2" Nelson studs 3" each way staggered welded to the bottom of angle embed for anchorage.
- E. Sleeves through concrete walls and footings shall be furnished and installed, as required, and shall be standard weight galvanized steel sections of a size sufficient to allow 1/4" minimum clearance all around between the sleeve and item to be inserted. Pipe sleeves in connection with mechanical and electrical work are included in the respective mechanical and electrical sections.
- F. Steel Ladders - (Elevator Pit): Construct as shown and according to Title 8 CCR, ANSI A14.3 and ASMEA17.1/CAN/CSAB44. Provide 3/8" by 1-1/2" flat bar rails spaced 1'-4" apart and 3/4" diameter steel rungs spaced 12" on center. Extend rungs through holes at centerline of rails with ends plug welded. Use 6" x 3-1/2" by 3/8" steel angle brackets welded or bolted to side rails with 1/2" diameter machine bolts and nuts at top and intermediate points, not exceeding 48" oc. Secure to floor with (2) 3/8" diameter machine bolts in expansion shields. Continuously weld all joints and grind smooth and flush. Hold ladder clear of pit wall minimum 6". Ladder is to extend a minimum of 36" above the elevation of bottom landing, from that point rails shall extend 42" above top rung and return to wall or structure unless other secure handholds are provided. Galvanize complete fabrication. Coordinate with elevator equipment and requirements. Prefabricated by Alhambra Foundry Co. 818.289.4294 Model #3383, or equal.
- G. Trench Drains and Catch Basins:
1. Custom fabricate gratings for trench drains and catch basins of 1-1/2" x 3/16" top steel support bars spaced 7/16" oc in short direction, with 1-1/2" x 3/16" spacer bottom cross bars at 4" oc maximum. Bars headed into 1-1/2" x 3/16" perimeter member and welded. Finished design shall render an assembly that does not exceed a 1/2" x 1/2" opening in the path of

- travel. Balance of connections welded. Fabricate gratings in section weighing not over 75 lbs. per panel.
2. Fit gratings to frames so that grates will not rock or rattle and that no open space exceeds 1/4". Provide 3/8" diameter by 1-1/4" long bolts with lock nut and leveling nut at 6 places minimum. Weld bolts to support angles. Top of grating shall be flush with frame. Trench drain pans shall be formed of 10 gage steel with 2" x 2" x 3/16" angle frame welded to pan. Weld 1/2" diameter x 1'-0" rod anchors to pan at 6" maximum from each corner and 2'-0"oc maximum, 2 per side.
  3. Fabricate frames (below)
  4. Galvanize complete fabrication.
- H. Elevator Sump Pit: Provide a 24" x 24" non-traffic grade (light-duty) galvanized cast iron grate and frame w/ cast anchor lugs as manufactured by Alhambra Foundry Company, Ltd. (818) 289-4294, Model A-2010; Neenah Foundry Company (602) 225-9801, Model R-4442-A grate w/R-4899 angle frame, or equal. Grates shall comply with the American Disabilities Act of 1990, with maximum 2" wide slots.
- I. Miscellaneous Steel: Furnish, fabricate and install all miscellaneous angles, channels, bent plate, clips, anchors, hangers, brackets, plates and other miscellaneous metal required. Items shall be formed of sizes and shapes indicated, complete for the location and purpose required. Fabricate in accordance to applicable provisions that are considered part of the work as if fully specified herein and detailed on the Drawings. Obtain templates where required.
- J. Miscellaneous Metal Fabrications for Elevators: Provide miscellaneous structural steel shapes and plates for attaching to and supporting elevator guide rails, including where shown on structural drawings. Provide all miscellaneous rolled angles, for connection of the threshold for a complete installation. Install separator beams with supports of sizes and connections shown; shop prime finish. Coordinate with requirements of elevator shop drawings.
- K. Barrier Beams and Supports: Provide C12 x 20.7 steel channel welded to 1" square by 12 gage steel tubing of length as detailed/dimensioned at 8'-0" on centers maximum and 4" from ends. Anchor to structure using steel channel as indicated on the detail. Connect tubing to angles using 3/4" diameter machine bolt and compression springs, as detailed. Fabrication to be galvanized with all welds ground smooth.
1. Include a 6" PVC Schedule 80 barrier beam (12'-0" maximum) with capped/closed ends suspended by 3/16" stainless steel aircraft strand wire cable at 4" from each end of required length hanging from steel channel bolted connection. Provide all required cable crimp/clamps, washers, and grommets as detailed and as required for a complete assembly.
- L. Clearance Barrier: Provide 5"od x 13'-0" extra strong steel tubing with ends capped and 1/8" diameter weep holes in bottom at 4'-0"oc. Weld, 1/2" diameter eye bolts in threaded expansion shields to structure above. Hang clearance barrier to the required dimension, using coil chain #000-5GA., 41lb/100 linear foot zinc plated.

- M. Steel Pipe Bollards and Posts: Fabricate as detailed on the Drawings. Install in true vertical position.
1. (At Grade): Provide standard 4" diameter min., or as otherwise indicated, heavy weight steel pipe 6'-0" for 3'-0" embedment into a 1'-4" diameter by 3'-3" concrete footing. Fill with 2,500psi concrete, domed to shed water or leveled and capped with 1/4 plate ground smooth.
  2. (Above Grade): Provide 4" diameter by 3'-6" high steel pipe welded to a 8" x 8" x 1/4" thick steel plate embedded / anchored to slab using (4) - 1/2" diameter x 4" machine bolts or Nelson studs welded to bottom of plate. Field weld post to previously placed embed perfectly plumb and true with 1/8" welds +/- 3"oc. Fill with 2,500 lbs. concrete domed to shed water or leveled and capped with 1/4 plate ground smooth.
  3. Parking Posts: Provide 3-1/2" diameter heavy weight (schedule 80) steel pipe 5'-0" for 2'-6" embedment into a 1'-4" diameter by 3'-0" concrete footing. Fill footing with 2,500psi concrete, domed to shed water. Interior left open and free of concrete for subsequent insertion of accessible parking signage.
- N. Steel Stairs:
1. Stringers: Steel channels, ASTM A36, minimum size as shown on Drawings and/or as required. Provide clip angles, supports and closures for exposed ends.
  2. Risers: Use sheet steel not lighter than 12-gage.
  3. Pan Filled Treads and Landings: Use sheet steel pans not lighter than 12-gage with stiffeners and intermediate landing supports necessary. Weld angle supports on interior for attaching pans to stringers. Welds indicated are to be considered minimum required. Modify frequency, size and type required to prevent racking, shake or wobble when design forces are applied to stringer, risers, posts or railings. Provide minimum 4 x 4 - W 1.4 x W 1.4, welded wire fabric mesh reinforcing fastened inside pans so that mesh centers in the concrete pour.
  4. Provide continuous welds ground smooth, where exposed. Weld fabrications and connections per AWS D1 standards.
  5. Hot-dip galvanize steel surfaces of stairs in as large prefabricated sections as possible.
  6. Fabrication and Erection:
    - a. Fabricate steel channel stringers from minimum sizes indicated with bearing plates, clip angles and other fastening devices required in conformance with the approved shop drawings and calculations. Provide stringers that conform to referenced code requirements and applicable portions of National Association of Architectural Metal Manufacturer's (NAAMM) publication "Metal Stairs". Shop drawings to indicate the sizes of all members and details of all connections. Provide stiffener angle supports inside landings pans as required to be concealed and prevent wobble
    - b. Railings shall be fabricated continuous and parallel to stair run with mitered intersections and terminations returned to walls with uniform clearances and capped ends. Continuously weld and grind smooth all connections. Welds that are exposed to touch (handrail) are to be additionally dressed for a perfectly smooth finish. Weld rail posts to stringers.
    - c. Make adjustments required for plumb, level, uniformly parallel treads and risers level with adjoining floors.



- O. Standpipe and Storm Drain Guard Barriers: Provide bent plate, channel, angles or pipe fabrications as detailed and required to protect piping in an approved manner in conformance with California Plumbing Code (CPC) Section 315e.
- P. Rolling Grille / Door Jamb Supports:
- Protection: Provide 3/16" (1/4") x 5'-0" (4'-0") bent plate to match the proposed edge profile of the masonry wall, as indicated. Weld 3/4" (1/2") diameter x 4" long anchor bolts at 3" from ends and 1'-6"oc field.  
Galvanize fabrication
  - Support: Coordinate with manufacturer and approved shop drawings to provide supporting steel angle or tube jambs complete with base plates as required per manufacturers installation requirements, if not provided under that scope of work.
- Q. Stair Nosing(s):
1. Stair Nosings - Heavy-duty extruded ribbed wide aluminum safety nosing plate with concealed fasteners for a cast in anchor system designed for installation on cast in-place and pan filled stairs and landings. Nosings shall have colored anti-slip abrasive granule ribs set between the extruded aluminum base plate ribs. Striping to comply with ADA and CBC requirements for the visually impaired. Provide a 3-inch wide contrasting color (70%) warning stripe parallel to and not more than 1-inch from the front nose of each / every stair (interior / exterior). Coordinate nosing profile with riser detail. Manufactured by American Safety Tread Co. Inc., as distributed by M.H. Powell & Co. Inc. (323) 887-0037; Balco Inc., Metalines, or equal.
  2. Provide heavy-duty cast aluminum with silicon carbide granules embedded into the walking surface while the matrix is in a molten state, so that the finished color qualify to the CBC requirement for the visually impaired 70% contrast in color. Nosing shall terminate not more than 3" from ends of steps for cast in-place concrete stairs. Use nosings that are the full length of steps minus 1/8" clearance at each end for pan filled stairs and landings. Nosing shall be furnished with concealed cast in anchors. Coordinate size and profile with stair pan fabrication. Manufactured by American Safety Tread Co. Inc., Style 801 at concrete stairs / Style 820 at pan filled steel stairs, as distributed by M.H. Powell & Co. Inc. (323) 887-0037; Balco Inc., Metalines, or equal.
- R. Exit Sign Posts at Roof Stairs: Provide 2-1/2" x 2-1/2" x .180" steel tubes with 6" x 4" x 1/8" steel plate base. Anchor to slab with 2- 1/2" diameter expansion bolts minimum 1-1/4" embedment. Dry pack base plate for a level mounting. Include U-bolt or a thru bolting at guard railing to prevent unsupported racking. Coordinate mounting of base plate with pt-cable locations.
- S. Emergency Generator Enclosure Gates:
- Provide steel tube post framing with the top ends capped with 3/16" plate. Embed posts into finished grade and concrete footing, a minimum of 18"deep x 8" diameter. Provide a minimum of 3 thread-rod masonry dowels each side tack-welded to the vertical posts.
  - Gate Framing: Provide steel tube perimeter framing with corners mitered and ground smooth. Infill with sheet metal louver fabrications and concealed fasteners Fasten using #14, Type 'B' screws @ 12oc.

- Hardware: Provide (3) each weld-on 4" x 4" heavy-duty steel, sealed / lubricated hinges, McKinnley TA2714 or equal, with interior inactive leaf bottom 18" long cane bolt with keeper and exterior 1/2" diameter slide-cane bolt with welded stop pin latching.

T. Ornamental Fencing and Gates:

1. Provide welded wire fencing, gates, tube steel columns and miscellaneous related hardware to furnish and install complete the section of sizes, styles and profiles as detailed on the drawings. Supply all related galvanized steel hardware for installation. Posts are to be standard weight square tube steel columns capped with 3/16" steel plate welded and ground smooth. Field infill panel is to be fabricated from zinc coated welded wire infill panels to match project standards as indicated on the drawings.
2. Support tube framing with base plates of the sizes indicated, bolted to the slab on grade and secured at the soffit using inner tube sleeves bolted together using 5/8" diameter machine bolts in 1-1/2" slotted holes allowing for alignment / movement in the structure.

U. Elevator Separator Screen Panel:

1. Fabricate work in conformance with contract document detailing and code requirements to sizes, configuration and stiffness required. Installed elevator pit divider screen fabrication shall extend full height above the pit floor, as required per code. Securely weld or bolt connections. Exposed edges shall be finished smooth. Fabricate work in as far as practical for transporting. Assemble at site with bolted connections or welding as indicated. Coordinate divider screen with elevator equipment requirements.
2. Screen perimeter framing shall be 6" x 3" x 3/16" 'L', welded between HSS divider beams. Use same size angle rotated for intermediate horizontal support and screen attachment. Provide McNichols expanded metal No. 1-#16-S, or approved equal meeting code requirements.

3.04 CLEANING

- A. Primed and galvanized finished surfaces shall be left free from grease, dirt or other foreign material in preparation to receive final steel coating system or finish paint specified under the work of Sections 09870 and 09900.
- B. Galvanized work / surfaces that are to remain exposed in the finished / completed work shall be touched-up / repaired as noted hereinbefore and left in acceptable condition as approved by the Architect and District. Clean surfaces that are to remain exposed so that they exhibit clean and uniform appearance.

END OF SECTION

1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Aluminum floor and floor/wall seismic expansion joint assembly(s) used for pedestrian applications for use as construction joint cover-plates. Pedestrian expansion joint assemblies are to have:
    - a. Recessed mounted flush assemblies where the base extrusions are mounted in deck block-outs, where the installed cover plate is flush with the adjoining deck surfaces.
    - b. Recessed mounted floor/wall assemblies where the base extrusion is mounted in a deck block-out, and the installed cover plate is flush with the adjoining deck surface and held in place by connection to both the wall and to the base by way of cover plate screw into the one sided centering bar.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 03300: Concrete and Concrete Finishes
- B. Section 05500: Miscellaneous Metals

1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
  - ASTM A209 - Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.
  - ASTM A221 - Standard Specification for Aluminum and Aluminum Alloy, Extruded Bars, Rods, Wire, Shapes and Tubes.
- B. Aluminum Association (AA)

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Shop Drawings: Indicate each different seismic system / type (s) required. Indicate finishes of assembly surfaces to the concrete deck and of the cover plate. Fully detail the system design anchorage to the structure as well as between the system components, overall assembly size and overall profile dimensions, fabricated lengths and splice details at aluminum extrusions and at the gutter system, profile and mounting of centering bar and cover plate, gutter and downspout systems, specific locations within the structure of each different type of system, as applicable and relationship of assembly to adjacent construction affected by installation of this system.

- C. Samples: Submit one complete 12" long section of each different type of expansion joint assembly specified. Include all components of the system as well as mounting hardware and the gutter and downspout system materials for the deck joints. The submitted cover plate for each deck system is to exhibit the specified finish as required for the complete system(s) specified.
1. Samples will be reviewed for conformance to project specifics and design intent. Manufacturer's standard assemblies, either as specified herein, or as indicated on the drawings are required to be modified at the manufacturer's expense to meet all requirements listed herein to be considered acceptable.
- D. Certification:
1. Provide certificate of training by the manufacturer that contractor has completed quality control program and is approved for installation of the specified expansion joint assemblies.
  2. Contractor admits to have reviewed the manufacturer's data and is well aware of the issues necessary to install the system in compliance with the manufacturer's recommendations and the contract document requirements.
  3. Selected manufacturer is to co-sign the Contractors certification letter to acknowledge / verify that project coordination between them and the Contractor has occurred and that the installation shall be performed in conformance with their requirements and in such a manner as to qualify the system for the 'Joint and Several', 'No Cost To District' warranty required.
- E. Warranty: Submit copies of the 'Joint and Several' manufacturer/installers warranty for review by the Architect, at the same time as for the product submittals. Conditions of the warranty and acceptance of any requested revisions will be used in evaluating/accepting the specified system(s)/product(s) submitted.

#### 1.05 QUALITY ASSURANCE

- A. Expansion joint systems / components / materials specified herein by make or model, are to conform to all of the listed performance and warranty requirements specified, to meet the intent of this project, whether indicated on the drawings or not. Contractor and manufacturer are to verify that the correct expansion joint system as specified, meets all of the required criteria.
1. If there is conflict between what is specified, what is required and what is standard manufacture by the listed manufacturer, question should be raised for clarification from the Architect.
  2. It is the intent of the listed system by make and model, to be a base system from which the manufacturer is to then incorporate the additional design requirements listed to arrive at the modified product that conforms to all of the specified requirements for this project.
  3. If the manufacturer does not have a system that can comply with all of the performance requirements listed or is unable or unwilling to modify the existing system listed to comply with those requirements, then it is encouraged not to provide a bid for this project.
  4. The Architect will not accept submittals from manufacturers that do not provide a system that meets all of the performance criteria listed in a design that is acceptable in the opinion of the Architect
  5. Installed work shall conform to the specified requirements, the contract documents, the selected manufacturer's recommendations, to applicable

building codes having jurisdiction and to referenced standards. In all cases the most stringent shall govern. Any conflicts between these documents shall be brought to the Architects attention in writing. Failure to document any conflicts will be determined as acceptance of all conditions.

6. Contractor and manufacturer shall both review the 'Joint and Several' 'No Cost To District' warranty requirements specified herein to agree to the terms / extent of the coverage. Failure to document any conflicts or objections to the requirements will be determined as acceptance of all conditions.

- B. Obtain all expansion joints assemblies of the same type / function for this project from one manufacturer throughout the project, unless indicated otherwise by the Architect.

#### 1.06 PERFORMANCE REQUIREMENTS

- A. **Base Extrusions:** Expansion joint base extrusions are to be recessed to allow for a flush cover plate design. The thickness of the base extrusion shall not require a recess greater than 1-1/4" in depth, and whose dimension in width is no greater than required based on throat opening and design movement. System design is based on a base extrusion that is either bolted in-place with expansion anchors, cast in-place or incorporates cast in-place anchor bolts for subsequent mounting of the base extrusions. Manufacturer shall provide the Contractor with a minimum of one template necessary to accurately form block-outs, or place cast in-place anchor bolts for systems with bases that are placed after pouring concrete. Refer to drawing details for the maximum expansion joint assembly size required. The size indicated represents the maximum joint throat opening and the properly sized cover plate in its final installed position after the maximum anticipated short term shortening and creep, after tensioning. System base extrusions shall incorporate a round recessed groove along the entire length of the assembly to accommodate unrestrained movement of the centering bar for thermal cycling (expansion / contraction) and for seismic movement (lateral drift and rotation) without chance of disengagement of the centering bar.
- B. **Design Movement:** System is to be designed to accommodate a maximum seismic lateral movement of not less than 50% of the structural joint width throat opening. Allow additional clearances to prevent the assembly from binding or being limited by the width/thickness or movement of its centering bar design. Also accommodate the extra width necessary to prevent hammering damage from assemblies that are sized for exactly twice the width of the throat opening without consideration of the assemblies cantilevered centering bar receiver track or a centering bar that obstructs 100% closure during a seismic event.
- C. **Centering Bar Performance:** System shall incorporate a self-locating centering bar that maintains a flush, ADA compliant cover plate that remains centered throughout movement cycles.
  1. Coordinate with the contract documents / structural drawings for criteria where 50% lateral movement capability is required to accommodate drift between structures.
  2. Design the deck joint system to accommodate rotation of a 1/2" minimum vertical movement when the assembly is 50% reduced from its neutral dimension created by lateral drift.

3. Centering bar design shall allow 100% negative lateral drift without binding into the receiver cove. When 100% movement is required, the bar shall not prevent the assembly from closure or premature hammering due to cantilevered components. Joint throat size will not be increased to compensation for assembly design defect.
  4. Centering bars are to have end attachments that fit into base extrusion receivers allowing for unrestricted movement along its axis. Expansion joint assemblies shall have ends with full or half ball glides that restrict centering bar pullout during movement or dropout due to detachment from cover plate.
  5. Base extrusion receiver coves and centering bar ball glide ends shall be designed to allow for rotational movement of the total assembly to accommodate vertical rotation of not less than 3/4" in each direction.
  6. Attachment of cover plates to centering bars shall be by screw or other means of fastening. Solid or continuously threaded connections that limit vertical movement, rotation or functional capability by the ability to over torque the attachment, is not permitted. Additional components or attachment redesign shall be incorporated to increase rotational capabilities.
- D. Floor deck system base extrusions are to be designed with an integral centering bar covered shoe receiver track to allow free unrestricted movement along the lateral axis to eliminate bar drop out if cover plate screws were to loosen. Systems with receiver tracks cantilevered off the base extrusion and extend beyond the edge of slab, actually minimize the systems design range of movement. The selected system shall accommodate the specified project movement and the additional clear width required to prevent hammering or damage to the system components. Extrusions shall have a dedicated slot for the required replaceable gutter system at each level
- E. Expansion joints / cover plate assemblies shall not be placed until the structure has undergone its maximum anticipated short term post tensioning shortening and creep. Drawings indicate a size based on the design intent of the expansion joint system in its final configuration after deck shortening. Contractor placing expansion joint(s)/cover plate assemblies prior to the structure experiencing its short term shortening shall replace installed assemblies with properly sized systems that allow for the full range capability required without additional cost to the Owner. Coordinate the required width of joint criteria with the drawings details, construction means and methods and actual deck shrinkage calculations, prior to forming decks.
- F. Cover plates are to be extruded or sheared to the required widths and fabricated or machined to produce a pedestrian slip resistant, textured surface finish in conformance with applicable codes. Acceptable surfaces / finishes include diamond plate, grooved or raised ridge surfaces. Blasted texture or applied coatings are not permitted.
- G. Deck to Wall Joint: Provide a system that can compatibly accommodate floor-to-floor and floor-to-wall transitions without differences in fabrication other than the anchorage of the center plate. System must accommodate specific/different project mounting configuration to maintain the required watertight replaceable gutter system. Conform to additional criteria requirements listed herein.

- H. Gutter systems are to be serviceable / replaceable by bolted or screwed fastenings without the need for complete removal of the entire joint assembly. Riveted attachment is not permitted. Moisture / vapor barriers that are the accordion type are not considered substitutions for a 1/2 round continuous flow design. Systems that utilize a snap in or slide into extruded receivers are not considered a securely fastened gutter system and require additional mechanical attachment. Assemblies are to have factory prepared outlet tube downspout connections for dealing with collected water run off.
- I. Systems manufactured from 6005-T6 or 6063-T5 alloys that are in contact with concrete must have a chromate protective coating in order to be considered acceptable. Systems manufactured from 6061-alloy are not required to have the required coating. To eliminate this requirement manufacturer must provide a letter from a metallurgist attesting to compatibility of contact. All aluminum system components in contact with dissimilar metals shall have isolation between the contact surfaces to prevent corrosion.

#### 1.07 PROJECT CONDITIONS

- A. Coordinate work of other trades to insure cast-in anchor systems, recesses and mounting hardware to be placed into decks are properly formed / placed to correct size / location and requirements needed for compliance with manufacturer's installation recommendations and as specified herein.
- B. Wall cover plate assemblies are detailed as closures over joints between building structure components that may or may not be inline with one another. Where drawings indicate units being continuous for vertical to horizontal transitions and where components maybe offset, contractor shall coordinate fabrication of the assemblies so that the finished installation is visually plumb and true to line.

#### 1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Handle to protect finished surfaces from damage before, during and after placement.
- B. Deliver materials ready for use, fabricated in as large sections and assemblies as practical. Assemblies shall be identical to submitted and reviewed shop drawings and samples.
- C. Remove damaged materials / components from the site and replace with new product.

#### 1.09 WARRANTY

- A. Manufacturers providing bid for this project must agree to the conditions of the warranty requirements set forth herein, otherwise are excluded from supplying materials / products and assemblies for this project. Whether specified as an approved system or not.
- B. Manufacturer shall warrant to the District, upon and subject to the terms and conditions of its standard full written / limited warranty and as revised herein without exclusion. Manufacturer warrants its expansion joints to be free from manufacturing and material defects for a period of two (2) years from the date of

installation. Manufacturer warrants that the expansion joint assembly will function as designed / required. The liability of the manufacturer under this warranty shall be joint and several, limited to repair or replacement, materials and labor.

1. No exclusions shall be made as to installation based on quality assurance requirements listed above.
2. No exclusions shall be made as to District's requirement to maintain and use in a manner consistent with manufacturers specifications. Assemblies are to be maintenance free and function as designed for seismic and thermal cycling of the structure.

## 2.00 PRODUCTS

### 2.01 MANUFACTURE

- A. Floor: Provide a recessed-flush mounted pedestrian floor/deck-to-deck expansion joint system of the design specified for the location and application indicated complete, inclusive of all components and anchorage connectors that make up the total system that is to be installed into the Work, as manufactured by: Watson-Bowman Acme (716) 691-7566 – Wabo-FJG-60, or approved equal by one of the following manufacturers:  
MM Systems (866) 506-6929  
M.H. Powell & Co. Inc. (323) 687-0037;  
In-Pro Corporation (909) 931-9791, (800) 222-5556;
- B. Floor-to-Wall: Provide a comparable expansion joint system of the same design as the recessed-flush mounted pedestrian floor / deck-to-deck expansion joint system, for location applications that necessitate the change in system design. Provide complete, inclusive of all components and anchorage connectors that make up the total system that is to be installed into the Work. Coordinate system detailing for expansion joints with runs that require a continuous gutter system and a different gutter anchorage at the face of the wall/column side of the throat opening. Floor-to-wall assemblies are to be of the same manufacturer as the floor/ deck-to-deck assemblies, but where to model references are different, refer to the following:  
Watson-Bowman Acme (716) 691-7566 – Wabo-FJG-60C, or approved equal by one of the following manufacturers:  
MM Systems (866) 506-6929  
M.H. Powell & Co. Inc. (323) 687-0037;  
In-Pro Corporation (909) 931-9791, (800) 222-5556;

### 2.02 MATERIALS

- A. Aluminum: ASTM B209 6061-T6 alloy or ASTM B221 6063-T5 alloy. Extrusions shall be supplied in minimum 10 ft lengths.
- B. Aluminum Conversion Coating: Protect aluminum surfaces in contact with cementitious substrate materials with a zinc chromate primer, chromate conversion or bituminous coating on the contacting surface, unless of an alloy certified in writing by an independent testing lab to not be affected. Protect dissimilar metal surfaces with an isolating grommet.
- C. Centering Bars: Provide extruded aluminum bar stock, cast aluminum or rolled stainless steel bar or plate designs that incorporate positive mechanical



attachment of the receiver shoe guides. Include all other integral movement enhancing components necessary to meet the performance criteria requirements.

- D. Accessories: Provide J-bolt or washer headed hex bolt cast-in anchor bolts of either stainless steel type 613 or galvanized steel with a minimum yield strength of 70,000psi. Include all set screws, spacers, flexible gutters, downspouts and vapor seals, adhesive and other accessories required for a complete installation to meet the specified requirements, and as reviewed by the Architect.
- E. Finish: Abrasive grit finish aluminum. Provide the specified cover plate finish to conform to the requirement for a friction coefficient / slip resistance factor greater than 0.060
- F. Gutter System: Provide a minimum 60 mil continuously reinforced uncured neoprene or EPDM seal system with solvent welded closed end design that meets the requirements listed above. Include a system outlet tube solvent welded to the gutter for connection of a flexible polyethylene downspout tube and required attachment and slice connector(s) required to take the water to the ground or to the applicable deck in a fashion to redirect the discharge, for a complete system of dealing with collected water. At deck-to-wall/column gutters, bring the wall side up to terminate behind to the top of the 4" upturned cover plate.

### 3.00 EXECUTION

#### 3.01 FLOOR JOINT INSTALLATION

- A. Install joint assemblies in conformance with the manufacturer's recommendation, as indicated on Contract Drawings and in accordance with these specifications. Any discrepancies with site conditions or conflict between requirements are to be brought to the Architects attention.
- B. Provide all embedded anchorage bolts, washers and fasteners for securing expansion joint assemblies, and all drilled-in fasteners for concrete where anchoring members are not embedded (side fastening where approved by the Engineer, prior to execution). Provide fasteners of metal, type and size to suit type of construction indicated.
- C. Perform cutting, drilling and fitting required. Install component assemblies in true alignment with adjoining finished surfaces measured from established lines and levels.
- D. Maintain continuity of expansion joint cover assemblies with end joints held to a 1/8" minimum and 3/8" maximum. Cut and fit ends to produce joints that will accommodate anticipated thermal expansion and contraction of the type and alloy of metal used to avoid buckling.
- E. Install gutter system / vapor barrier systems per manufacturers recommendations and as reviewed by the Architect. Membrane seams and gutter end closures are to be heat or solvent welded as approved by the manufacturer. Drain run-off water to the building perimeter and provide gutter downspout outlet tubes to channel to a lower level or to the storm drain system. Deal with the water runoff

as approved by the Architect. Detail proposed conditions on the shop drawing submittal.

- F. Fasten cover plates to centering bars per manufacturers recommended torque requirement. Do not tighten beyond that required which would limit the function or durability of the assembly.

### 3.02 WALL COVER PLATE INSTALLATION

- A. Install wall cover plate assemblies per manufacturer's recommendations and approved shop drawings using standard anchorage attachments based on substrate material being fastened to.
  - 1. Weather Seal: Prior to cover plate installation review drawings and project requirements to provide the required joints with the specified weather back seal membrane indicated. Install continuous fastening bars where a weather back seal is indicated to prevent moisture penetration. Set into a bed of sealant prior to fastening to both sides of the interior of the wall joint. Install/snap the weather seal into the receiving grooves on each fastening bar on both sides of the joint. All seal end and mitered joints are to be heat/solvent welded for a watertight fabrication.
  - 2. Wall Cover Plates: Assemblies are to be installed true and in-line mounted flush with the anchoring surface. Closures over joints between building structure components that may or may not be inline with one another and units that are either continuous or mitered for vertical to horizontal transitions where these components maybe offset, shall be coordinate in the shop drawings, during fabrication and on-site to guarantee that the assemblies are installed visually plumb and true to line.
    - a. Base members are to be set completely plumb to compensate for any irregularities in the wall construction and so that the completed installation is completely true in all respects. Provide a continuous bead of sealant in the base member for material isolation and for weather integrity. Allow the proper end clearances for thermal expansion.
    - b. Install the cover plate, clips and exposed cap extrusions as required to provide an installation that is held in tension between all components, to preclude cover plate drift or water intrusion.
  - 3. When vertical wall closures meet horizontal floor cover plate assemblies, provide a bead of sealant to close the joint and make weather tight. Where vertical wall closures meet horizontal seismic floor expansion joint assemblies provide the wall closures with a backing weather back seal that wraps under the seismic cover plate and drains into the expansion joint gutter system. Do not use sealant to close this moving joint.

### 3.03 CLEANING

- A. Do not remove strippable protective assembly materials until adjacent work is complete.
- B. Upon completion of work and removal of the protective wrap, clean exposed metal surfaces per manufacturer's instructions.

END OF SECTION

1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division 1 apply to work of this section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the contract, including, but not limited to, these major items:
  - 1. Wood furring, stripping and nailers.
  - 2. Plywood sheathing / backboards.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 04220: Concrete Masonry Unit

1.03 REFERENCE STANDARDS

- A. West Coast Lumber Inspection Bureau (WCLIB)
- B. Western Wood Products Association (WWPA)
- C. American Plywood Association (APA)
- D. American Society for Testing and Materials (ASTM)
  - ASTM E84 "Standard Test Method for Surface Burning Characteristics"
  - ASTM D2898 "Standard Method of Accelerated Weathering of Fire Retardant Treated Wood for Fire Testing."

1.04 REQUIREMENTS

- A. Exterior fire retardant treated framing lumber and plywood sheathing shall have a flame spread rating of 25 or less, when tested in accordance with ASTM E84 and have no increase in fire hazard classification when test is extended from the standard duration of 10 minutes to 30 minutes.
- B. In addition to the flame spread testing required, materials shall also be tested / certified in conformance with ASTM D2898, for exposure to the elements.
- C. Each piece of fire rated lumber or plywood produced shall bear the mark identifying Underwriters Laboratories classification and its follow up service.

1.05 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to job site and store in a safe area away from traffic off ground and under cover.
- B. Handle with care to prevent damage and splitting.

2.00 PRODUCTS2.01 MATERIALS

- A. Plywood: Conform to U.S. Product Standard P.S. 1-83 and American Plywood Association, APA Rated. 3/4" Structural I, Sheathing CD, exposure 1, minimum 5 ply.
- B. Miscellaneous Furring: Douglas Fir #2.
- C. Bolts, Lag Screws, Wood Screws and Nails: Steel of standard manufacture per National Design Specification of NFPA and CBC Section 2318A.
- D. Power Driven Anchors: Provide 1/4" diameter threaded type anchors with threads upset to 3/8" shot through 1-1/2" diameter x 1/8" washers; or when permitted by code and the Engineer, provide 3/8" with 7/32" shank diameter headed drive pins. Both types of anchors shall be long enough to provide 1-1/2" penetration, unless indicated otherwise. Products as manufactured by "Omark," "Ramset," "Bonded," or equal.
- E. Treated Lumber:
  - 1. Pressure Treated Lumber: When in contact with concrete or masonry use "Chemonite" or 'CZC' by J.H. Baxter, "Wolman CCA" by Koppers Co., or equal; kiln-dried after treatment. Soak cut ends in a wood preservatives, twice for 15 minutes each at least two (2) pours prior to installation. Mark or brand treated lumber. Seal cut ends of joists, planks, beams and stringers.
  - 2. Fire Retardant Protection:
    - a. Where required, treat lumber and plywood with Barnard Chemical Company, Inc., "Bar-Flame 606G", J.H. Baxter "Exterior", Jasper Wood Treatment, Hoover, or equal. Refer to paragraph 1.04 - Requirements.
    - b. Exterior Fire-X (Hoover) can be painted or stained. Water repellent preservative finish is recommended for exterior applications directly exposed to weather. Test sample to determine desired effect. Specify whether stick (dying) marks are acceptable on both sides.

### 3.00 EXECUTION

#### 3.01 INSTALLATION

- A. Install furring and stripping as required and indicated. Shim accurately to line, level and surface. Provide framing anchors, special nailing, bolts or anchors as indicated on drawings to support and anchor the furring, stripping, nailers or equipment backboards.
- B. Fasten plywood sheathing with face grain perpendicular to supports with a maximum 1/8" at edge clearance joints for expansion and contraction.

#### 3.02 CLEANING

Upon completion of work thoroughly broom clean all surfaces.

END OF SECTION

1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division 1 apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Interior finish carpentry and millwork, inclusive of finish molding trim around dispatch counter
  - 2. Hanging of wood doors and installation of finish hardware
  - 3. Redwood bench in Staff Shower Locker Room
  - 4. Plywood countertop sub-base in preparation for travertine and granite counters

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 06410: Architectural Woodwork
- B. Section 08205: Wood Doors

1.03 REFERENCE STANDARDS

- A. Woodwork Institute – (WI)
- B. West Coast Lumber Inspection Bureau (WCLIB)
- C. Western Wood Products Association (WWPA)
- D. Redwood Inspection Bureau - "Standard Specifications for Grades of California Redwood Lumber"

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Shop drawings shall show all dimensions and all detail of construction / installation, and relationship to adjoining and related work where the same requires cutting or close fitting. Indicate all reinforcements, anchorage and attachments required for complete installation, including hardware.
- C. Samples - Trim / Millwork: Provide 6" samples to indicate section profile of trim, moldings, and redwood plank, etc, to demonstrate size, detail and material.

1.05 QUALITY ASSURANCE

- A. All millwork (materials, construction and workmanship) shall meet or exceed (as indicated and as specified herein) standard established in the current edition,

including all amendments thereto, of the "Manual of Millwork" of the Woodwork Institute (WI) for "Premium" Grade.

- B. Interior wood doors hung as part of the work of this section shall be operate without bind and have uniform clearances on all edges.

#### 1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Materials shall not be delivered to building in damp or wet weather and shall not be stored or installed in the building until concrete, drywall and paint and other items that raise humidity in buildings are thoroughly dry.
- B. Protect surfaces of work subject to damage before, during and after installation, until accepted by the District.

#### 1.07 GUARANTEE

- A. Millwork that may become warped or otherwise defective within one (1) year following acceptance of building shall be replaced with new materials including removal, repairs and installation of the replacement and repair work. Adjacent surfaces that may become marred as result of the repair work shall be painted and finished.
- B. Repairs and replacement work including painting and finish are subject to approval by Architect.

#### 2.00 PRODUCTS

##### 2.01 FINISH CARPENTRY AND MILLWORK MATERIALS

- A. General: It is the intention of this Specification that the following shall not be construed as a complete schedule of material requirements. Additional finish carpentry and millwork items may be noted on drawings.
- B. Miscellaneous Wood Trim: Idaho Pine K.D., for painted finish
- C. Furring and Stripping: Douglas Fir, Construction Grade, 12% moisture content maximum.
- D. Redwood - Smooth Sawn – Select, 2" x 4" members, CRA grade-marked / certified Redwood, clear, vertical grain, kiln dried.
- E. Kiln Dried Materials: Between 6 – 8 % moisture control.
- F. Accessories:
  - 1. Adhesive: FS MMM-A-130 waterproof type as recommended by manufacturer to suit application.
  - 2. Nails: Size and type to suit application.
  - 3. Screws: Size and type to suit application; nickel-chrome plated finish.
  - 4. Shower Bench Steel Angle: Comply with ASTM A36 or ASTM A283, Grade C, cold formed angle hot-dip galvanized per ASTM A153 as applicable.

5. Carriage Bolts, Nuts and Washers shall be stainless steel

G. Countertop Sub-base for Travertine and Granite Counters: Provide 3/4" exterior grade plywood with dot and dash saw cuts 6" to 8"oc through length to prevent warping.

### 3.00 EXECUTION

#### 3.01 QUALITY OF WORK

##### A. Selection of Lumber:

1. Exposed members will be left natural; select members for appearance. Architect reserves right to reject members not acceptable, whether or not installed. This includes material damaged during installation.
2. Select individual pieces without knots or obvious defects that would interfere with placing bolts or nailing, and will allow for proper connections.
3. Lumber will be rejected for excessive warp, twist, bow, crook, mildew, fungus, sap, or mold, as well as questionable cutting and fitting

#### 3.02 INSTALLATION - GENERAL

- A. Millwork shall be installed in accordance with requirements specified and per best industry practices. Install work plumb, straight and true, firmly secured to grounds, blocking, furring, framing or backing. All joints shall be neatly and securely made. Where a choice is given Contractor as to construction methods, notify Architect as to proposed method of joining.
- B. Extreme care shall be exercised to avoid damaging finished surfaces during handling and erecting of the millwork.
- C. All nailing shall be so located and driven as not to be visible in the finish. All nail heads shall be set.
- D. Mill assemblies shall be joined with concealed nails and screws or by mortise and tendons with glued blocks using waterproof glue.
- E. Scribing, mitering and joining shall be done accurately and neatly to conform accurately to section profile detail.
- F. All members shall be erected as single piece elements, whenever practical. Where joints are required, provide overlapping miter and arranged as inconspicuous as possible, and as required to allow for minimal shrinkage.
- G. Trim shall be of one continuous length of lumber(where possible) without butt joints. Jointing between casings shall be by overlapping rabbit joint. Butt joints are not permitted.
- H. All out comers and casing of trim shall be carefully mitered to section detail with hairline joints.
- I. Wood Doors: Interior wood doors shall be hung so that the finished installation is free swinging without hinge bind or hardware misalignment. Door shall have uniformly planed edges and a level / true sill undercut. Hardware height /

locations shall be as indicated on the drawings and as required to meet industry / code standards,

1. Install using a casing jig that matches the required hardware height locations required and as required to meet the specified hardware requirements for size, depth, thickness, mounting, anchorage, etc.
2. Door shall be machined to match the hardware location requirements already established on the previously set / manufactured metal door frame assemblies.
3. Take care in handling door cores so as to not damage door skin face veneer finishes or transitional edge surfaces. Filed edges shall be uniformly smooth without rounding.
4. Install finish hardware and verify correct and trouble free operation.

### 3.03 INSTALLATION - BENCH

- A. Accurately saw-cut lumber and fit into the respective locations, true to line, grade and level, as indicated or required; permanently secure in proper position. Produce joints which are tight, true with members assembled in accordance with the Drawings and as required to execute installation of materials following work of this section.
- B. Pre-drill all carriage bolt holes
- C. Use flat washers with all thru bolts and carriage bolts
- D. Allow 1/2" spacing between planks and at ends of planks that butt against walls.

### 3.04 CLEANING UP

- A. Keep the premises in a neat, safe and orderly condition at all times during execution of this portion of the Work, free from accumulations of sawdust, cut-ends and debris.
- B. Sweeping:
  1. At the end of each working day, thoroughly sweep surfaces where refuse from this portion of the Work has settled. Remove refuse.
  2. Upon completion of this portion of the Work, thoroughly broom clean all surfaces and rooms.

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including, but not limited to, these major items:
  - 1. Plastic laminated cabinetwork.
  - 2. Laminated plastic countertops

1.02 REFERENCE STANDARDS

- A. Woodwork Institute (WI) - "Manual of Millwork – 11<sup>th</sup> Edition"
- B. American Woodwork Standards (AWS)
- C. Southern California Association of Cabinet Manufacturers - "Specification Guide for Wood Cabinets"

1.03 CONDITIONS – DSA Requirements

Provide 'U' shaped wire pulls at all accessible casework or equally accessible pull hardware that does not require grasping, pinching or twisting of the wrist. CBC Section 1125B.4

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Shop Drawings
  - 1. Completely detail per WI requirements, the size and construction of all parts of all cabinet and countertop units, identified with location, quality, grade, type of finish and species of wood.
  - 2. Indicate all door swings in plan and hinge side on all elevations.
- C. Submit plastic laminate samples showing color and texture of all plastic laminate items as specified.

1.05 QUALITY ASSURANCE

- A. Before delivery to jobsite, issue a WI Certified Compliance Certificate indicating the products to be furnished for this project and certifying they will fully meet requirements of the grade or grades specified.
- B. Apply WI Certified Compliance Grade Labels indicating grade specified on each unit of casework.

- C. Apply WI Certified Compliance Grade Labels indicating grade specified on each plastic laminate countertop.
- D. Furnish a Certificate of Compliance from an approved independent testing laboratory in lieu of certificate.
- E. Do not perform fabrication, finishing or installation until shop drawings and finish samples are approved.

#### 1.06 REQUIREMENTS

- A. Prior to ordering / fabricating cabinet units, countertops, sub-base and associated millwork, thoroughly review project specific requirements. Review drawings, specified requirements and mock-ups
  - 1. Bring discrepancies to the Architects attention, prior to executing the work of this contract.
  - 2. Review all selections of finish and texture with the Architect for confirmation of selections, indicated and specified. Document selection in written form to record surfaces finishes, textures and colors prior to submitting shop drawings and samples for review.

#### 1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Protect all surfaces of work subject to damage while in transit.
- B. Deliver, store and handle work to prevent damage of any kind until final acceptance. Repair or replace damaged work without additional cost to the District.
- C. Store completed units on site in a controlled / protected environment as recommended by the manufacturer / fabricator, away from rain, water, moisture due to construction materials, away from windows and direct sunlight. If required provide a temperature controlled environment.

#### 1.08 ENVIRONMENTAL REQUIREMENTS

- A. Do not begin installation of architectural woodwork until area of work has been completely enclosed and interior is protected from the elements. All adjoining work of 'wet construction' shall be complete and fully cured.
- B. Maintain temperature and humidity in areas of installation within reasonable limits, as close as possible to final occupancy standards. If necessary, provide artificial heating, cooling and ventilation to maintain required environmental conditions

#### 1.09 GUARANTEE

Cabinetwork that may become warped or otherwise defective within one year following acceptance / completion of building shall be replaced with new materials including removal, repairs and installation of the replacement and repair work. Adjacent surfaces that may become marred as result of the repair work shall be painted / finished to the

satisfaction of the District.

## 2.00 PRODUCTS

### 2.01 MATERIALS

- A. Provide all lumber and plywood of new, clean stock of the species and WI grades shown, unless otherwise selected by the Architects or indicated on the Drawings.
1. Manufacture and grade Douglas Fir for concealed stripping, blocking and framing in accordance with "Standard Grading and Dressing Rules 16 of WCLIB", "D" VG Finish Grade S4S, kiln-dried to a maximum 12% moisture content.
  2. Particleboard: ANSI A208.1, Grade 1-M-3, CS 236 Table 1, Classification B2 minimum, 45-47 pound density pulp or wafer textures as selected by Architect.
  3. Softwood: WI Section 3, "Custom" grade, Douglas Fir vertical grain and White Pine, heartwood, rift sawn.
  4. Softwood Plywood: WI Section 5, "Custom" grade, Douglas Fir-rotary cut.
- B. Laminated Plastic Countertops and Splashes:
1. "Custom" grade per WI Section 16. At kitchen / employee lounge areas, with minimum 4" high integral cove back splash, self-edged (top lap over edge); and veneer or lumber cores; particleboard cores permitted except where specifically not approved by Architect. Provide solid pine at Lobby Counter, per Detail 1/A5.20. Color and finish as selected by Architect.
  2. Laminated plastic including backing sheet must be high pressure type conforming to standards of the National Electrical Manufacturers Association LD3-80.
  3. Grade: Standard or fire rated as required for fire rating, minimum .050" thick (minimum 0.42" thick for forming) for horizontal surfaces and minimum .030" thick for vertical surfaces. Provide minimum .020" thick backing sheets at panels including backsplashes to assure stability and moisture resistance.
- C. Casework:
1. Laminated Plastic Casework: "Custom" grade per WI Section 15, Type I (multiple units), Style A (frameless).
    - a. Grain Pattern: Run and match vertically.
    - b. Cabinet Doors: WI Type A.
    - c. Laminated Plastic: High-pressure type conforming to NEMA-LD1, minimum thickness .028". Color and finish as selected by Architect.
    - d. Finish semi-exposed interior surfaces of open cabinets (where indicated by the Architect) with Kortron II low-pressure polyester laminate surface liner, conforming to ALA-85. Color as selected by Architect.
    - e. Edge Banding: Provide pressed-in vinyl "T" edging in grooved semi-exposed edges of shelves covered with low-pressure laminates. Color as selected by Architect.
  2. Construction: Flush overlay type with veneer or lumber cores; particleboard cores permitted except where specifically not approved by

- Architect.
3. Casework (where applicable) with low-pressure laminate liner must conform to the requirements as specified per WI Section 15, and be laminated to minimum 45 pound density particleboard conforming to ANSI-208. All work quality is subject to approval or rejection by the Architect.
  4. Edge band plywood shelving with glued solid hard- wood stock set with tongue and groove joints. Unsupported spans must not exceed 3'-0".
  5. Furnish and install cabinet hardware as specified herein. Submit standard products of other manufacture in lieu of products specified herein for approval by the Architect.
  6. Coordinate fabrication of casework with requirements of District and other trades requiring work within or on casework. Provide neatly trimmed cutouts, backing, etc., for equipment and items of District and other trades.

D. Hardware:

1. Adjustable Shelf Standards: Knappe and Vogt 255 and 256 or Grant 120 and 21Z for flush mounting; natural aluminum finish. Shelf rests in drilled holes are not permitted.
2. Drawer Slides: Knappe and Vogt 1300, Grant 338SC, HDI 1900, or equal. Provide full extension for file drawers, Knappe & Vogt 1460, Grant 329, or equal.
3. Pulls: Provide 3" wire pulls, Stanley No. 448, 3-1/2" or equal.
4. Hinges: Fully concealed, adjustable, self-closing nickel-plated steel hinges with minimum 120 degrees opening as manufactured by Blum, Hafele, Stanley or equal. Provide type and quantity as recommended by hinge manufacturer for face construction and door size and weight.
5. Locks: Removable five (5) -pin tumbler lock; coordinate keying with District. District standard is Kenstan Lock Company, 'Disc tumbler line'
  - a. Provide cam locks, drawer / door, gang, snap bolt, plunger, z-bolt or ratchet, based on project specific cabinet details. .
6. Finish: US26D, unless noted otherwise.
7. Drawer Stops: Provide wood block stops to prevent drawers from hitting face of cabinet body.
8. Deal Tray: Provide minimum 12" x 10" recessed mounted, 16-gage stainless steel with brushed finish, dip tray with radius ends for easy access. Product as manufactured by C. R. Laurence, Los Angeles, CA (800) 421-6144 or equal.

### 3.00 EXECUTION

#### 3.01 CONDITION OF SURFACES

- A. Field coordinate with trades involved for proper locations of required blocking.
- B. Examine and approve prior to concealment, grounds, stripping and blocking required to secure cabinets.
- C. Correct defects before proceeding.

#### 3.02 MILLWORK

Assemble millwork at the shop as complete as practicable and deliver ready to set in place.

3.03 INSTALLATION

- A. Install finish carpentry and millwork plumb and level without distortion and in accordance with WI Section 26, "Custom" grade.
- B. Secure wall and base cabinets to walls and in addition base cabinets to floor.
- C. Shim as necessary with concealed shims.
- D. Accurately scribe and closely fit faceplates and filler strips. Trim strips to irregularities of adjacent surfaces.
- E. Install furring and blocking where shown or as required.

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including, but not limited to, these major items:
  - 1. Sheet membrane waterproofing membrane / underlayment for added prevention of water/vapor intrusion, used over horizontal or near horizontal surfaces of work installed by other sections. Install where indicated over exterior framing / sheathing and under subsequent finish materials
    - a. Install under the precast cornices / sills
    - b. Install under sheet metal parapet wall caps
    - c. Install under the two layers of Grade 'D' building paper for the exterior plaster system, where surfaces are not vertical (i.e. sloped plaster wall of police station, etc.)

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 07600: Sheet Metal Work
- B. Section 09203: Metal Lath
- C. Section 09235: Exterior Sheathing

1.03 REFERENCE STANDARDS

American Society for Testing and Materials (ASTM)  
ASTM D412 Test Methods for Rubber Properties in Tension  
ASTM D903 Test Method for Peel or Stripping Strength of Adhesive Bonds  
ASTM D1970 Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection  
ASTM E96 Test Methods for Water Vapor Transmission in Materials

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Provide manufacturers product data sheet and written installation recommendations for project specific applications similar to those encountered by the work of this section.
- C. Technical data of selected membrane physical properties.
- D. Samples, 5 inches by 5 inch of membrane and auxiliary products.

- E. Warranty: Submit copies of the manufacturers warranty for review by the Architect, jointly signed by the manufacturer and the (contractor / applicator / installer) indicating non-exclusion agreement between both parties to provide joint and several warranty upon completion of the work. Conditions of the warranty will be used in evaluating / accepting the specified product and the reviewed submittal.

#### 1.05 QUALITY ASSURANCE

- A. Obtain waterproofing / underlayment materials required from a single source.
- B. Pre-installation Conference: Prior to commencement of the work the Contractor shall convene a meeting at the job site to review and discuss underlayment work and its relationship to all other related work. Meeting shall be attended by the Contractor, District, Architect, sheet metal contractor, plaster contractor, contractors of related work and inspection personnel, prior to executing the work. Review and coordinate related requirements and procedures to be followed in performing the work of this Section. Discuss the sequencing, layout, scope and installation procedures to determine and anticipate conditions prior to start of work. Notify all responsible parties a minimum of 48 hours before conducting meeting.
- C. Contractor shall notify the Architect of the completed installation a minimum of 48 hours prior to subsequent building paper and lathing work. Architect will perform review to verify work standards and pre-installation conference agreement, regarding scope of application, conformance to manufacturer recommendations, and the number, use and location of penetrating fasteners. Non-conforming work will be replaced without additional cost to the District.
- D. The sole intent of the use of this membrane and control of its installation is to form an impenetrable water-shedding surface. Use of sheet metal and stucco alone / individually are not to be considered weather barriers.

#### 1.06 REQUIREMENTS

- A. Contractor shall inspect substrates and adjoining construction, affected by the work of this section, prior to executing the work of this section. Notify the Contractor of any defects detrimental to the work. Application of materials shall be considered acceptance of surfaces.
- B. Flashings passing through or adjoining this membrane underlayment shall be properly set prior to work of this section.
- C. Contractor shall review these specifications, the drawings and project specific detailing to determine the full scope of work required by the contract documents and any additional membrane recommended based on industry experience. Contractor shall fully coordinate scope of work, whether indicated or whether in addition to that indicated, if increased usage would be in best industry practices. Obtain approval of additional scope of work prior to execution. Installed work shall be inspected prior to subsequent installation of the code required building paper.

#### 1.07 JOB CONDITIONS



- A. Environmental Conditions: Apply in fair weather at temperatures of 40 degrees F and above. Provide adequate ventilation when using primers.
- B. Covering: Sequence subsequent material / surfacing installation promptly at temperatures of 40 degrees F and above.

#### 1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver products to job site in unopened packages with labels and containers intact and store off the ground under waterproof cover. Do not stack palletized material.
- B. Remove damaged material from job site and replace.

#### 1.09 GUARANTEE

Furnish to District a written guarantee against all defects in materials, workmanship, resulting in water intrusion or similar defects. Provisions of the guarantee shall include responsibility for ruptures in the membrane caused by cracking in the substrate up to 1/8" in width, for three (3) years from date of acceptance. The material installed and quality of work performed under this section of work shall be warranted by both the manufacturer and applicator, (joint and several), under a single document to the District

#### 2.00 PRODUCTS

##### 2.01 MANUFACTURER

Provide membrane underlayment as manufactured by one of the following:  
Carlisle CCW WIP 200, 800-527-7092;  
Henry Company 'Blueskin SA' 800- 598-7663;  
Protecto Wrap Company 'Rainproof 40' 800-759-9727;  
W.R. Grace, 'Ice and Water Shield' (40) / 'Grace Ultra' (30mil) (high temperature applications) 866- 333-3726  
Tamko TW Metal and Tile Underlayment (800) 539-8868  
Miradri 'WIP 300HT',  
Or equal

##### 2.02 MATERIALS

Provide a minimum 40 (30) mil flexible, self adhering rubberized asphalt (butyl rubber based adhesive backed by a layer of high density cross laminated polyethylene) sheet membrane with a polyethylene film on the surface and a removable silicone-treated release sheet on the adhesive underside.

#### 3.00 EXECUTION

##### 3.01 PROJECT CONDITIONS

- A. Examine substrates and adjacent surfaces where work of this section will be performed. Report conditions detrimental to timely and proper completion to the Contractor. Do not proceed until unsatisfactory conditions are corrected. Executing work is deemed acceptance of surfaces received.

B. Proceed with the work as forecasted weather conditions will permit.

### 3.02 INSPECTION

Examine surfaces to assure conditions are acceptable to written manufacturers requirements.

### 3.03 PREPARATION

Surfaces to receive underlayment membrane must be free of dust, dirt, loose screws and / or other contaminants.

### 3.04 INSTALLATION

A. Horizontal Wall Surfaces:

1. Cut the membrane into 10' to 15' lengths and re-roll.
2. Peel back of release paper 1 to 2 feet, align the membrane on the lower edge of the wall surface and place the first 1 to 2 feet.
3. Pull the release paper under the membrane and continue to peel it from the membrane.
4. Press or roll the membrane in place to assure full adhesion to the surface being applied.
5. When installed on the top of the wall / parapet, verify that the applied top membrane is fully adhered prior to affixing / rolling down onto both sides.
6. Shingle end laps minimum 6"; side laps minimum 4". Always work from the low point to the high point.

### 3.05 PROTECTION

- A. Protect membrane against damage from weather or subsequent trades until covered by building paper / finish materials.
- B. Coordinate with the placement of fasteners for anchorage of the building paper and metal lath or sheet metal copings are as few as possible, where required and that their usage does not damage the membrane in a way, beyond the penetrations that are allowed, that would in any way void the manufacturers / Owners warranty.

### 3.06 CLEAN-UP

Remove trash and debris resulting from work of this Section and dispose of properly.

END OF SECTION

1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division 1 apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Fluid applied waterproofing on the following surfaces:
    - a. Non-shored foundation / basement / planter retaining walls and ramp walls below grade
    - b. Elevator pit walls
  - 2. Polyolefin protection course over all fluid applied surfaces
  - 3. Drainage composite protection course
  - 4. Protection panel along top termination of all vertical walls in landscape areas
  - 5. Waterproofing system termination flashing
  - 6. Above grade inside the stair stringers and landing pans

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 02720: Sub-drainage System

1.03 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340
- B. Submit manufacturer's product data and installation instructions for application.
- C. Samples - Submit representative samples of the following for approval:
  - 1. Waterproof membrane material and associated accessories
  - 2. Polyolefin protection course
  - 3. Prefabricated drainage composite.
  - 4. Geo-textile fabric
  - 5. Protection board
  - 6. Termination flashing
- D. Certificate of Compliance as issued by the manufacturer's representative that all work of this section, of the project conditions specified and all written recommendations of the manufacturer have been complied with.
- E. Warranty: Submit copies of the manufacturer's warranty for review by the Architect, jointly signed by the manufacturer and the (contractor / applicator / installer) indicating agreement between both parties to provide a joint and several warranty upon completion of the work. Conditions of the warranty will be used in evaluating / accepting the specified product and the reviewed submittal.

1.04 QUALITY ASSURANCE

- A. Waterproofing contractor/applicator shall be trained and approved by the selected waterproof membrane manufacturer.
- B. Pre-installation Conference: Prior to commencement of the work the Contractor shall convene a meeting at the job site to review and discuss waterproofing work of this Section and all related work. Meeting shall be attended by the Architect, District Representative, Waterproofing consultant, Installer, Concrete Contractor and/or Masonry Contractor and a representative who is a full-time employee of the waterproofing manufacturer, and contractors of related work and inspection personnel, prior to executing associated work. Review and coordinate related requirements and procedures to be followed in performing the work of this Section. Discuss the sequencing, layout and installation procedures to determine and anticipate conditions prior to start of work. Notify all responsible parties a minimum of 48 hours before conducting meeting.
- C. The manufacturer's representative and the approved applicator shall inspect the installed membrane prior to protection course installation/operations. Any defects shall be corrected to the approval of the manufacturer, for warranty compliance. Additional materials and labor required for the repair of the waterproofing membrane shall be back charged to the Contractor. Failure by the manufacturer and/or Contractor to inspect membrane installation shall not relieve the manufacturer from the conditions of the warranty.

#### 1.05 JOB CONDITIONS

- A. Protect all adjacent areas not to be waterproofed. Where necessary, apply masking to prevent staining of surfaces to remain exposed wherever membrane abuts to other finish surfaces.
- B. Perform work only when existing and forecasted weather conditions are within manufacturers recommendations for the material and product used.
- C. Ambient temperature shall be within manufacturers specifications (Greater than +40 deg. F/ +7 deg. C).
- D. All plumbing, electrical and structural items to be under or passing through the waterproof membrane shall be positively secured in their proper positions and appropriately protected prior to membrane application.
- E. Coordinate installation of drainage piping vertical drops, landscape piping, etc. through the membrane with manufacturers special detailing prior to membrane installation. Do not allow traffic adjacent to membrane applied walls until the membrane is cured and protection course is installed and approved.

#### 1.06 REQUIREMENTS

Where root barrier is required, coordinate with the Landscape Architect to determine / establish the depth of the material required, based on the species of plant or tree that it is controlling.

#### 1.07 DELIVERY, STORAGE AND HANDLING

Deliver materials to site in original unbroken packages bearing manufacturers label showing brand, weight, volume and batch number. Store materials on site in strict compliance with manufacturer's instructions.

## 1.08 WARRANTY

- A. Manufacturer shall warrant its products to be free of defects. Additionally the approved applicator shall guarantee the wall, deck and planter surfaces that received application of the waterproofing membrane and system components from leakage due to faulty materials or installation for a minimum period of two (2) years following acceptance of the structure by the District, Contractor, manufacturer and applicator shall be jointly responsible for any/all repair procedures required in the event of failure to remain watertight. Coordinate with the District for availability of optional longer length warranties.
- B. Manufacturer shall not be released of any liability stemming from faulty materials or application by enforcement of standard warranty verbiage whether expressed or implied. Contractor shall be responsible for all repairs of any consequential or incidental damages and defects resulting from any subsequent work prior to the covering of the membrane.

## 2.00 PRODUCTS

### 2.01 MATERIALS

- A. Fluid applied waterproofing system shall be a single component, single course, high build, polymer-modified asphalt emulsion. Waterborne and spray applied at ambient temperature. Nominal thickness of 80 dry mils (60 dry mils minimum required) unless specified otherwise. Product shall be from the following:
1. Epro 'Ecoline', distributed by Systems Waterproofing Supply (805) 383-2735.
  2. Carlisle 'Barriercoat', as distributed by Heidt and Associates (818) 248-9677
  3. Pacific Polymers, 'Impermeo-Coat', 714.898.0025.
  4. Polycoat Products, 'Polycoat – Aquaseal 60', 562.577.9339
- (A.) ALTERNATE: Architect will consider bids for an alternate fluid applied system consisting of a solvent-free, single component, high solids, moisture cured, polyurethane coating:
1. Tremco – 250GC
  2. Pacific Polymers, 'Elasto-Deck B.T.1000',
  3. Carlisle 'CCW-525'
  4. Polycoat, 'Aquaseal 5000'
- B. Protection Course: Provide a 15 mil polyolefin geo-membrane vapor barrier / protection course, in the widest manufactured width possible. Installation shall include that all seams be taped with the manufacturers approved water resistant accessory tape. Provide SocoShield, as manufactured by Socopac Co. (714) 661-1389, Stego Wrap, as manufactured by Stego Industries, Inc. (877) 464-7834, or approved equal.
- C. Drainage Composite: Provide a drainage core composite with a 3-dimensional, high impact resistant, polymeric sheet dimpled core with a non-woven geo-textile filter fabric securely bonded to surface on one side. Provide mastic, impaling pins

or square cap nails as recommended by the manufacturer and as approved in writing by the waterproofing manufacturer. Cosella Dorken 6000, Tremdrain 6000, Miradrain 6000, or equal.

- D. Geo-textile Fabric: Continuous filament tight pervious non-woven weave (22 x 22 count), nylon, polyester or polypropylene fibers or combination filter fabric weighing minimum 4.5 oz/sq.yd. Each side neoprene or chloroprene coated 6.0 oz/sq.yd. for minimum total weight of 16.5 oz/sq.yd. Products manufactured by Mirafi 140N; Monsanto / Bidim C22 or C28; or equal.
- E. Protection Board: 1/4 inch asphalt saturated fiberboard, APOC or equal
- F. Termination Flashing: Flexible, high-strength, non-corrosive, UV stable, grey pvc, flush mounted, spring-lock termination flashing for closure and confinement of the top horizontal waterproofing system termination "Sure-term" as distributed by Systems Waterproofing Supply (805) 383-2735 or equal (no known equal).

### 3.00 EXECUTION

#### 3.01 EXAMINATION

All surfaces to be waterproofed shall be inspected and approved by the applicator at least one day prior to commencing work. Commencement of work shall be deemed approval and acceptance of substrata for waterproofing work.

#### 3.02 SURFACE PREPARATION

- A. Provide 24 inches minimum clearance out from surfaces to receive the waterproofing membrane. The application surface shall be prepared and provided to the applicator in accordance with manufacturers specifications listed below:
- B. Concrete / Masonry: Concrete surfaces shall be light broom finish or smoother, free of any dirt, debris, loose material, release agents or curing compounds. Fill all voids more than 1/4 inch deep and 1/4 inch wide. Masonry joints shall be struck smooth. All penetrations shall be prepared in accordance with manufacturers specifications. Provide a 3/4-inch minimum cant of manufacturers standard trowel grade, or other suitable material, at all horizontal to vertical transitions and other inside corners of 90 degrees or less.

#### 3.03 INSTALLATION OF MEMBRANE ON CONCRETE / MASONRY

- A. Due to the numerous variables affecting concrete (i.e. water content, mix specifications, cement source, "free-lime" percentage, calcium content, pumped vs. poured, environmental conditions at the time of concrete placement, admixtures, pH, acidity, type of finish, curing conditions, etc., etc.) every job will require pre-testing to determine the installation procedure. Follow the manufacturer's standard written recommendations and the specified procedures below carefully.
- B. Refer to manufacturers written recommendations for procedures to seal around penetrations, and as specified below.

- C. Provide a 3/4-inch minimum trowel grade cant, or other suitable material, at all horizontal to vertical transitions and other inside corners of 90 degrees or less. Allow cure a minimum of 24 hours before the application of membrane.
- D. Delineate a test area on site with a minimum dimension of 10 feet by 10 feet. Apply membrane material to a nominal thickness of 80 mils plus or as required so that the ultimate dry mil thickness will result in a guaranteed 60 dry mil membrane, and let it cure for 24 hours. Observe for blisters. If minor or no blistering occurs, proceed to the next step. (See note regarding blisters below). If blistering does occur, apply a thin (10 mil) tack coat without catalyst to the concrete surface and allow cure before proceeding. On horizontal concrete surfaces a 4 oz/yd. Non-woven geo-textile may be applied onto the concrete in lieu of the tack coat.
- E. Spray apply selected membrane to an 80 mil plus nominal thickness (60 dry mils minimum). If a second coat is required, remove any standing water from the membrane before proceeding with the second application.
- F. Spray on vertical surfaces should begin at the bottom and work towards the top. This method allows the product to adhere to the surface before hitting catalyst runoff.
- G. Do not penetrate membrane. Keep membrane free of dirt and debris and traffic until the protective cover is in place. It is the responsibility of the Contractor to insure that the membrane and the protection system is not penetrated or damaged in any way.
- H. On vertical surfaces apply protection as approved by the manufacturer and in conformance with Section 02720. On vertical areas requiring subsurface drain mat, apply with the geo-textile side facing backfill after surface moisture has evaporated from membrane.

#### 3.04 SEALING AROUND PENETRATIONS

- A. Clean and etch all penetrations. All metal penetrations shall be etched with a 10% muriatic acid solution.
- B. Roll out geo-textile on sub-grade with the heat-rolled side facing up. Overlapping seams a minimum of six inches (6"). Cut the geo-textile around penetrations so that it lays flat on the sub-grade. Lay geo-textile tight at all inside corners. Spray membrane within the seam overlap to a thickness of 60 mils minimum. (Note: This step may be omitted with applications not required geo-textile).
- C. Apply 80 mils nominal dry thickness (60 dry mils minimum) membrane trowel grade in a three inch (3") wide ring around the penetration and up the penetration a minimum of three inches (3"). Allow trowel grade to cure completely before proceeding to step "D".
- D. Spray apply membrane to an 80 mil nominal dry thickness (60 mils minimum) around the clean penetration, completely encapsulating the collar assembly and to a height one and one half inches (1-1/2") minimum above the trowel grade collar. Spray-apply membrane to surrounding areas as specified for the particular application.

- E. Allow trowel grade to cure completely before proceeding to step "F".
- F. Wrap penetration with polypropylene cable tie at a point two inches (2") above the base of the penetration. Tighten the cable tie firmly so as to squeeze the cured membrane collar.

3.05 INSTALLATION OF PROTECTIVE COURSE(S)

- A. Polyolefin / Vapor Barrier
  - 1. Roll out the selected polyolefin protection course in the greatest widths manufactured to minimize laps whenever possible. Overlap edges and ends a minimum of 1'-0". Treat each lap with manufacturers recommended 3"-4" wide tape continuously along the length of the joint.
  - 2. Tuck membrane tight into horizontal / vertical corner transitions. Fold protection membrane back evenly. At inside corner conditions apply membrane material in the corner to allow embed adhesion. Tape and treat all vertical joints as indicated above. Temporarily attach the top horizontal edge using seaming tape, until the entire system is terminated and flashed.
  - 3. At planter corner conditions, fold protection membrane in such a manner, mitering at corners to create a joint-less / seamless 'shower-pan' effect. Tape all folded seams.
  - 4. Care shall be taken at drain penetrations to properly seal the vapor barrier to the waterproofing membrane and the drain body assembly. The drain body shall be bolted together in such a way as to create a positive seal and allow water to flow directly down into the drainage system.
  
- B. Drainage Composite Panel:
  - 1. Install continuous drainage panels over the entire wall waterproofing previously covered with the polyolefin protection vapor barrier interlayer.
  - 2. Beginning at the bottom of the wall, (or base of planters) attach panels to walls with membrane mastic, tape or other non-penetrating fasteners. Extend up the wall to finish grade unless otherwise indicated.
  - 3. Attach panel with filter fabric side out, away from wall surface.
  - 4. Butt joint panels together at ends and sides, covering all joints with filter fabric. Provide spray adhesive or membrane mastic fastening of the fabric overlaps
  - 5. Repeat to cover the entire wall surface.
  - 6. Place bottom of drain panel behind drainpipe or above or behind the lateral drainage core. In planters drainage panels will be behind the gravel base layer. Coordinate with Section 02720.
  - 7. Cover terminal edges with filter fabric by tucking behind core. For corners and other uneven surfaces, attach fabric flap to wall with mastic to prevent soil intrusion behind panels.
  - 8. Where required, provide root barrier fabric over the drainage panel fabric, as indicated below.
  - 9. Where root barrier fabric is not required, backfill within seven days. Place and compact fill material to within 12" of system termination
  - 10. Place and compact soil directly adjacent to drainage composite using plate laboratory compactors, being careful to not damage the drainage composite. Turn plate compactor exhaust away from drainage structure so as to not burn the geo-textile fabric.



- C. Protection Board
1. Provide protection board along the termination of all walls adjoining landscaping and not subsequently covered with paving, within planters and continuously covering the sloped basement roof cap south of line A1
  2. Install protection board prior to installation of the system termination flashing, to protect the system assembly from subsequent damage of shovel backfill / landscaping operations.
  3. Install true, level and plumb along and in-line with the top terminal edge of the waterproofing system components.
  4. Butt joint ends of panels and tightly fit corners.

### 3.06 MEMBRANE TERMINATION FLASHING INSTALLATION

Contractor shall install the PVC spring lock surface mounted flashing continuously using the manufacturers standard 10'-0" strips, above the entire waterproofing system, along finish grade and/or no greater than 6" below grade. Fasten at 3" from each end and 12" in the field.

### 3.07 STAIRS STRINGERS AND LANDING PANS

- A. Contractor shall coordinate construction scheduling to provide application of the fluid applied membrane to the interior of stair and landing pans prior to installation of welded wire reinforcing and prior to placement of the concrete fill.
- B. Provide coating to the horizontal surfaces, over the transition (supporting angles) welds between vertical and horizontal connections and 3" up the perimeter vertical surface.

### 3.08 FIELD QUALITY CONTROL

- A. Field quality control is an essential part of this application. Contractor shall check its own work for coverage, thickness, and workmanship before calling for inspections by the manufacturer as a condition of warranty.
- B. When thickness or integrity is in question the system membrane should be tested in the proper manner as described below. Inspectors should always use visual and tactile measurement to guide them. Areas suspected of being too thin to the touch should be measured with gauges to determine exact thickness.
- C. On Concrete / Masonry Surfaces:
1. Membrane may be checked for coverage with a lightly oiled, needle nose depth gauge, taking four (4) readings over a one square inch area, every 500 square feet. Record the minimum reading. Mark the test area for repair.
  2. Test areas are to be patched over with membrane to an 80 mil minimum dry thickness, extending a minimum of one inch (1") beyond the test perimeter.
  3. NOTE: Due to the nature of concrete as a substrate, it is normal for some blistering to occur. This is caused by either concrete's tendency to off-gas when sealed, or water that is temporarily trapped between the concrete and the membrane. With time and the applied pressure of backfill, blisters will absorb into the concrete without detriment to the membrane.

4. A small number of blister heads should be sampled and checked for proper membrane thickness. If the samples have the required membrane thickness (80 mils nominal / 60 dry mils minimum), then the remaining blisters should not be punctured or cut. If the samples have less than the minimum 60 mils, then the area can either be re-applied to obtain the proper thickness or the blisters can be cut out and the immediate area re-applied or patched with trowel grade membrane.

END OF SECTION

1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including, but not limited to, these major items:
  - 1. Clear waterproof coating on exterior exposed split-faced CMU masonry and exposed aggregate plaster veneer panels

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 04220: Concrete Unit Masonry

1.03 REFERENCE STANDARDS

American Society for Testing and Materials (ASTM)  
ASTM E514 Standard Test Method for Water Penetration and Leakage through  
Masonry.

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Preliminary Tests: Contractor shall provide to the sealer manufacturer samples of the substrates to be used in the structure. Sealer manufacturer shall seal the samples and return to the Architect for its approval both for aesthetics and effectiveness, accompanied with a letter stating the actual application rates required to meet the warranty requirements.
- C. Method-of-Installation: Submit to Architect three (3) copies of manufacturer's current Method-of Installation recommendations. These recommendations, when approved by the Architect, shall become the basis for acceptance or rejection of actual installation methods used on the work.
- D. Samples: The applicator shall apply clear waterproofing to the masonry sample. The purpose of this sample is to observe color uniformity and intensity, the method of application, including workmanship techniques, and to water test surfaces for a thirty (30) day period. Equipment to be used for actual application to building walls shall be used to apply materials to samples.
- E. Notification: A representative of the manufacturer shall be notified 48 hours in advance and be present during job application.
- F. Verification:
  - 1. The applicator shall furnish to the Architect duplicates of invoices of all

- materials purchased for the project.
2. The applicator shall furnish certification, co-signed by the Contractor and manufacturer's representative, which verifies the quantity of materials applied to the project and the method of application, was in conformance with manufacturers recommendations. Base certification on verification of coverage rates and field inspection reports.
  3. The applicator shall file "Application for Guarantee" with the manufacturer.
- G. Manufacturer's certification that system complies with these specifications and those of the manufacturers. Base certificate on verification of coverage rates accompanied by copies of purchase orders and of manufacturer representatives field inspection reports and approval of substrate.
- H. Warranty: Submit copies of the manufacturers warranty for review by the Architect, jointly signed by the manufacturer and the (contractor / applicator / installer) indicating agreement between both parties to provide a joint and several warranty upon completion of the work. Conditions of the warranty will be used in evaluating / accepting the specified product and the reviewed submittal.

#### 1.05 QUALITY ASSURANCE

- A. Qualifications of Manufacturers:
1. Manufacturer shall show evidence that the firm has been engaged in producing such material for at least five (5) years and that the product submitted has a satisfactory performance record of at least five (5) years.
  2. Manufacturer shall be selected on the basis of providing on site services, supervision/inspection during and after the application to guarantee compliance with project and manufacturers' specifications and warranty.
- B. Qualifications of Applicator: Contractor qualified to apply this product shall be an applicator who has been trained, approved and certified by the manufacturer. Applicator shall have at least two (2) years experience spraying clear coatings.
- C. A representative of the manufacturer shall be notified 48 hours in advance and be present during job application. Manufacturer's representative shall approve the substrate in which the coating is to be applied and that the product selected for use is compatible to obtain the desired performance and aesthetic results. Any recommended changes contrary to these specifications shall be brought to the Architects attention immediately. Start of work implies that the manufacturer agrees with product selection and execution and assumes responsibility for the application.

#### 1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery shall be made to the job site in manufacturer's original containers with seals unbroken and labeled with manufacturer's batch number and date of manufacture.
- B. Store materials in original, unopened container in compliance with manufacturer's printed instructions.
- C. Use all means necessary to protect work of this Section before, during and after

installation and to protect the installed work of other trades. In the event of damage, immediately make all repairs and replacements necessary to the approval of Architect and at no additional cost to District.

## 1.07 GUARANTEE/WARRANTIES

- A. Upon completion of the installation, and as a condition of its acceptance, deliver to Architect a written warranty that the waterproofing installed will remain watertight for a period of five (5) years. Manufacturer shall guarantee material against moisture penetration for five (5) years.
- B. The applicator shall guarantee the installation against poor workmanship for a period of two (2) years from the date of acceptance of the parking structure by District, making all necessary repairs without charge to District during that period.

## 2.00 PRODUCTS

### 2.01 CLEAR WATERPROOFING

- A. All substrates shall be sealed with products as manufactured by one of the following:
  - 1. Weather Seal products, manufactured by ProSoCo, Inc. (800) 255-4255, locally distributed (949) 498-7077.
  - 2. Enviroseal products, manufactured by Harris Specialty Chemicals, Inc., distributed by (562) 438-4343
  - 3. Klere-Seal products, manufactured by Pecora Corporation (800) 233-9754, locally distributed (818) 991-3343.
  - 4. Chem-Trete products, manufactured by Huls America (800) 631-5275.
  - 5. UltraShield IIA, manufactured by Pro-Seal Products Inc. (800) 349-7325, locally distributed (818) 248-9677.
- B. The products listed above are selected as standards of quality and based on manufacturers recommendations for execution and substrates. Adjustments of application procedure and coverage rates must be in conformance with approved manufacturers standards and warranty requirements. Selection of particular product by any one proposed manufacturer ultimately is as selected by the Architect.
- C. Proposed alternate products must not contain any modified silicone oils, paraffin waxes, urethanes, or silicates, acrylics (poly's), methyl-based compounds or methacrylates. Siliane, siloxane and polycarbon based products with alkylalkoxy-, isobutyl-, or octyl functional groups are required.
- D. Coverage shall be based on manufacturer's minimum coverage rates for permeability and surface area. At no time shall rate of coverage be less than detailed in manufacturer's technical data sheets for substrate being covered.

### 2.02 EQUIPMENT

- A. Waterproofing shall be applied by a preferred method of a low pressure, high volume material pump with pressure not to exceed 20 psi. Pump shall not atomize but shall flow the material on the wall at a minimum rate of 12 gallons per

minute (orifice size 0.060 to 0.110 inches).

- B. Alternate methods include a heavily saturated brush or roller, or by spray equipment with pressure not exceeding 50 psi.

### 3.00 EXECUTION

#### 3.01 PROJECT CONDITIONS

- A. Do not apply coatings when surface temperature is more than 80 degrees in the shade, or when the relative humidity is more than 70 percent. Avoid application during high temperatures or wind, to minimize evaporation and drift.
- B. Do not apply when temperatures are 50 degrees or less at time of application and for four hours following treatment, or expected to drop below freezing during the 24-hour period following application.
- C. Do not apply coatings if rain is anticipated within 3 days. If rain does occur, allow surfaces to dry a minimum of five (5) days.

#### 3.02 SURFACE CONDITIONS

- A. Prior to all work of this Section, inspect the installed work of other trades and verify that all such work is complete to the point where this installation may commence. The manufacturer's representative shall field inspect and verify to the Contractor that the waterproofing may be installed in accordance with the manufacturer's recommended methods. In the event of discrepancy, immediately notify the Architect.
- B. Substrate shall be allowed to cure at least 28 days before clear waterproofing is applied. Walls shall be free of any soil, mud, efflorescence, excess mortar, etc., when possible use a "Dry" cleaning method. If wet cleaning is necessary, allow adequate time for drying to assure uniform penetration. Cracks, other than hairline cracks, shall be pointed up. Defective mortar joints shall be routed out, point with mortar and tooled.

#### 3.03 INSPECTION AND TESTING

The surfaces shall be inspected by the manufacturer's representative prior to the application of any waterproofing materials. Surfaces shall be tested for moisture content using the "Electronic Moisture Register". A minimum of one reading shall be taken for each 200 square feet of wall area and the results documented. The moisture content shall not exceed 15%, or as approved by the manufacturer for any surface prior to the waterproofing application.

#### 3.04 APPLICATION - Vertical

- A. Clear waterproofing shall be applied with a light coat to break surface tension followed by a flood coat. Flood coat passes shall be made starting at top of the wall followed by overlapping passes going down the wall. The spray head shall be held so that the fan will be vertical, with the head about 8 to 10 inches from the surface so that the flood coat runs freely down the surface 6 to 8 inches below the point of application. In all instances, spray by traveling horizontally to ensure

uniform coverage. On denser substrates overlap each following pass by approximately 50% (start each new section by holding the spray head centered on the bottom line of the previous pass). Refer to manufacturer's list of porous and denser substrate coverage rates. The surface shall remain wet for a few minutes and damp for over one hour. Repeat the procedure on spots which absorb too quickly as recommended by manufacturer's specifications and on site inspection recommendations. In cases of conflict, pay for required testing.

- B. Trigger sprayer off at the end of each pass to avoid an excessive amount of material being applied. Do not over apply. Avoid application in hot windy weather.
- C. Avoid overlapping dry areas. Keep a wet edge. If a white deposit occurs during overlapping, wipe with a damp cloth soon after forming. Delay in removing deposit may result in the necessity of using mechanical cleaning methods.

### 3.05 PROTECTION / CLEAN-UP

- A. During application, protect all adjacent work from damage and overspray. Concrete sidewalks shall be protected from runoff by soaking with water immediately prior to application on adjacent walls.
- B. Remove excess materials, equipment and debris incidental to this work.

END OF SECTION





1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division 1 apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Thermal insulation (batt, board) in exterior walls and roof.
  - 2. Sound insulation in partitions.
  - 3. Auxiliary insulating materials

1.02 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
  - ASTM C 167 Test Methods for Thickness and Density of Blanket or Batt Thermal Insulations.
  - ASTM C 423 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
  - ASTM C 612 Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
  - ASTM C 665 Mineral Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
  - ASTM E 84 Test Method for Surfaced Burning Characteristics of Building Materials.
  - ASTM E 96 Test Method for Water Vapor Transmission of Materials.
  - ASTM E 119 Test Methods for Fire Tests of Building Construction Materials.
- B. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) – 90.1.
- C. American National Standards Institute (ANSI)
- D. Acoustical and Insulating Materials Association (AIMA)
- E. Underwriters Laboratories (U.L.) Fire Resistance Directory
- F. State of California Code of Regulations, CCR Title 24, Insulation Quality Standards.

1.03 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Materials list of items proposed, insulation, anchors, etc.
- C. Test reports, specifications or catalog data that the materials being provided meet the criteria specified herein.

- D. Shop Drawings in sufficient detail to show each type of installation indicating manufacturer, location, extent, material, method of anchorage, vapor barrier continuity and interface of the work of this section with the work of adjacent trades.
- E. Submit samples of each type of insulation, size 12" x 12", and fasteners of each type to be used with manufacturers printed instructions. Include vapor barrier tape, 12" long.
- F. Certification: Provide certified test data and certificate that insulation materials conform to requirements of Title 24 CCR, Section 5311 (a) and that materials are installed to meet flame spread rating and other requirements.

#### 1.04 QUALITY ASSURANCE

- A. Engage a single firm to assume responsibility for all components of the exterior insulation work. The firm must demonstrate not less than five (5) years successful experience in fabrication and installation of work similar to the work of this project. Use skilled workers who are thoroughly trained and experienced in the necessary requirements and methods needed for proper performance of the work of this Section.
- B. Architectural drawings are diagrammatic. The details shown are intended as a guide for the aesthetic and interfacing requirements of the exterior wall insulation work to and with other work. The drawings are not to be construed as erection or engineering design, or adequate to meet the erection / engineering design requirements.
- C. Insulation shall be retained by use of fastening devices which are mechanically retained.

#### 1.05 SEQUENCE AND SCHEDULING

- A. Coordinate installation with other trades whose work may be affected.
- B. Do not install insulation until construction has progressed to the point that inclement weather will not damage or wet the insulation material.
- C. Install insulation after electric wiring, plumbing and other concealed work is in place.
- D. Insulation shall not be closed until it has been inspected and approved.

#### 1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original unopened packages, clearly marked with product brand name, manufacturer's labels, applicable standard, and R-value.
- B. Store insulation under cover, off ground, in a dry location to prevent damage from weather, soiling or construction activities. Use caution before, during and after installation to prevent damage to the mineral fiber batt or vapor barrier membranes.

- C. Protect insulation boards by not exposing to sunlight, except to extent necessary for period of installation and concealment. Protect against ignition at all times. Do not deliver to site ahead of installation time. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

## 1.07 WARRANTY

Furnish a written warranty/guarantee stating that all materials and workmanship for this section has been performed in accordance with the manufacturer's recommendations to provide a continuous thermal barrier and vapor barrier and that the work is guaranteed against defects for a period of five (5) years after completion and final acceptance of work by the Owner. Defects due to faulty material or workmanship developed during the guarantee period will be satisfactorily repaired or replaced, including removal, repair and replacement of contiguous work at no cost to the District.

## 2.00 PRODUCTS

### 2.01 MANUFACTURE

Provide products as manufactured by Certainteed Corporation, Johns Manville Inc., Owens - Corning, USG Interiors Inc., or equal.

### 2.02 MATERIALS

- A. Thermal Insulation: ASTM C665, Types II or III, Class A, B, or C; Fed Spec HH-I-521F as required by governing energy and fire codes. Rated wall assemblies shall be by Type III, Class A only having a maximum flame spread rating of 25, and a smoke develop rating of 50 per ASTM E84 where exposed or required by the California Building Code. Thermal resisting value of R30 and R13 as indicated on the Drawings. Provide batts with flanges for use under roof decks.
- B. Sound Insulation (Unfaced Batts): ASTM C665 Type I or Fed Spec HH-I-521F incombustible mineral fiber or glass fiber with maximum flame spread rating of 25 and a smoke develop rating of 50. Minimum 3-1/2 inch thick sound attenuation blankets with minimum density of 0.75 lbs /cu ft.
- C. Faced Mineral Fiber Blanket/Batt Insulation: Thermal insulation produced by combining mineral fibers of type described below with thermosetting resins to comply with ASTM C665 for Type III, Class A (blankets with reflective vapor-retarder membrane facing with flame spread of 25 or less); foil, scrim, kraft or foil-scrim polyethylene vapor retarder membrane on one face and as follows:
  - 1. Mineral Fiber Type: Fibers manufactured from glass or slag.
  - 2. Surface Burning Characteristics: Maximum flame spread and smoke developed values of 25 and 50, respectively.
  - 3. Acceptable Manufacturers:
    - Certain Teed - "FSK-25"
    - Owens Corning - "FS-25"
    - Johns Manville, Inc. - "FSK-25"
    - USG Interiors, Inc. - Thermafiber FS-25"

- D. Spindle anchor attachments for insulation under roof deck is to be with weld-on type impaling pins at metal decking with self-clinching washers as manufactured by AGM, Buildex, Erico, Gemco, Stic-Klip Mfg. Co., Type A or B as required, with Type S adhesive; Miracle Adhesive Corp. "Miracle StuckUps" with Type HT994 adhesive; or Goodloe E. Moore Gemco or Tuff-Weld with G-P Improved or Tuff-Bond quick set type adhesive as applicable; or equal. Use adhesives of correct type for substrates and type of anchor. Flathead "drop-pins" inserted through holes from top of deck are not permitted.
1. Pin Anchors: Perforated plate 2 inches square, welded to projecting pin with self-locking washer complying with the following requirements:
    - a. Plate: Zinc plated steel, 0.106 inch thick
    - b. Pin: Copper-coated low carbon steel, fully annealed, 0.106 inches in diameter, length to suit depth of insulation indicated and with washer in place to hold insulation tightly to substrate behind insulation.
    - c. Self-Locking Washer: Mild steel, 0.016 inch thick, size as required to hold insulation securely.
    - d. Where spindles will be exposed to human contact after installation, protect ends with capped self-locking washers
- E. String Wires: Minimum 18 gage galvanized steel wire.
- F. Vapor tape shall be a minimum of 4" wide foil, scrim or kraft face stock coated tape, coated on one side with acrylic rubber based pressure sensitive adhesive protected by a bleached kraft release liner. Reinforcing scrim arranged in a tri-directional pattern. Tape to be FasTape 0821 By Fasson or equal.
- G. Other Materials: Provide other materials not specifically described but required for a complete and proper installation as selected by the Contractor subject to the approval of the Architect.

### 3.00 EXECUTION

#### 3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.
- B. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- C. Verify that surfaces and locations to receive the work of this section are clean and free of dust, dirt or debris and free from any grease oil or coatings that would inhibit adhesion of bonding agents.

#### 3.02 INSTALLATION

- A. Inspect the Drawings and verify location of all partitions, ceilings and other areas requiring installation of sound and thermal control batt blankets. Install all work of this section in strict accordance with manufacturer's recommendations and in conformance with jurisdictional code requirements. Anchor all components firmly

into position. Comply with the following requirements:

1. Select width of batts to match stud spacing. Install insulation with edges closely butted with joints square, straight and in alignment (not staggered) and with aluminum foil facing on warm side of building and with exposed faces flush and in the same plane without warp or twist. Seal joints between insulation and perimeter or at penetrations with specified tape. Provide insulation at all locations required to meet thermal resistance requirements of the exterior wall.
2. Fit full thickness insulation snugly between framing intersecting or penetrating surfaces. Insulate small areas between closely spaced framing members. Cut and fit tightly around pipes, conduits and other obstructions and fill any voids with insulation compressing insulation where necessary. Where friction fit does not hold provide other appropriate means to secure batts.
3. At staggered stud partitions, install blanket insulation continuous without openings between batts.
4. Maintain nominal 3/4-inch air space between the insulation and interior wall or ceiling finish.
5. Apply a single layer of insulation to the required thickness, unless a double layer is required to make up the total thickness shown.
6. Install vapor barrier foil faced insulation at exterior walls with foil facing interior. All joints shall be sealed with 4" wide foil faced skrim reinforced tape to prevent vapor and air migration.
7. Tape all joints and ruptures in vapor barriers using tape specified and seal each continuous area of insulation to surrounding construction so as to insure a continuous vapor barrier.
8. Where insulation is impaled on stick clips, provide clips not less than 3" from corners or edges and not more than 12"oc.

### 3.03 INSULATION UNDER METAL DECK

Secure insulation in place with 16 gage galvanized stand off wires at 16"oc fastened with spindle fasteners and self-clinching washers to prevent excessive bowing of insulation.

### 3.04 CLEANING

Replace insulation or facing which becomes torn, water soaked or otherwise damaged.

### 3.05 PROTECTION

Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse and other causes. Provide temporary coverings or enclosures where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after insulation.

END OF SECTION



## 1.00 GENERAL

### 1.01 SCOPE

- A. Requirements of General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Spray on cementitious fireproofing to all structural steel members and metal decking of the Police Station.

### 1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 05100: Structural Steel
- B. Section 05300: Metal Decking
- C. Section 05500: Miscellaneous Metal

### 1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials
  - ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
  - ASTM E119 Standard Test Method for Fire Tests of Building Construction and Materials
  - ASTM E605 Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Materials Applied to Structural Members.
  - ASTM E736 Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members
  - ASTM E759 Standard Test Method for Fire Resistive Material Applied to Structural Members.
  - ASTM E761 Standard Test Method for Compressive Strength of Sprayed Fire Resistive Material Applied to Structural Members
  - ASTM E859 Standard Test Method for Air Erosion of Sprayed Fire-Resistive Materials Applied to Structural Members.
- B. American National Standards Institute
- C. Underwriters Laboratories UL Fire Resistance Directory

### 1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Manufacturer's literature of product data with certified test reports on surface burning characteristics, densities, bond strengths, insulating values and corrosion resistance. Indicate compliance with codes of jurisdiction.

- C. Submit independent test reports to confirm that proposed materials comply with minimum specified performance criteria.
- D. Submit manufacturer's certificate of compliance.

#### 1.05 QUALITY ASSURANCE

- A. Applicators Qualifications: Provide certificate of factory-training by the manufacturer of fireproofing material.
- B. Fire Endurance Tests: Provide materials which have been tested in accordance with ASTM E84 and E119 for a flame spread rating of 0, and a smoke developed rating of 0, and listed in the ANSI / UL Fire Resistance Directory.
- C. Performance and test criteria shall be certified by the manufacturer of the fireproofing material, otherwise independent testing shall be conducted to verify conformance with this Section.

#### 1.06 REQUIREMENTS

- A. Products must conform to California Building Code (CBC) and the specific ANSI / UL system directory design required.
- B. Verify whether pre-primed surfaces are suitable to receive "direct-to-steel" fireproofing. Consult fireproofing manufacturer and refer to the ANSI / UL Fire Resistance Directory.
- C. Temperature: Maintain air and substrate temperature at minimum of 40 degrees for not less than 24 hours prior to and after application.
- D. Ventilation: Provide adequate ventilation to allow for proper drying of the fireproofing during and subsequent to its application. In poorly ventilated or enclosed areas lacking adequate natural ventilation, forced air circulation is required to permit the material to become substantially dry within 30 days after application.

#### 1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Material shall be delivered in original unopened packages, fully identified as to manufacturer, brand or other identifying data, and bearing the proper ANSI / UL labels for the fire resistance classification.
- B. Material shall be stored (above ground), under cover and in a dry location until ready for use. All bags that have been exposed to water before use shall be unsuitable for use and discarded. Stock of material is to be rotated and used prior to its expiration date.

### 2.00 PRODUCTS

#### 2.01 MATERIALS

- A. Sprayed on fireproofing, must be a non-asbestos, factory blended cementitious



material, W.R. Grace & Co. "Monokote MK-6", ICC ES 4607 approved, or equal.

- B. Product Performance Criteria
1. Thickness: Conform to ANSI / UL Fire Resistance Ratings for hourly rating required by building code of jurisdiction.
  2. Bond Strength: Minimum average bond strength of 200psf when tested in accordance with ASTM E736.
  3. Air Erosion: Minimum allowable weight loss of fireproofing materials is .005gms / sq. ft. tested in accordance with ASTM E859.
  4. Compressive Strength: Deform more than 10% when subjected to 1000psf compressive force in accordance with ASTM E859.
  5. Density: Conform to ASTM E605 with 14 lb. minimum, 15 lb. average.
  6. Abrasion Resistance: 15.0 cm<sup>3</sup>.
  7. Impact Penetration: 6 cm<sup>3</sup>.
  8. Asbestos-free fireproofing,
- C. Products of fibrous (mineral wool) base and not a true cementitious based products and are not permitted. Proposed alternates must provide manufacturer data proving compliance.

### 3.00 EXECUTION

#### 3.01 PREPARATION

- A. All surfaces to receive sprayed fireproofing shall be free of oil, grease, paints / primers, loose mill scale, dirt or other foreign substances which may impair proper adhesion of the fireproofing to the substrate. Cleaning of surfaces to receive fireproofing shall be the responsibility of the structural steel erector, as outlined in the structural steel or steel deck section.
- B. Prior to application of fireproofing, clips, hangers, support sleeves and other attachments required to penetrate the fireproofing shall be in place.
- C. Ducts, piping and other suspended equipment which would interfere with application of fireproofing materials shall not be positioned until fireproofing work is complete.
- D. Coordinate completion of all roofing work prior to application of fireproofing to the underside of the roof deck. Prohibit all roof traffic during fireproofing application until materials are fully cured.
- E. Provide masking, drop cloths or other coverings to prevent over spray of fireproofing.
- F. Contractor shall be responsible for posting appropriate cautionary SLIPPERY WHEN WET signs. Signs shall be posted in all areas in contact with wet fireproofing material. Contractor shall be responsible for appropriate barriers to prevent entry by non-workers into the fireproofing spray and mixer areas or other areas exposed to wet fireproofing material.
- G. Application of sprayed fireproofing shall not begin until Contractor has inspected surfaces to receive fireproofing to determine surface acceptability to receive the

fireproofing material. Where primer is specified or required by the manufacturer, or if a mechanical attachment is required to obtain the fire resistance rating, Contractor shall install such attachments before the fireproofing begins.

### 3.02 APPLICATION

- A. Equipment and application procedures shall conform to the material manufacturer written instructions.
- B. Apply the required thickness and material densities in accordance with hourly ratings required by code.
- C. Apply fireproofing uniformly in density and thickness over the entire column, joists or metal deck surfaces.
- D. All patching and repairing of sprayed fireproofing, due to damage by other trades, shall be performed under this section and paid for by the trade(s) responsible for the damage.

### 3.03 FIELD QUALITY CONTROL

- A. The Architect / District may select for the District's independent testing laboratory to sample and verify the thickness and density of the fireproofing in accordance with provisions of ASTM E605, "Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Materials Applied to Structural Members," or California Building Code Standards.
- B. Deficiencies in applied materials below the required density or thickness may be either removed and replaced, or increased in thickness per UL specifications. Patch voids where test samples are taken.

END OF SECTION

1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. The project consists of installing Carlisle's Sure-Weld gray FleeceBACK 115 mil membrane adhered with Flexible FAST or FAST Adhesive as outlined below:
    - a. Police Station – Adhered System: Apply the Sure-Weld FleeceBACK Adhered Roofing System directly to the new concrete roof deck.
    - b. Elevator Lobby, Stair, Bus Stop and Elevator Shaft Roof – Mechanically Fastened System: Apply the Sure-Weld FleeceBACK Mechanically-Fastened Roofing System in conjunction with InsulFoam SP insulation over the metal deck roof.

1.02 EXTENT OF WORK

- A. Provide all labor, materials, tools, equipment, and supervision necessary to complete the installation of both the Sure-Weld FleeceBACK 'Adhered' and 'Mechanically-Fastened' Roofing Systems including flashings and insulation as specified herein and as indicated on the drawings in accordance with the manufacturer's most current specifications and details.
- B. The roofing contractor shall be fully knowledgeable of all requirements of the contract documents and shall make themselves aware of all job site conditions that will affect their work.
- C. The roofing contractor shall confirm all given information and advise the District, prior to bid, of any conflicts that will affect their cost proposal.
- D. Any contractor who intends to submit a bid using a roofing system other than the approved manufacturer must submit for pre-qualification in writing fourteen (14) days prior to the bid date. Any contractor who fails to submit all information as requested will be subject to rejection. Bids stating "as per plans and specs" will be unacceptable.

1.03 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Prior to starting work, the roofing contractor must submit the following:
  - 1. Shop drawings showing layout, details of construction and identification of materials.

2. A sample of the manufacturer's Membrane System Warranty.
  3. Submit a letter of certification from the manufacturer which certifies the roofing contractor is authorized to install the manufacturer's roofing system and lists foremen who have received training from the manufacturer along with the dates training was received.
  4. Mechanically Fastened: Certification from the membrane manufacturer indicating the fasteners are capable of providing a static backout resistance of 10 inch pounds minimum is required.
  5. Certification from the membrane manufacturer indicating the membrane thickness over the reinforcing scrim (top ply membrane thickness) is nominal .015-mil or thicker.
  6. Certification of the manufacturer's warranty reserve.
- C. Upon completion of the installed work, submit copies of the manufacturer's final inspection to the Architect prior to the issuance of the manufacturer's warranty.

#### 1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to the job site in the manufacturer's original, unopened containers or wrappings with the manufacturer's name, brand name and installation instructions intact and legible. Deliver in sufficient quantity to permit work to continue without interruption.
- B. Comply with the manufacturer's written instructions for proper material storage.
1. Store Sure-Weld membrane in a dry, cool, shaded area in the original undisturbed plastic. Sure-Weld membrane that has been exposed to the elements for approximately 7 days must be prepared with Weathered Membrane Cleaner prior to hot air welding.
  2. Store curable materials (adhesives and sealants) between 60°F and 80°F in dry areas protected from water and direct sunlight. If exposed to lower temperature, restore to 60°F minimum temperature before using.
  3. Store materials containing solvents in dry, well ventilated spaces with proper fire and safety precautions. Keep lids on tight. Use before expiration of their shelf life.
- C. Insulation must be on pallets, off the ground and tightly covered with waterproof materials.
- D. Any materials which are found to be damaged shall be removed and replaced at the applicator's expense.

#### 1.05 WORK SEQUENCE

- A. Schedule and execute work to prevent leaks and excessive traffic on completed roof sections. Care should be exercised to provide protection for the interior of the building and to ensure water does not flow beneath or wick into any completed sections of the membrane system.
- B. Do not disrupt activities in occupied spaces.

#### 1.06 USE OF THE PREMISES

- A. Before beginning work, the roofing contractor must secure approval from the building owner's representative for the following:
  - 1. Areas permitted for personnel parking.
  - 2. Access to the site.
  - 3. Areas permitted for storage of materials and debris.
  - 4. Areas permitted for the location of cranes, hoists and chutes for loading and unloading materials to and from the roof.
- B. Interior stairs or elevators may not be used for removing debris or delivering materials, except as authorized by the building superintendent.

#### 1.07 EXISTING CONDITIONS

If discrepancies are discovered between the existing conditions and those noted on the drawings, immediately notify the District's representative by phone and solicit the manufacturer's approval prior to commencing with the work. Necessary steps shall be taken to make the building watertight until the discrepancies are resolved.

#### 1.08 PRECONSTRUCTION CONFERENCE

- A. Prior to submittal, the roofing contractor should schedule a job site inspection to observe actual conditions and verify all dimensions on the roof.
- B. Prior to commencement of the work the Contractor shall convene a meeting at the job site to review and discuss the roofing work of this Section and all related work. Meeting shall be attended by the Architect, District Representative, Installer, and contractors of related work and inspection personnel, prior to executing associated work. Review and coordinate related requirements and procedures to be followed in performing the work of this Section. Discuss the sequencing, layout and installation procedures to determine and anticipate conditions prior to start of work. Notify all responsible parties a minimum of 48 hours before conducting meeting.
- C. Any conditions which are not shown on the shop drawings should be indicated on a copy of the shop drawing and included with bid submittal if necessary to clarify any conditions not shown.

#### 1.09 TEMPORARY FACILITIES AND CONTROLS

- A. Building Site:
  - 1. The roofing contractor shall use reasonable care and responsibility to protect the building and site against damages. The contractor shall be responsible for the correction of any damage incurred as a result of the performance of the contract.
  - 2. The roofing contractor shall remove all debris from the job site in a timely and legally acceptable manner so as to not detract from the aesthetics or the functions of the building.

#### 1.10 JOB SITE PROTECTION

- A. The roofing contractor shall adequately protect building, paved areas, service drives, lawn, shrubs, trees, etc. from damage while performing the required work.

Provide canvas, boards and sheet metal (properly secured) as necessary for protection and remove protection material at completion. The contractor shall repair or be responsible for costs to repair all property damaged during the roofing application.

- B. Do not overload any portion of the building, by either use of or placement of equipment, storage of debris, or storage of materials.
- C. Protect against fire and flame spread. Maintain proper and adequate fire extinguishers.
- D. Take precautions to prevent drains from clogging during the roofing application. Remove debris at the completion of each day's work and clean drains, if required. At completion, test drains to ensure the system is free running and drains are watertight. Remove strainers and plug drains in areas where work is in progress. Install flags or other telltales on plugs. Remove plugs each night and screen drain.
- E. Store moisture susceptible materials above ground and protect with waterproof coverings.
- F. Remove all traces of piled bulk material and return the job site to its original condition upon completion of the work.

#### 1.11 SAFETY

The roofing contractor shall be responsible for all means and methods as they relate to safety and shall comply with all applicable local, state and federal requirements that are safety related. Safety shall be the responsibility of the roofing contractor. All related personnel shall be instructed daily to be mindful of the full time requirement to maintain a safe environment for the facility's occupants including staff, visitors, customers and the occurrence of the general public on or near the site.

#### 1.12 WORKMANSHIP

- A. Applicators installing new roof, flashing and related work shall be factory trained and approved by the manufacturer they are representing.
- B. All work shall be of highest quality and in strict accordance with the manufacturer's published specifications and to the building owner's satisfaction.
- C. There shall be a supervisor on the job site at all times while work is in progress.

#### 1.13 QUALITY ASSURANCE

- A. The Sure-Weld Membrane Roofing System must achieve a UL Class C
- B. The membrane must be manufactured by the material supplier. Manufacturer's supplying membrane made by others are not acceptable.
- C. Unless otherwise noted in this specification, the roofing contractor must strictly comply with the manufacturer's current specifications and details.

- D. The roofing system must be installed by an applicator authorized and trained by the manufacturer in compliance with shop drawings as approved by the manufacturer. The roofing applicator shall be thoroughly experienced and upon request be able to provide evidence of having at least five (5) years successful experience installing single-ply roofing systems and having installed at least one (1) roofing application or several similar systems of equal or greater size within one year.
- E. Provide adequate number of experienced workmen regularly engaged in this type of work who are skilled in the application techniques of the materials specified. Provide at least one thoroughly trained and an experienced superintendent on the job at all times roofing work is in progress.
- F. There shall be no deviations made from this specification or the approved shop drawings without the prior written approval of the Architect. Any deviation from the manufacturer's installation procedures must be supported by written certification on manufacturer's letterhead and presented for the Architect's consideration.
- G. Upon completion of the installation, the applicator shall arrange for an inspection to be made by a non-sales technical representative of the membrane manufacturer in order to determine whether or not corrective work will be required before the warranty will be issued. Notify the building owner seventy-two (72) hours prior to the manufacturer's final inspection.

#### 1.14 JOB CONDITIONS, CAUTIONS AND WARNINGS

Refer to Carlisle's FleeceBACK Adhered Roofing System specification for General Job Site Considerations.

- A. Material Safety Data Sheets (MSDS) must be on location at all times during the transportation, storage and application of materials.
- B. Adhered System:
  - 1. Do not apply FAST Adhesive when surface and/or ambient temperatures are below 25°F.
  - 2. Drums of FAST Adhesive must be a minimum of 70°F at the time of use. Use drum band heaters when necessary.
  - 3. The addition of FAST Adhesive Catalyst (to Part B side) is recommended to speed up reaction time when temperatures are below 50°F.
  - 4. The contractor must exercise caution during adhesive spraying to avoid overspray.
  - 5. Use a non-atomizing spray tip such as the Graco Spatter Tip and reduce spray pressure to 500 – 800 psi to increase adhesive droplet size and reduce airborne mist. Maintain hand held wind screens on-site for use as necessary.
  - 6. Extruding FAST Adhesive method may be used to eliminate overspray concerns.
- C. When positioning membrane sheets, exercise care to locate all field splices away from low spots and out of drain sumps. All field splices should be shingled to

prevent bucking of water.

- D. When loading materials onto the roof, the Carlisle Authorized Roofing Applicator must comply with the requirements of the building owner to prevent overloading and possible disturbance to the building structure.
- E. Proceed with roofing work only when weather conditions are in compliance with the manufacturer's recommended limitations, and when conditions will permit the work to proceed in accordance with the manufacturer's requirements and recommendations.
- F. Proceed with work so new roofing materials are not subject to construction traffic. When necessary, new roof sections shall be protected and inspected upon completion for possible damage. Provide protection, such as 3/4 inch thick plywood, for all roof areas exposed to traffic during construction. Plywood must be smooth and free of fasteners and splinters.
- G. The surface on which the insulation or roofing membrane is to be applied shall be clean, smooth, dry, and free of projections or contaminants that would prevent proper application of or be incompatible with the new installation, such as fins, sharp edges, foreign materials, oil and grease.
- H. New roofing shall be complete and weather tight at the end of the work day. Care must be taken to avoid wicking water through the fleece by properly sealing exposed edges of the membrane.
- I. Contaminants such as grease, fats and oils shall not be allowed to come in direct contact with the roofing membrane.

#### 1.15 WARRANTY

- A. Provide manufacturer's 20 year Total System Warranty covering both labor and material with no dollar limitation. The maximum wind speed coverage shall be peak gusts of 100 mph measured at 30 feet above ground level. Certification is required with bid submittal indicating the manufacturer has reviewed and agreed to such wind coverage.
- B. Pro-rated System Warranties shall not be accepted.
- C. Evidence of the manufacturer's warranty reserve shall be included as part of the project submittals for the Architect's approval.

#### 2.00 PRODUCTS

##### 2.01 MANUFACTURER

- A. All components of the specified roofing system shall be products of Carlisle SynTec or accepted by Carlisle SynTec as compatible.
- B. Unless otherwise approved by the Architect and accepted by the membrane manufacturer, all products (including adhesives, insulation, fasteners, fastening plates and edgings) must be manufactured and supplied by the roofing system



manufacturer and covered by the warranty.

## 2.02 MEMBRANE

- A. Furnish Sure-Weld gray FleeceBACK 115-mil reinforced TPO (Thermoplastic Polyolefin) membrane. Membrane thickness over the reinforcing scrim (top-ply thickness) shall be nominal .015-mil or thicker.
- B. Gray Membrane Sheets are 12' wide by 100' long.

## 2.03 INSULATION / UNDERLAYMENT

- A. When applicable, insulation shall be installed in multiple layers and mechanically fastened or secured with Carlisle FAST Adhesive to the substrate in accordance with manufacturer's published specifications.
- B. Insulation shall be InsulFoam SP as supplied by Carlisle SynTec. Minimum R-value required is Not Required.
  - 1. InsulFoam SP – A closed-cell lightweight expanded polystyrene (EPS) with a factory-laminated fiber glass facer. Nominal density of 1.25 lbs/cubic ft (pcf), and meets ASTM C578, Type VIII. Designed for low-sloped roof applications that employ mechanically fastened or ballasted membranes.

## 2.04 ADHESIVES, CLEANERS AND SEALANTS

All products shall be furnished by Carlisle and specifically formulated for the intended purpose.

- A. Membrane and Insulation Adhesive:
  - 1. Flexible FAST Adhesive: An elongating impact resistant two component insulating urethane adhesive used to attach insulation and FleeceBACK membrane. Packaging formats include 50 and 15 gallon drums.
    - a. Adhesive to provide 150% elongation in conjunction with fleece backed membrane – ASTM D412
    - b. MDI content of Part A material less than 25%
  - 2. FAST Adhesive: A two component insulating urethane adhesive used to attach insulation and FleeceBACK membrane. Packaging formats include 50 and 15 gallon drums as well as Dual Cartridges and 5 gallon Bag in a Box formats.
- B. Sure-Weld Bonding Adhesive: A high-strength, synthetic rubber adhesive used for bonding Sure-Weld membrane to various surfaces. The adhesive is applied to both the membrane and the substrate at a coverage rate of approximately 60 square feet per gallon per finished surface (includes coverage on both surfaces).
- C. Low VOC Bonding Adhesive 1168: This product meets the <250 gpl VOC (volatile organic compound) content requirements of the OTC Model Rule for Single Ply Roofing Adhesives. A high strength, solvent-based contact adhesive the allows bonding of TPO membrane to various porous and non-porous substrates. Apply at a rate of 60 ft<sup>2</sup> per gallon finished surface. Available in 5-gallon cans. This product complies with southern California counties with

additional restrictions on solvents. See Carlisle's Product Data Sheet for a listing of the counties involved.

- D. **Cut-Edge Sealant:** A white or clear colored sealant used to seal cut edges of reinforced Sure-Weld membrane. A coverage rate of approximately 225 - 275 linear feet per squeeze bottle can be achieved when a 1/8" diameter bead is applied.
- E. **Water Cut-Off Mastic:** Used as a mastic to prevent moisture migration at drains, compression terminations and beneath conventional metal edging (at a coverage rate of approximately 10' per tube or 100' per gallon).
- F. **Universal Single-Ply Sealant:** A 100% solids, solvent free, voc free, one part polyether sealant that provides a weather tight seal to a variety of building materials. It is white in color and is used for general caulking such as above termination bars and metal counter flashings and at scuppers.
- G. **Thermoplastic One-Part Pourable Sealer:** A one-part, moisture curing, elastomeric polyether sealant used to fill TPO Molded Pourable Sealant Pockets. Packaged in 4, 2-liter foil pouches inside a reusable plastic bucket. 1 pouch will fill 2 TPO Molded Pourable Sealant Pockets.
- H. **Weathered Membrane Cleaner:** Used to prepare membrane for heat welding that has been exposed to the elements or to remove general construction dirt at an approximate coverage rate of 400 square feet per gallon (one surface).
- I. **TPO Primer:** A solvent-based primer used to prepare the surface of Sure-Weld Membrane prior to application of Pressure-Sensitive Coverstrip and TPO Pressure-Sensitive RUSS.
- J. **TPO Low VOC Primer:** A solvent-based, low solids primer used to prepare the surface of Sure-Weld Membrane prior to application of Pressure-Sensitive Coverstrip and TPO Pressure-Sensitive RUSS. This low VOC product is ideal for use in states where environmental issues are a concern.
- K. **Police Station:**
  - 1. **CCW 702 or CCW 702-LV:** a single component, solvent based, high tack primer used to provide adhesion between Carlisle 725TR and an approved substrate.
  - 2. **Cav-Grip Primer:** a low VOC contact adhesive used to prime surfaces for the application of 725TR.

2.05 **FASTENERS AND PLATES** – Non Penetrating Fasteners are to be used for the Elevator Lobby, Stair and Bus Stop roofs

- A. **Pre-Assembled ASAP Fasteners:** A pre-assembled 3" diameter Plastic Plate and # 12 threaded fastener with a #3 drive used for insulation attachment into steel or wood decks. Installed using OMG Fastening Tools.
- B. **InsulFast Fasteners:** A threaded #12 fastener with #3 phillips drive used for insulation attachment into steel or wood decks.

- C. Polymer Gyptec Fasteners: A **non-penetrating**, plastic fastener and corresponding 3" diameter plate used with lightweight deck substrates such as cementitious wood fiber, gypsum, and lightweight insulating concrete.

2.06 **CARLISLE METAL EDGING AND MEMBRANE TERMINATIONS**

**NOTE:** Provide the appropriate flashing as project specifics dictate

- A. General: All metal edging s shall be tested and meet ANSI/SPRI ES-1 standards and comply with California Building Code.
- B. SecurEdge 3000: a metal fascia system with a 20 gauge steel retainer bar and 24 gauge galvanized steel fascia. Metal fascia color shall be as designated by the Owner's Representative.
- C. SecurEdge 2000: a metal fascia system with an extruded aluminum anchor bar and 24 gauge galvanized steel fascia. Metal fascia color shall be as designated by the Owner's Representative.
- D. SecurEdge 1000: a metal fascia system with an .050" aluminum retainer bar and 24 gauge galvanized steel fascia. Metal fascia color shall be as designated by the Owner's Representative.
- E. SecurEdge 300: a snap-on edge system consisting of a 24 gauge galvanized metal water dam and 24 gauge steel Metal fascia color shall be as designated by the Owner's Representative.
- F. SecurEdge 200: a snap-on edge system consisting of a 24 gauge galvanized metal water dam and 24 gauge steel. Metal fascia color shall be as designated by the Owner's Representative.
- G. SecurEdge One Fascia: A snap-on edge system consisting of an extruded aluminum retainer bar, corrosion resistant fasteners and a 24 gauge or 0.040 Kynar finished aluminum fascia cover. Available with a 3" fascia height 12' long. Metal fascia color shall be designated by the Owner's Representative.
- H. SecurEdge One Edge: A snap-on edge system consisting of a 24 gauge retainer bar, corrosion resistant fasteners and a 24 gauge or 0.040 aluminum Kynar finished fascia cover. A spring clip holds the fascia cover in place. Available in sizes up to 8" fascia height 12' long. Metal fascia color shall be designated by the Owner's Representative.
- I. SecurWeld Drip Edge: 4'x 10' coated metal sheets made from 24 gauge galvanized steel with a minimum .035" thick non-reinforced gray Sure-Weld laminate. Sure-Weld membrane can be welded directly to the Sure-Weld Coated Metal in accordance with the manufacturer's detail.
- J. SecurEdge Coping: incorporates a 20 gauge anchor cleat with 4 pre-slotted holes, a concealed joint cover and 10 foot continuous sections of coping cap; can accommodate minimum 5 " wide parapet walls. Metal coping cap color shall be as designated by the Owner's Representative.
- K. SecurEdge One Coping: A snap-on coping edge system consisting of a 24 gauge

retainer bar (face side only), corrosion resistant fasteners and a 24 gauge or 0.040 aluminum Kynar finished coping cover. The coping cover is secured by clipping on the retainer bar and fastened on the backside with corrosion resistant fasteners (with rubber washer). Available for wall thicknesses up to 30". Metal coping cap color shall be as designated by the Owner's Representative.

- L. Termination Bar: a 1" wide and .098" thick extruded aluminum bar pre-punched 6" on center; incorporates a sealant ledge to support Lap Sealant and provide increased stability for membrane terminations.

## 2.07 WALKWAYS

Protective surfacing for roof traffic shall be Sure-Weld TPO Walkway Rolls installed per manufacturer's requirements or concrete pavers loose laid over an approved slip sheet (pavers not recommended for slopes greater than 2" in 12").

## 3.00 EXECUTION

### 3.01 GENERAL

- A. Comply with the manufacturer's published instructions for the installation of the membrane roofing system including proper substrate preparation, job site considerations and weather restrictions.
- B. Position sheets to accommodate contours of the roof deck and shingle splices to avoid bucking water.

### 3.02 INSULATION PLACEMENT – Mechanically Fastened System

- A. Install insulation or membrane underlayment over the substrate with boards butted tightly together with no joints or gaps greater than 1/4". Stagger joints both horizontally and vertically if multiple layers are provided.
- B. Secure insulation to the substrate with the required Carlisle fasteners and plates in accordance with manufacturers specifications.

### 3.03 MEMBRANE PLACEMENT AND ATTACHMENT – Mechanically Fastened System

- A. Unroll and position membrane without stretching. Provide and secure both perimeter and field membrane sheets in accordance with the manufacturer's most current specifications and details.
- B. Secure the membrane with the required Carlisle Fasteners and Plates spaced a maximum of 12" on center depending on project condition and plates shall be placed approximately 1-1/2" from the edge of the membrane sheet.
- C. Install adjoining membrane sheets in the same manner in accordance with the manufacturer's specifications

### 3.04 MEMBRANE PLACEMENT AND BONDING – Adhered System

- A. Position and unroll successive sheets and align to provide a minimum 2 inch

overlap (use pre-marked overlap line) along the selvage edge. At end laps (along the width of the sheet), membrane shall be butted together which will be overlaid with 6 inch wide Sure-Weld Reinforced Membrane and hot air welded on all edges.

- B. FleeceBACK Membrane shall be fully adhered to an acceptable substrate with Carlisle FAST Adhesive. The adhesive is spray applied or extruded to the substrate only and the membrane is rolled into the wet adhesive once it has foamed up and reached string/gel time (approximately 2 minutes). Roll the membrane with a weighted (100 - 150 pounds) steel roller to set the membrane into the adhesive.

**Note:** Exercise care to prevent overspray onto the membrane. If FAST Adhesive should contaminate the splice area, immediately (while the adhesive is still in liquid form) clean with Weathered Membrane Cleaner or allow FAST Adhesive to cure and remove with a paint-type scraper.

- C. Position adjoining sheets to allow a minimum overlap of 2 inches to provide a minimum 1-1/2" hot air weld.
- D. Continue to install adjoining membrane sheets in the same manner, overlapping edges a minimum of 2 inches and complete the bonding procedures as stated previously.

### 3.05 MEMBRANE HOT AIR WELDING PROCEDURES

- A. General: The FleeceBACK membrane has a selvage edge (the fleece-backing is discontinued) along the length of the sheet for membrane splicing. Selvage edges are not provided along the width of the membrane; adjoining membrane sheets must be butted together and overlaid with 6 inch wide Sure-Weld Reinforced membrane heat welded on all sides.
- B. Hot Air Welding Procedures
  1. Hot air weld the Sure-Weld FleeceBACK membrane using an Automatic Hot Air Welding Machine or Hot Air Hand Welder in accordance with the manufacturer's specifications. At all splice intersections, roll the seam with a silicone roller to ensure a continuous hot air welded seam.  
**Note:** When using 115-mil thick or thicker membrane, all splice intersections shall be overlaid with Sure-Weld T-Joint covers or non-reinforced flashing
  2. Probe all seams once the hot air welds have thoroughly cooled (approximately 30 minutes).
  3. Repair all seam deficiencies the same day they are discovered.
  4. Apply Cut Edge Sealant on all cut edges of reinforced membrane (where the scrim reinforcement is exposed) after seam probing is complete. Cut Edge Sealant is not required on vertical splices.

### 3.06 FLASHING

- A. Flashing of parapets, curbs, expansion joints and other parts of the roof must be performed using Sure-Weld FleeceBACK membrane or Sure-Weld reinforced membrane. Sure-Weld non-reinforced membrane can be used for flashing pipe

penetrations, Sealant Pockets, and scuppers, as well as inside and outside corners, when the use of pre-molded accessories is not feasible.

- B. Follow manufacturer's typical flashing procedures for all wall, curb, and penetration flashing including metal edging/coping and roof drain applications.

### 3.07 WALKWAYS

- A. Install walkways at all traffic concentration points (such as roof hatches, access doors, rooftop ladders, etc.) and all locations as identified on the specifier's drawing.
- B. Hot air weld walkway pads to the membrane in accordance with the manufacturer's specifications.

### 3.08 DAILY SEAL

- A. On phased roofing, when the completion of flashings and terminations is not achieved by the end of the work day, a daily seal must be performed to temporarily close the membrane to prevent water infiltration.
- B. Use FAST Adhesive or other similar material in accordance with the manufacturer's requirements.

### 3.09 CLEAN UP

- A. Perform daily clean up to collect all wrappings, empty containers, paper, and other debris from the project site. Upon completion, all debris must be disposed of in a legally acceptable manner.
- B. Prior to the manufacturer's inspection for warranty, the applicator must perform a pre-inspection to review all work and to verify all flashing has been completed as well as the application of all caulking.

END OF SECTION

## 1.00 GENERAL

### 1.01 SCOPE

- A. Requirements of General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Concrete vehicular traffic deck surfaces, inclusive of the following areas:
    - a. Delay pour strip at roof.
    - b. Over elevator machine room at ground level
    - c. Over electrical room, communications room and storage room under ground level ramp
  - 2. Concrete deck surfaces where noted on drawings.

### 1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 03300: Concrete and Concrete Finishes
- B. Section 07122: Fluid Applied Waterproofing
- C. Section 07900: Sealants and Caulking

### 1.03 SYSTEM PERFORMANCE REQUIREMENTS

- A. Provide low odor, non-flammable, liquid applied, (100%) high-solids, (solvent-free / low odor – zero VOC) elastomeric urethane, seamless, moisture cured, traffic coatings that are watertight, UV resistant, and that will not deteriorate upon exposure to sun, weather, normal traffic, spillage of motor oil, transmission fluids, other motor vehicle operating compounds, and manufacturer recommended cleaning procedures.
  - 1. Deterioration of traffic coatings includes but is not limited to:
    - a. Adhesive or cohesive failures
    - b. Abrasion or tearing failure resulting from normal traffic.
    - c. Surface crazing or spalling.
    - d. Intrusion of water, oils, gasoline, grease, salt or deicer chemicals, etc. into deck substrate.
- B. DSA Requirements: Finish coating texture shall demonstrate a coefficient of friction / slip resistance of at least 0.6 per ASTM C1028, in conformance with CBC / ADA Standards.

### 1.04 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)  
ASTM C794 Specification for Adhesion-in-Peel of Elastomeric Joint Sealants

ASTM C957	Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane With Integral Wearing Membrane
ASTM D412	Rubber Properties in Tension
ASTM D2240	Property-Durometer Hardness
ASTM D4060	Abrasion Resistance of Organic Coatings by the Taber Abraser
ASTM E96	Water Vapor Transmission in Materials
ASTM E108	Fire Tests of Roof Coverings

#### 1.05 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Samples: Submit samples 4" x 6" of coating systems used on 3" plywood base or suitable backing in specified mil thickness, quality of work, texture and color. Color as selected by Architect.
- C. Product Data: Manufacturer's printed product literature and installation instructions for evaluating the technical / tested physical and performance properties of the traffic coating material proposed for use and the requirements for preparing substrate and the ways and means of application of the system. Include Material Safety Data Sheets (MSDS) and any other safety requirements. Include a copy of the manufacturers ISO 9002 certification.
  - 1. Manufacturer's literature shall indicate all results of specific ASTM testing procedures consistent with cold applied traffic bearing membranes with integral wear course and long term service conditions. Include:
    - a. Weather resistance, including ultraviolet degradation.
    - b. Hydrolitic stability
    - c. Chemical resistance
    - d. Recovery from elongation.
    - e. Weight loss
    - f. Adhesion in peel after water immersion
    - g. Abrasion resistance
    - h. Low temperature flexibility
- D. Certificate of Compliance:
  - 1. Certification that products comply with local regulations controlling use of volatile organic compounds (VOC).
  - 2. Certificate of License, issued to applicator by manufacturer with evidence of a minimum of five (5) years experience in application of proposed products and system.
  - 3. Provide a field report prepared by the manufacturers representative or licensed applicator, stating that applied materials and procedures conform to project specifications and manufacturers requirements for application and required mil thickness of each area installed.
- E. Warranty: Submit copies of the manufacturers warranty for review by the Architect, jointly signed by the manufacturer and the (contractor / applicator / installer) indicating agreement between both parties to provide joint and several warranty upon completion of the work. Conditions of the warranty will be used in evaluating / accepting the specified product and the reviewed submittal.



## 1.06 QUALITY ASSURANCE

- A. **Applicator:** Installer shall be certified in writing by the selected manufacturer of the approved coating, that the applicator is experienced (minimum five years) in applying traffic coatings of comparable scope / scale of this Project. Apply material by factory-trained workers in strict accordance with manufacturer's instructions, using equipment and procedures recommended by the manufacturer.
- B. **Single Source Responsibility:** Obtain primary traffic coating materials, including primers and aggregates from a single manufacturer regularly engaged in manufacturing traffic coatings. Provide secondary materials including sheet flashings, joint sealants and substrate repair materials of type and from source recommended by traffic coating manufacturer.
- C. **Field Samples:** Apply traffic coating field sample to 200sqft of project substrate to demonstrate surface preparation, joint and crack treatment, thickness, texture, color and standard of workmanship.
  - 1. If Architect determines that field sample does not meet requirements, reapply traffic coating until the field sample is acceptable.
  - 2. Keep the accepted sample undisturbed during application as a standard for judging the remainder of the completed traffic coatings. The approved, undamaged field sample may be incorporated into the work.
- D. Comply with the following procedures when requested by the Architect. Testing shall be done on the base membrane as applied by a recognized testing laboratory and certified reports shall be submitted.
  - 1. **Fire Test:** Minimum Class "B", and Building Code approved, tested in accordance with ASTM E108. Conform to Underwriter's Laboratories, Inc. or Warnock Hersey, Class "B" listing.
  - 2. **Percent Elongation:** Elongation tested in accordance with ASTM D412 to be at least 400 percent.
  - 3. **Tensile Strength:** Tensile strength tested in accordance with ASTM D412 to be at least 1200psi.
  - 4. **Abrasion Test:** Tested in a Tabor Standard Tester for 1000 cycles under a 1000 gram load using CS17 Wheels. Test is for a 70-mil specimen to lose no more than .004 inches in depth in wear. Perform test on a smooth sample without aggregate.
- E. Upon completion and as a condition precedent to final acceptance, the coating manufacturer shall issue a certificate to the District stating that the work of this Section has been inspected and has been performed in compliance with all contract requirements.

## 1.07 REQUIREMENTS

Mil thickness specified in this Section is "dry" film. Selected manufacturer / system reviewed must provide the mil thickness as specified herein, regardless of the manufacturer's standard approved system mil thickness.

## 1.08 COORDINATION

- A. Cooperate with other trades whose work affects or is affected by the work of this section in order that all phases of the work are properly coordinated to avoid delays, omissions or damage to any part of the work installed by the Section.
- B. Notify applicator and the manufacturer's representative in sufficient time to attend pre-construction conference to describe to the workers the type of concrete finish that will be acceptable for the areas which are to receive the traffic coating.
- C. Verify whether liquid curing agents are approved by the membrane manufacturer to cure concrete in areas to be coated, or whether only water or moisture curing operations are required. Refer to Section 03300 - Concrete and Concrete Finishes.

#### 1.09 ENVIRONMENTAL AND SAFETY REQUIREMENTS

- A. Environmental Conditions: Apply traffic coatings within the ambient and substrate temperatures recommended by the manufacturer. Do not apply coatings to a damp or wet substrate, when relative humidity exceeds 85 percent or when temperatures are less than 5 deg F (3 deg C) above dew point. There shall be no precipitation during application of adhesive / primer or subsequent coatings.
- B. Substrate Temperature: Do not apply coatings in rain, fog or mist, or when such weather conditions are imminent. Substrate surface temperature shall be not lower than 45 deg. F, nor greater than 95 deg. F. during application or curing of adhesive / primer or subsequent coatings.

#### 1.10 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in the original manufacturer's undamaged packages and containers with seals unbroken and bearing manufacturer's labels containing brand name, type of material, date of manufacture, lot or batch number, color, directions for handling, storage and mixing with other components.
- B. Store all materials out of direct exposure to the sun and so as to preclude damage from all other sources. Store materials in areas maintained at a temperature range between 50 and 90 deg. F.

#### 1.11 GUARANTEE

The coating materials and quality of work involved in this application shall be guaranteed jointly by manufacturer and applicator, under a single 'No Dollar Limit – No Cost To District document to the District for a term of not less than three (3) years after the date of building acceptance. Provisions of the wearing and waterproofing performance of the system guarantee shall include responsibility for bridging cracking in the substrate up to 1/8" in width.

### 2.00 PRODUCTS

#### 2.01 SYSTEM COMPONENTS

- A. Acceptable Manufacturers: (70 mil systems) – Elastomeric Urethane Coatings

1. Elasto-Deck 5000 P.D.S. - 70 mil Parking Deck System, Pacific Polymers, Inc., (714) 898-0025, RR#24208.
  2. UI System #70H, UPI Sealant Products, Inc. (714) 560-0204
  3. Vulkem 350 Traffic Deck Coating System as manufactured by Mameco International, Inc., (714) 968-0890, RR # 24174.
  4. Dura-Deck 800 System as manufactured by Pecora Corporation (800) 233- 9754, locally represented by (818) 991-3343.
  5. Carlisle Coatings 800.527.7092 – CCW-5123,
- (A.) Acceptable Manufacturers: (Minimum 42 mil systems / double texturing not less than 56 mils) – Epoxy / Polyurethane Type Systems
1. Carlisle Coatings 800.527.7092 – Eco-Fast II Heavy Duty Deck Coating, as distributed by Heidt & Associates 800.223.0512 / 818.248.9677.
  2. Pacific Polymers 714.898.0025 - Elasto-Deck 5000 H.T. 6500 VT
  3. Polycoat Products 562.802.8834 – Poly-I-gard 246 (246 SF) Vehicular Deck System,
  4. Miracote / Crossfield Products 310.886.9100 – Mirathane (42-46) Hi-Use (56)
  5. Neogard 214.353.1689 – Auto-Gard (FC)
- B. Primers: Manufacturer's standard factory formulated single or multi component, high solids, low viscosity, (low odor) VOC compliant, fast-cure epoxy primer, as required by the selected manufacturer for use on concrete and porous surfaces (plywood / OSB) to improve adhesion and to reduce pinholes, and on any metal surface in which membrane may be applied.
- C. Urethane Base and Intermediate Wearing Coat(s): Single or multi-component, high solids, low VOC, low odor, self leveling, medium or high viscosity, fast-curing, aromatic liquid polyurethane elastomer coating, with good chemical resistance and good adhesion properties for a static and dynamic crack bridging base and waterproofing membrane used for multi-component systems.
- D. Top Coat: Single or multi-component, high solids, low VOV, low odor, UV stable, self leveling, moisture curing, aliphatic liquid polyurethane elastomer coatings to provide abrasion-resistant wearing characteristics, chemical resistance and ultraviolet degradation gloss topcoat sealer to the previously applied system components.
- E. Miscellaneous Materials:
1. Sealants: Single or multi-component urethane sealants complying with ASTM C920 as recommended by the manufacturer for substrate and joint conditions, used in sealing cracks expansion joints and for use in forming cants and for compatibility with the traffic coatings. Refer to Section 07900.
  2. Aggregate: Cleaned and graded, 20-30 or 40-60 mesh quartzite, silica sand, silicon carbide, alumina oxide, or commercially prepared ground walnut shells, as recommended by approved coating manufacturer, for selected wear coarse, with a minimum hardness of 6 on the Moh-Scale.
  3. Sheet Flashing: 50 mil minimum non-staining uncured sheet neoprene.
  4. Adhesive: Manufacturer's recommended contact adhesive.
  5. Reinforcing Strip: Manufacturer's recommended fiber-glass mesh.

### 3.00 EXECUTION

#### 3.01 SUBSTRATE CONDITION

- A. Examine substrate conditions under which traffic coating systems will be applied for compliance with requirements. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Start of work in any area to which vehicular or pedestrian traffic or roof deck coatings are to be applied, implies acceptance of the substrate surfaces and the assumption of all obligations under the required guarantee.
- C. Do not commence sealing of deck pour and separation joints until after the building is completed and all post-tensioning shortening / creep has taken place. Width of joints may vary from dimensions detailed. Refer to application paragraph for specific procedures.
- D. Verify that work performed under other sections meets the following requirements:
  - 1. That concrete surfaces were finished / textured in accordance with manufacturer's requirements.
  - 2. That concrete was cured by a water-based curing agent approved by the deck coating manufacturer or moisture curing was implemented.
  - 3. That concrete has completed a minimum 28-day curing period and is completely dry, and/or as approved by the deck coating manufacturer.
  - 4. Concrete surfaces shall be visibly dry and pass a 4-hour rubber mat test (no condensation) prior to application of coating system. Mat shall be taped to deck on all sides. Conform to ASTM D4263.
  - 5. That concrete is clean and free of contaminants.
  - 6. Other requirements that may be prerequisite of the manufacturer of the coating used.

#### 3.02 PREPARATION OF SURFACES

- A. Clean and prepare substrate according to manufacturer's recommendations and as specified. Provide a clean, debris / dirt and dust -free substrate. Remove grease, oil, paints or other penetrating contaminants from concrete, which prevent proper adhesion, by detergent power wash or acid etching surfaces. Thoroughly rinse and allow surfaces to dry, prior to execution.
- B. Remove concrete fins, ridges or other projections. If required, provide abrasive blast clean concrete surfaces to a uniform profile according to ASTM D 4259 with a self-contained re-circulating blast cleaning apparatus. Remove remaining loose material and power wash to provide a sound surface free of laitance, glaze, efflorescence, curing compounds, concrete hardeners or form release agents. Surface blast profile to expose the top surface of the fine aggregates. Clean surfaces according to ASTM D4258.
- C. Shrinkage cracks in concrete over 1/16" in width shall be saw cut or routed clean to minimum 1/4 inch wide by 1/2 inch deep, and filled flush with flowing type liquid

elastomeric sealant material or manufacturers standard repair mortar and made level with the existing surface. Other methods for crack treatment may be used which is standard with the manufacturer of the coating membrane in order to effect the required guarantee.

- D. Mask off adjoining surfaces not receiving traffic coatings and close off drains and other penetrations to prevent spillage and migration of liquid membranes.

### 3.03 PREPARATION AT TERMINATIONS AND PENETRATIONS

- A. Prepare vertical and horizontal surfaces at terminations and penetrations through traffic coatings and at expansion joints, drains and sleeves according to ASTM C1127 and manufacturers recommendations.
- B. Provide sealant cants at / around penetrations with reinforced and non-reinforced deck to wall (horizontal to vertical) joints.
- C. Prime substrates and apply preparatory base coat. Embed joint reinforcing strip in coating when recommended by traffic coating manufacturer.
- D. Terminate edges of deck to deck expansion joints with preparatory base coat strip.

### 3.04 JOINT AND CRACK TREATMENT

- A. Prepare, treat, rout and fill joints and cracks in substrate according to ASTM C1127 and traffic coating manufacturer's recommendations. Remove dust and dirt from joints and cracks complying with ASTM D4258 prior to coating surfaces.
  - 1. Cut open existing cracks less than 1/8 inch, clean, prime and fill with sealant in accordance with manufacturer's instructions.
  - 2. Prime substrates on both sides of cracks and joints greater than 1/8 inch and apply a 20-mil minimum dry film preparatory base coat strip extending a minimum of 2 inches each side of joint. Embed joint reinforcing strip in base coat when recommended by traffic coating manufacturer.
  - 3. Apply bond breaker tape between sealant and preparatory base coat strip when required by manufacturer.
  - 4. Comply with recommendations of ASTM C1193 for joint sealant installation.

### 3.05 SHEET FLASHING

- A. Deck-to-Wall Expansion Joints and Dynamic Joints: Install sheet flashing and bond to deck and wall substrates according to manufacturer's recommendations.
  - 1. Prime all junctions of all changes in planes and around all through deck penetrations.
  - 2. Place a 2" x 2" bead of joint sealant to these primed areas. Tool cants to a 45 deg. cove.
  - 3. Allow membrane to cure properly
  - 4. Place bond breaker tape on cured sealant.

### 3.06 COATING APPLICATION

- A. Clean surfaces and prime all surfaces to be coated. Mix all component materials in accordance with manufacturer's recommendations. Apply coatings by spray, roller, notched rubber squeegee or other applicators and back-rolling according to manufacturer's printed recommendations and in compliance with factory training. Apply liquid coating (membrane coating) as required, with not less than the minimum thickness of each coating recommended by the manufacturer. Extend subsequent coating(s) over entire previous coating. Verify wet film thickness of each component coat every 100sqft. Cure for a minimum of 24 hours prior to allowing pedestrian traffic onto finished surface.
1. Apply coatings in minimum 3 coats to total (wet / dry) mil thickness of not less than the manufacturer's recommendations, in strict accordance with manufacturer's application spread rate instructions and the specified requirements herein.
  2. Application should not be stopped part way across an area and then completed later. Continuous application shall ensure complete waterproof integrity / continuity and a smooth level coat with no lines, streaks, ridges or puddles that disfigure the deck.
  3. Since it is common for moisture vapor to "gas" out of the concrete and cause "pinholes" in the primer or basecoat as it sets up, especially if the air temperature is increasing. These pinholes can lead to leaks. To avoid pinholes, apply the primer or basecoat when the temperature is at the Dew Point or decreasing, generally mid to late afternoon. Moisture vapor pressure is reversed as the temperature starts decreasing and the material is drawn into the concrete, forming a much stronger, more monolithic bond with the substrate.
  4. Allow primer to change color (as applicable) and become tack-free before proceeding. Do not exceed 24 hours before next application.
  5. Prior to applying subsequent coats, inspect primer and basecoat for pinholes or bubbles due to moisture vapor "out gassing." Grind or scrape off any bubbled material and fill flush with polyurethane sealant.
  6. While wearing coarse is still fluid walk back through the wet material on spiked golf-type shoes and broadcast aggregate by hand, glitter gun, or sand pot spray, to excess or complete refusal in a even, uniform fashion, free of lumps or streaks cross-rolled to incorporate the aggregate. Rebroadcast areas where the aggregate sinks completely into thick spots of material, if any. Apply to the follow rates:
    - a. Vehicular / Pedestrian Traffic Coating: Normal duty. Apply aggregate at a minimum rate of 15 lb/100sq.ft. Finish texture shall comply with paragraph 1.03B.
    - b. Ramps and Turns: Heavy duty. Apply aggregate at a minimum rate of 25 lb/100sq.ft.
  7. Sweep or blow off all excess aggregate. Scrape all lumps or streaks to match the surrounding aggregate surface profile. Apply topcoat by squeegee and back-roll to provide the recommended coverage rate and allow coating to cure at least (72) hours before allowing traffic on deck.
  8. Where coating adjoins walls, return coating minimum 4" up on wall to form base. Omit aggregate on vertical surfaces.
  9. Application of all coatings at pour strips and deck surfaces as noted on the Drawings, are to extend an additional 12" beyond the areas indicated to be coated.

### 3.07 FIELD QUALITY CONTROL

- A. Verify applied thickness before material attains final set by use of mil-thickness gauge as work progresses. Immediately apply additional coating materials to produce required membrane thickness where readings indicate wet mil thickness less than that specified.
- B. In-Place Testing: Contractor shall test each near-level deck area for leaks immediately after nominal cure of completed traffic coatings. Execute by damming and flooding each area to be tested for 24 hours, examining the underside of the deck for evidence of leaks. Repair any/all leaks observed. Repeat testing and make repairs until no leaks are detected.
- C. Visually inspect other areas which cannot be water tested for voids, damage or rupture in the completed system membrane.
- D. If test results show that installed system materials do not comply with manufacturers requirements, remove all non-complying components, prepare surfaces and reapply with specified materials and methods until deemed acceptable.

### 3.08 CURING, PROTECTION AND CLEANING

- A. Cure traffic coatings according to manufacturer's printed instructions taking care to prevent contamination and damage during application and curing.
- B. Do not allow traffic on coated surfaces during the required cure time necessary for recoating / top coating. Allow a minimum of 72 hours or longer as recommended by selected manufacturer / system used, depending on temperature and humidity. Low temperature and low humidity retards (extends) cure. Protect deck from traffic, wear and damage during remainder of construction period.
- C. Remove temporary coverings and clean coatings just before final inspections. Use cleaning materials and procedures recommended by manufacturer.

END OF SECTION





1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Miscellaneous metal flashing and counter-flashing installed in conjunction with roofing system
  - 2. Metal scuppers, leader head and downspout
  - 3. Steel louvers with bird screens
  - 4. Coping caps (typical and that indicated below 7d.)
  - 5. Drip flashings.
  - 6. Elevator shaft cant flashings.
  - 7. Closure plates
    - a. Vertical closure plates at column / elevator shaft wall joints between structures at each level, interior and exterior
    - b. Horizontal cant closure plates over Second Level spandrel moment beam and CMU east wall of the Police Station.
    - c. Vertical closure plates between columns and CMU wall, at the same location noted above
    - d. Horizontal cant closure plate coping cap along the Third (roof) Level moment beam and CMU east wall parapet of the police station
  - 8. Miscellaneous metal flashings, counter-flashing, and sheet metal, except where provided under Mechanical and Electrical Sections.
  - 9. Galvanizing and field touch-up.
  - 10. Caulking.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 05300: Metal Decking
- B. Section 05500: Miscellaneous Metal
- C. Section 07113: Waterproofing Underlayment
- D. Section 07530: Single Ply Roofing
- E. Sections 09203 and 09250: Metal Accessories for Lathing and Drywall
- F. Division 15 and 16: Sheet Metal Work for Electrical and Mechanical functions

1.03 SYSTEM PERFORMANCE REQUIREMENTS

- A. Factory Mutual Class 1-60 Rating: Install metal flashing and other interfacing work in compliance with Factory Mutual (FM) Loss Prevention Bulletin 1-49 for FM Class 1-90 certification, 90 psf uplift pressure.
- B. Thermal Movement: Provide assemblies capable of withstanding up to 120 F degrees ambient; 180 degrees F material surface; of thermal movement without

buckling, imposing stress on fasteners or anchors, loss of weather-tightness, or other reduction in performance

#### 1.04 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
  - ASTM A653 Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-iron Alloy Coated (Galvannealed) by the Hot-Dip Process
  - ASTM A924 Specifications for General Requirements for Steel Sheet, Metallic Coated by the Hot-Dip Process
  - ASTM B32 Specification for Solder Metal
- B. Federal Specification (FS)
  - FS TT-S-230 Sealing Compound: Elastomeric Type, Single Component (For Caulking, Sealing and Glazing in Building and other Structures)
  - FS TT-S-1543 Sealing Compound: Silicone Rubber Base (For Caulking, Sealing and Glazing in Buildings and other Structures)
  - FS UU-B-790 Building Paper, Vegetable Fiber (Kraft, Waterproofed, Water Repellant and Fire Resistant)

#### 1.05 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Product Data: Provide manufacturer's technical product data, installation instructions and general recommendations for each specified flashing material and fabricated product.
- C. Shop Drawings: Submit for review prior to fabrication all fabricated sheet metal showing layout, profiles, details, methods of joining, flashing connections, anchoring and fastening, relationship to supporting structure, thickness and gages of metals, concealed reinforcement, expansion joint details, finishes, sections and profiles. Drawings shall also show installation details of prefabricated items with relationship to project requirements, adjacent materials and adjoining construction.
- D. Samples: Submit such samples for materials or assemblies as may be requested.

#### 1.06 QUALITY ASSURANCE

- A. Drawings and requirements specified govern. Conform to the current "Architectural Sheet Metal Manual" published by Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA), latest edition, for conditions not indicated or specified and for general fabrication of sheet metal items.
- B. Install sheet metal flashing, trim assemblies and fasteners to meet the FM Class 1-90 wind uplift resistance, structural movement, thermally induced movement and exposure to weather without failing.
- C. Where possible, take field measurements of structure or substrates to receive fabricated sheet metal assemblies prior to manufacture. Allow for adjustment of assemblies where final dimensions cannot be established prior to fabrication.

- D. Complete installation promptly after roofing installation to preclude moisture from entering roofing system.

#### 1.07 PROJECT CONDITIONS

Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of work and protection of materials and finishes.

#### 1.08 DELIVERY, STORAGE AND HANDLING

- A. Stack pre-formed material to prevent twisting, bending and abrasions and to provide ventilation.
- B. Prevent contact with materials that may cause discoloration or staining.
- C. Ship pre-coated products with strippable covering

#### 1.09 GUARANTEE

Guarantee all sheet metal work for two (2) years after date of acceptance, against any inherent or developed defect in materials, fabrication or installation. Guarantee that work will remain watertight during this period, including repair or replacement of defective materials and workmanship.

### 2.00 PRODUCTS

#### 2.01 BASIC MATERIALS

- A. Galvanized Steel: Carbon steel sheets of commercial quality, complying with ASTM A653, hot dipped galvanized in accordance with ASTM A924, with minimum zinc coating of 1.25 ounces per square foot and 0.2 percent copper bearing, (G90 coating designation), mill phosphatized for paint adhesion, 24 gage minimum unless otherwise shown or specified.
- B. Solder: ASTM B32, B284, alloy grade as recommended by industry standards:
  - 1. Galvanized Steel: Grade SN 50 with 50% lead and 50% tin, or Grade SN60, 60% tin and 40% lead.
- C. Solder Flux: Standard brand non-corrosive acid-base neutralized with zinc type. Use a non-corrosive rosin flux over tinned surfaces.
- D. Fasteners: Zinc or cadmium coated steel or Type 302 or 304 stainless steel, hard copper, bronze or brass, or other non-corrosive metal of approved quality and strength for purpose specified. Match finish of exposed heads with material being fastened.
  - 1. Screws: with matching non-ferrous washers, Phillips or Hex head, self-drilling, self tapping, stainless steel or tempered non-corrodible steel of proper size and length to suit conditions. Screw heads shall be furnished with neoprene washers.
  - 2. Rivets: Soft iron, tinned.
  - 3. Metal Accessories: Provide sheet metal clips, anchoring devices and

similar accessory units as required for installation of Work, matching or compatible with material being installed; non-corrosive; size and thickness required for performance.

## 2.02 MISCELLANEOUS MATERIALS

- A. Elastomeric Sealant: ASTM C920, Elastomeric silicone polymer sealant, low modulus; of type, grade, class and use classification required to seal joints in sheet metal flashing and trim and remain watertight. Comply with requirements for joint sealants as specified in Section 07900 - Sealants and Caulking.
- B. Butyl Sealant: ASTM C1311, single-component, solvent release butyl rubber sealant, polyisobutylene plasticized; heavy bodied for hooked type expansion joints with limited movement.
- C. Primer: Approved brand of zinc-dust zinc-oxide primer or manufacturer's pretreatment materials.

## 2.03 PRE-MANUFACTURED MATERIALS

Reglets and Counter-flashings: Fry Reglet Corp. flashing systems complete with unions and preformed corners of necessary types for particular locations, of 24 gage galvanized steel, or Metco Metal Products Co., Pacific Loxtite Flashing Co., National Cornice Works, Redco, Lane-Air, or equal. Use a single manufacturer's products, equivalent to Type CO at concrete, Type MA at masonry, Type ST at plaster or Type SM, as required by Drawings and details.

## 2.04 FABRICATION REQUIREMENTS

- A. Verify all field measurements for work which is to be shop fabricated with surrounding work and site conditions comparing dimensions and details of this work with those of adjoining work by other trades to insure against discrepancies, and provide for proper fit.
- B. Shop fabricate work to the greatest extent possible. Comply with details shown and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance, with expansion provisions for running work spaced 20'-0"oc maximum. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
- C. Do all cutting, drilling and fitting required by setting materials in place.
- D. Fabricate items to avoid distortion and overstressing of fastenings due to expansion and contraction. Lock and solder corners and blind hem exposed edges. Make joints with 4" lap and solder unless otherwise shown or specified otherwise. Fill single lock seams with sealant where soldering is infeasible. Run flanges 4" minimum onto roof and wall surfaces. Fabricate sheet metal items in nominal 10-foot lengths unless otherwise shown or specified.
  - 1. Form sections true to shape, accurate in size, square and free from

- distortion or defects.
2. Hem exposed flashings on underside ½ inch; miter and seam corners.
  3. Fabricate vertical faces with bottom edge formed outward ¼ inch and hemmed to form drip.
  4. Fabricate cleats and starter strips of same material as sheet, interlockable with sheet.
  5. Form pieces in longest practical lengths.
  6. Hem exposed edges on underside 1/2 inch; miter and seam corners.
  7. Form non-moving seams in sheet metal with flat lock seams. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.
  8. Tin edges to be seamed, form seams and solder. After soldering, remove flux. Wipe and wash solder joints clean.
  9. Fabricate corners from one piece with at least 18 inch long legs; seam for rigidity and seal with sealant.
  10. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to view.
  11. Fabricate cleats and attachment devices from same material and thickness as sheet metal component being anchored or from compatible, non-corrosive metal recommended by SMACNA.
- D. Soldering: Thoroughly clean surfaces before soldering. Execute soldering slowly with full flowing joints and with joints as thin as possible. Make flat, locked seams at least 2 inch wide, and sweat full of solder. Lap seams where soldered at least 3 inches wide. Make flat and lap seam joints in direction of flow. Solder and seal joints except those indicated or required to be expansive type joints. As work progresses, neutralize excess flux with 5 to 10 percent washing soda solution, and thoroughly rinse. Wipe and wash solder joints clean.
- E. Weld sheet metal 18-gage and heavier using shielded electric arc method. Provide welding rods as recommended by manufacturer for use with galvanized sheet steel zinc alloy sheet or cold rolled sheet metal.

## 2.05 FABRICATED ITEMS

- A. Provide 22 gage minimum galvanized steel unless otherwise indicated or specified.
- B. Counter-flashing: Except where indicated or specified otherwise, insert counter-flashing in reglets and extend down vertical surfaces over upturned vertical leg of base flashings not less than 3 inches. Fold the exposed edges of counter-flashings 1/2 inch. Provide end laps in counter-flashings not less than 3 inches and make weather-tight with plastic cement. Lengths of metal counter-flashings shall not exceed 10 feet. Form the flashings to the required shapes before installation. Factory form the corners not less than 12 inches from the angle. Secure the flashings in the reglets with lead wedges and space not more than 18 inches apart; at short runs, place wedges closer together. Fill caulked-type reglets or raked joints which receive counter-flashing with caulking compound as covered in Section 07900. Turn up the concealed edge of counter-flashings built into masonry or concrete walls not less than 1/4 inch and extend not less than 2 inches into the walls. Install counter-flashing to provide a spring action against base flashing.

- C. Coping Caps: Fabricate 10'-0" long units of minimum 22 gage galvanized sheet metal with 2" rolled edges with drip lip edges, of widths as required. Corner units shall have maximum 18" long legs with joints locked and soldered watertight. Make intermediate joints of the 4" overlapping type, centered over a 12 wide backing plate of the same profile and gauge as the cap, set underlying and overlap in a 1/2" wide bead of sealant. Secure both edges of caps over a 12" wide 20-gage galvanized steel cleats spaced at maximum 32" centers and locked into drip hem.
- D. Ventilation Wall Louvers: Sheet metal louvers shall be stationary blade, non-acoustical, horizontal sight-proof drainable, 4" deep unless otherwise shown and formed of galvanized sheet metal. Build louvers to accurately fit openings as indicated. Construct with smoothly finished weather-tight frames and blades of 16 gage material. Rivet louver blades and solder to frames; edges turned up at back to form weathering, down in front to form drip, and with upper and lower edges turned back one-half inch to form stiffening. Blades shall be set at 45 degree slope spaces 4"oc with 3/4" leg at top and bottom. Screen rear face of louvers with 1/4" mesh No.18 gage min. hardware cloth welded to a 22 gage x 1" U-frame, tap screwed in place at no more than 12" intervals. Coordinate with Section 05500 for louver units used as generator gate infill.
- E. Downspouts:
1. Factory-fabricate 22 gage rectangular 4 inch by 2 inch non-corrugated flat locked type seams. Set downspouts plumb. Telescope joints between lengths of downspouts with end of upper lengths at least 1-1/2" into lower length.
  2. Provide one piece straps adjacent to the joint at top of each section of downspout with an additional strap adjacent to bottom joint of termination elbow and at 4 foot on center maximum. Bolt through flange legs into expansion shields.
- F. Conductor Heads: Provide 22 gage box type conductor heads with flat locked soldered seams of the size and detail indicated on the drawings. Attach the conductor head plumb and with the backside not less than 1" below scupper bottom. Solder flanged, locked outlet tubes at bottom of conductor heads, conforming to size and shape of downspouts for a minimum 2". Attach conductor heads to wall and loose lock back edge to bottom edge of scuppers.
- G. Scuppers: Fabricate scuppers with 22 gage locked and soldered joints of the size and detail as indicated. Extend scuppers beyond exterior face of wall with bottom edge to form a drip, attached to conductor head. Return top and sides at interior face of wall, joining with closure flange forming a bottom-edge gravel stop.
- H. Drip Flashing: Provide 22-gage hemmed exposed edges 10 ft. piece lengths.
- I. Elevator Shaft Cant Flashings: Provide 20 gage cant flashings as indicated on the drawings or as required to eliminate all flat surfaces over 2" at the top edge of the pit, masonry spandrel beams, curtain wall mullions, etc., to provide a 75 degree cant-angle preventing a stepping ledge.
- J. Building Closure Plates: Provide minimum 18 gage galvanized sheet metal fabricated with hemmed edges and bent 30 degrees as required for spring

tension as indicated on the drawings. Mount using sheet metal screws in expansion anchors. Provide in longest manufactured lengths possible with the ground level being of full length material. Overlap sections shingle fashion shedding water to the outside.

1. Vertical closure plates at column / elevator shaft wall expansion joints between structures at each level (interior and exterior) shall be fabricated as detailed for a surface to surface mounting.
2. Horizontal cant closure plates where indicated shall be fabricated with edges turned up in the back to form a weathering flashing against the CMU wall and/or integrated into a coping cap fabrication. Closures shall extend a minimum of 6" beyond the 6" expansion joint with free floating exposed ends. Lower edge shall be turned back one inch to form stiffening and set at a minimum 30 degree slope.

K. **Miscellaneous Sheet Metal:** Include all miscellaneous items of sheet metal called for in the Drawings or as required and not specifically mentioned in the specifications. Include all sheet metals and flashings not manufactured to a standard shape. Make all measurements at the building and make all templates and patterns, and supply with all necessary information for the proper execution of the work to insure that it is properly fabricated for its installation at the building.

L. **Wall Flashing:** Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors and louvers.

2.06 **FINISH:** All ferrous items shall be free from burrs, rust, seal and rough surfaces.

**Galvanizing:** Provide hot-dipped zinc galvanizing with 2.0 ounces minimum/square foot after fabrication G90 unless specified otherwise. Repair abraded galvanized surfaces in field. After repair do no additional cutting, drilling or welding. For repairs use, "Drygalv" (213) 254-9131; "Galicon" (714) 547-6684; or "Z.R.C. Cold Galvanizing Compound" (213) 698-6655, or equal.

### **3.00 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine substrate surfaces to receive flashing and sheet metal systems and associated work and conditions under which work will be installed. Do not proceed with installation until unsatisfactory conditions have been corrected in a manner acceptable to installer. Starting work within a particular area will be construed as applicators acceptance of surface conditions.
- B. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

#### **3.02 INSTALLATION REQUIREMENTS**

- A. Conform to drawing details and performance requirements published in the SMACNA Manual and manufacturers installation instructions. Install metal items as indicated according to approved shop drawings, submittals and as required to

complete the entire work. Securely fasten, anchor and assemble securely in place with provisions made for expansion and contraction without leaks. Set units true to line and level with miters and joints accurately fitted. Install work with laps, joints and seams that will be permanently watertight and weatherproof.

1. Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.
  2. Insert flashings into reglets to form tight, permanent and secure fit. Seal flashings into reglets with sealant.
  3. Secure flashings in place using concealed fasteners, where possible.
  4. Apply plastic cement compound between metal flashings and felt flashings.
- B. Install exposed sheet metal work that is without oil canning, buckling and tool marks and that is true to line and level with exposed edges folded back to form hems.
- C. Expansion and Contraction: Provide expansion and contraction joints at not more than 12-foot intervals for aluminum and at not more than 20-foot intervals for other metals, with no joints allowed within 24 inches of corner or intersection. Where the distance between the last expansion joint and the end of the continuous run is more than half the required interval, an additional joint shall be provided. Space joints evenly.
1. Join extruded aluminum gravel stops and fascias by expansion and contraction joints spaced not more than 12 feet apart.
  2. Where lapped or bayonet-type expansion provisions in work cannot be used or would not be sufficiently weatherproof and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25mm) deep, filled with mastic sealant (concealed within joints).
- D. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheet to be soldered to a width of 12" (38mm), except where pre-tinned surfaces would show in finished work. Do not use torches for soldering. Heat surfaces to receive solder and flow solder into joint. Fill joint completely. Completely remove flux and splatter.
- E. Sealed Joints: Form joints in metal to accommodate elastomeric sealant to comply with SMACNA standards.
1. Fill concealed joint with mastic sealant and form metal to completely conceal sealant.
  2. Use mastic sealant for non-moving joints where indicated not to be soldered.
  3. Use elastomeric sealant for exposed joints and to seal against adjacent material.
- F. Lap Joints: Form lap joints in sheet metal a minimum of 4 inches and set in bed of sealant.
- G. Seams: Fabricate non-moving seams in sheet metal with flat-lock seams. Tin edges to be seamed and soldered.
- H. Separations: Separate metal from non-compatible metal or corrosive substrates by coating concealed surfaces at locations of contact with asphalt mastic or other



- permanent separation as recommended by manufacturer. Bed flanges of work in a thick coat of roofing cement where required for waterproof performance.
- I. Coordination: Coordinate sheet metal items required for roofing or waterproofing for fabrication and proper installation. Schedule to avoid delay in the work of other sections. Install roofing sheet metal simultaneously with roofing work.
  - J. Caulking: Provide sealants and caulking as indicated and required to seal and complete work of this section. Conform to Section 07900 – Caulking and Sealants.
  - K. Protection from Contact with Dissimilar Materials: Paint metal surfaces in contact with mortar, concrete or other masonry materials with alkali-resistant coatings such as heavy-bodied bituminous paint.

### 3.03 ERECTION TOLERANCES

- A. Shim and align sheet metal flashing and trim within installed tolerance of ¼ inch in 20 feet on slope and location lines and within 1/8 inch offset of adjoining faces and of alignment of matching profiles.
- B. Shim and align sheet metal flashing and trim within installed tolerances specified by reference standards.

### 3.04 COMPLETION

- A. Exposed assemblies exhibiting dents, oil canning, buckling, skewing from building lines, lack of dimensional uniformity in final installation, or other defects will not be accepted. Inspect the work for compliance with requirements, replacing defective or improperly applied installations
- B. Examine installed sheet metal and water test installed areas as directed. Correct any work found to be damaged, defective or of questionable quality prior to installation of subsequent coverings.

### 3.05 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering or with subsequent finish adhesion.
- B. Clean and neutralize flux materials. Clean off excess solder
- C. Clean off excess sealants
- D. Remove temporary protective coverings and strippable films as sheet metal and trim are installed unless otherwise indicated in manufacturers written instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.
- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all sealants and caulking, backing materials and supplementary work to complete the Contract, including but are not limited to these major items:
  - 1. At all door frames, window wall and storefront, etc.
  - 2. All concrete pour, construction and separation joints in slab on-grade and elevated concrete slabs
  - 3. Roof penetrations
  - 4. Around sheet metal flashings and closures
  - 5. Joints in site concrete
  - 6. Around fixtures in staff lounge, restroom, locker room, shower room, etc.
  - 7. Between joints in exterior building panels
  - 8. All other Sealants and Caulking as indicated on Drawings.
  - 9. Fire retardant sealants for type of rated penetration, as required.
  - 10. Sealant between top of interior masonry walls and slab soffits where noted on Drawings.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 07600: Sheet Metal Work
- B. Section 07915: Sealing Expansion Control System
- C. Section 08100: Hollow Metal Doors and Frames
- D. Section 08410: Aluminum Storefront and Window Wall Systems
- E. Section 08800: Glass & Glazing

1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)  
ASTM C 920 Specification for Elastomeric Joint Sealants  
A sealant qualifying under this specification shall be classified as to type, grade, class, and use as follows:
  - 1. Type S - Single component sealant
  - 2. Type M - Multi component sealant
  - 3. Grade P - Pourable or self-leveling
  - 4. Grade NS- Non-sag or gunable
  - 5. Class 25 - Adhesion and cohesion under movement shall withstand an increase or decrease of at least 25% of the joint width.
  - 6. Use T - Pedestrian and vehicular traffic areas. Sealant shall have a hardness reading, after being properly cured, of not less than 25 or more than 50 when tested in accordance with Test Method C 661.
  - 7. Use NT - Non-traffic applications
  - 8. Use M - Mortar/Masonry

- 9. Use G - Glass
- 10. Use A - Aluminum
- 11. Use O - Other than the Standard Substrates meeting this specification.

ASTM C962 Standard Guide Use of Elastomeric Joint Sealants  
 ASTM C1193 Standard Guide for Use of Joint Sealants.  
 ASTM C1184 Standard Guide for Use of Structural Sealants.  
 ASTM D1565 Standard Specification for Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Open-Cell form)  
 ASTM D1667 Standard Specification for Flexible Cellular Materials - Vinyl Chloride Polymers and Copolymers (Closed-Cell Foam)

- B. Federal Specification
  - FS TT-S-00227E "Sealing Compound, Rubber Base, Two-Component."
  - FS TT-S-00230 "Sealing Compounds, Synthetic Rubber Base, Single Component, Chemically Curing."
- C. Sealant, Waterproofing and Restoration Institute (SWRI) Sealant and Caulking Guide Specifications.

#### 1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Product Data: Submit manufacturer's technical data, mixing instructions, application recommendations and installation instructions including cleaning, priming instructions and sealant limitations for each type of material required. Include manufacturer's published product data or letter of certification accompanied by a certified test laboratory report indicating that each material selected complies or is suitable for the temperatures, movements and weather conditions that will be encountered during the sealants service life. Manufacturer shall provide a letter attesting to inspection of project surface conditions and determination whether surface primers are required as part of the warrantable system.
- C. Samples: Submit manufacturer's standard bead samples consisting of strips of actual products to be exposed to view showing full range of cured colors available.
- D. Contractor's and manufacturers' guarantees and warranties respectively.
- E. Sealant Schedule: Indicate each sealant type and backer rod type proposed for each appropriate location and for each appropriate substrate.
- F. Certificates: Furnish manufacturer's certification that sealant systems comply with local regulations controlling use of volatile organic compounds. Manufacturer shall certify that sealant systems are compatible with adjacent substrate and related finish materials.
- G. Product Testing: Include manufacturer or independent laboratory test results demonstrating hardness, stain resistance, adhesion and cohesion under cyclic

movement per ASTM C719, low temperature flexibility, modulus of elasticity at 100 percent strain, effects of heat aging and effects of accelerated weathering.

- H. Warranty: Submit copies of the manufacturers warranty for review by the Architect jointly signed by the manufacturer and the (contractor / applicator / installer) indicating agreement between both parties to provide a joint and several two (2) year warranty upon completion of the work. Conditions of the warranty will be used in evaluating / accepting the specified product and the reviewed submittal.

#### 1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an installer who has successfully completed within the last three (3) years at least three (3) joint sealer applications similar to type and size to that of this project.
- B. Single Source for Materials: Obtain joint sealer materials from a single manufacturer for each different product required and for each different project specific application.

#### 1.06 REQUIREMENTS

- A. Sealant system shall include joint preparation, joint back-up or bond breaker, priming, sealant and caulking required to seal exterior and interior joints throughout the project including those not specifically indicated in the Contract Documents but necessary to completely eliminate active, direct / indirect moisture and weather elements of water, air or dust from entering through, around, over and under joints of building components to provide a watertight, moisture tight and weather tight building envelope and seal joints between adjacent materials.
- B. Properties: Sealants shall not harden or soften more than 10 Shore-A durometer points as measured 21 days after original installation. Movement capability shall be +50% /-50 %.
- C. Verify compatibility of sealants with existing sealants or joint systems at any point of interface or possible contact.
- D. Sealants and caulking joints shall not be placed until the structure has undergone its anticipated short term post tensioning shortening and creep. Contractor shall make provisions to replace all defective joints without additional cost to the District for all joints placed prior to the time that the structure undergoes short-term movement in excess of the elongation capacity of the sealant materials. Coordinate with the Architect prior to execution.

#### 1.07 PROJECT/SITE CONDITIONS

- A. Weather Conditions: Do not proceed with installation of sealants under adverse weather conditions or when ambient and substrate temperatures are below or above manufacturer's recommended limitations for installation or below 40 deg. F. Proceed with the work only when forecasted weather conditions are favorable for proper cure and development of high early bond strength.

- B. Surface Conditions: Provide proper primers suited to surfaces and conditions. Sealant manufacturer may wave this requirement in writing. Where any doubt exists prepare sample joints on actual materials as furnished for the job to determine the matter.

#### 1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to project site in original unopened containers or bundles with labels indicating manufacturer, product name, designation, color, the expiration period for use, pot life, curing time and mixing instructions for multi-component materials.
- B. Store at 80 deg. F or less in a cool / dry area. Handle materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants or other causes.
- C. Use sealant within the time recommended by the manufacturer.

#### 1.09 GUARANTEE

Provide warranty from manufacturer and installer to repair or replace sealant compounds which have failed to provide airtight and watertight joints for any reason or which appear to have failed (inherent or developed) defects in material or installation, due to adhesion, cohesion, abrasion resistance, migration-resistance, stain resistance, durability (which fail, leak, crumble, harden, shrink, bleed, sag, stain or any other form) or apparent deterioration. Guarantee that installed work will remain watertight for a period of two (2) years after date of acceptance.

### 2.00 PRODUCTS

#### 2.01 MATERIALS

Use sealants of the following types and manufacturers. Use manufacturer's standard or custom colored materials to match color of adjacent surfaces. Where adjacent materials on each side of the joint are different colors, the Architect will select sealant colors. If the desired color is not available from one manufacturer, select the proper desired color from another manufacturer as a reference stand to match.

#### 2.02 MANUFACTURERS

- A. Provide one of the following for each different product required:
  1. Tremco / Mameco International, Inc.
  2. Pacific Polymers
  3. Pecora
  4. Sika
  5. Sonneborn Building Products
  6. Lymtal International / Iso-Flex
  7. Equivalent products meeting performance criteria specified.

#### 2.03 MATERIAL TYPES

- A. Polyurethane Sealants

1. One part, non sag, non staining, gun grade sealants ASTM C920, Type S, Grade NS, Class 25, uses NT, M, G, A & O, TT-S-00230C, Type II, Class A.
  - a. Location/Use: Exterior/Interior, Horizontal/Vertical joints in concrete, masonry, steel, aluminum and glass
  - b. Mameco International 'Vulkem 116 or 921'  
Pacific Polymers 'Elasto-thane 230-Type II', Elasto-seal 230  
Pecora 'Dynatrol 1XL'  
Sika - Sikaflex - 1a or 15LM  
Sonneborn 'Sonolastic NP-1/Ultra/Sonolastic 150'  
Lymtal IsoFlex 830
2. Two part, non sag, non staining, gun grade sealant, Type M, Grade NS, Class 25, uses NT, M, A & O, TT-S-00227E, Type II, Class A.
  - a. Location/Use: Exterior/Interior, Horizontal/Vertical joints in concrete, masonry, steel and aluminum.
  - b. Mameco International 'Vulkem 227 or 922'  
Tremco 'Dymeric 240'  
Pacific Polymers 'Elasto-seal 227 or Elasto-thane 920 Type II'  
Pecora 'Dynatrol II'  
Sika - Sikaflex - 2c NS/SL  
Sonneborn 'Sonolastic NP-2'  
Lymtal IsoFlex 881
3. One part, self leveling, pourable sealant, ASTM C920, Type S, Grade P, Class 25, Uses T, M, A & O, TT-S-00230C, Type 1
  - a. Location/Use: Exterior/Interior, horizontal expansion and control joints; light traffic.
  - b. Mameco International 'Vulkem 45'  
Pacific Polymers 'Elasto-thane 230-Type I'  
Pecora 'Urexpan NR-201'  
Sika - Sikaflex - 1 CSL  
Sonneborn 'Sonolastic SL1'  
Lymtal IsoFlex 860SL
4. Two part, self leveling, pourable sealant, ASTM C920, Type M, Grade P, Class 25, uses T, M, A & O, TT-S-00227E, Type I.
  - a. Location/Use: Exterior/Interior horizontal expansion and control joints; medium to heavy traffic.
  - b. Mameco International 'Vulkem 245-255'  
Pacific Polymers 'Elasto-thane 227 High Shore'  
Pecora 'Urexpan NR-200' or 'Dynatred'  
Permapol 'RC-2SL'  
Sika - Sikaflex 2CSL  
Sonneborn 'Sonolastic SL2'  
Lymtal IsoFlex 880GB
5. One or two part, low modulus, semi-self leveling sealant, pourable ASTM C920, Type S, Grade P, Class 25, uses T, M, A & O, TT-S-00227E, Type I.
  - a. Location/Use: Exterior/Interior, horizontal joints in level and/or slightly sloped (6%) surfaces.
  - b. Mameco International 'Vulkem 300SL'  
Pacific Polymers 'Elasto-thane 230 SL'  
Sika - Sikaflex 2CSL  
Sonneborn 'Sonolastic SL2'  
Pecora Urexpan 'NR-201'

Lyntal IsoFlex 860SL

- B. Silicone Sealants: Medium and low modulus silicone sealant, one-part, non-acidic, neutral curing, Type S, Grade NS, Class 25. Use NT classified sealant capable of withstanding movements from +50 to -50 for medium modulus and +100 to -50 percent for low modulus based on original joint design. Standard or custom colors as selected by the Architect.
1. Silicone based single component, non-sag conforming to Federal Spec TT-5-0030C (2) & TT-S-001543A.
    - a. Locations/Use: Joints in glass and metal surfaces of walls or other vertical and sloping window surrounds.  
General Electric- GE1200  
Dow Corning - 791  
Pecora 864 or 890  
Sonneborn - Sonolastic 150/Omniseal
    - b. Locations/Use: Joints in concrete, masonry and plaster for vertical and sloping surfaces.  
General Electric- Silpruf  
Dow Corning - 790, 795  
Pecora 895  
Sonneborn-Sonolastic-150/Omniseal
    - c. Locations/Use: Used where mildew resistance is required, such as joints in toilet rooms at plumbing fixtures and at miscellaneous countertops, etc.  
General Electric - SCS 1702  
Dow Corning - 786  
Pecora 898  
Sonneborn-Sonolastic-150/Omniseal
- C. Joint Backing (backer rod): Closed cell materials, neoprene, polypropylene, polyolefin foam or polyethylene ASTM D1565 or D1667 conforming to manufacturers written recommendations. Material is to be non-gassing, non-staining free of asphalt, oils or creosote. Sized and shaped to control depth of sealant and to provide 25-50 percent compression upon insertion. Open cell polyurethane foam backer rod is not allowed.
1. Ethafoam-SB backer rod by Dow Chemical
  2. Sonofoam backer rod by Sonneborn / Rexnord
  3. Taylor Foam backer rod by Taylor Foam Products
  4. Industrial Thermo Polymers ITP (Form 104) Soft Type Backer Rod
- D. Primers: As recommended in writing by sealant manufacturer. Verify that recommended primer has been tested not to stain the substrate. Refer to 3.02D below.
- E. Bond Breaker: Pressure sensitive adhesive polyethylene tape or other type recommended by sealant manufacturer.
- F. Fire Retardant Sealant: Products as tested and listed by approved system design as indicated in the U.L. Inc Volume 2, directory. System shall be recognized by UL and ASTM E119 procedures, (and ICC by Report #243) for fire rating of penetration to be sealed. Product distributed by Kirwan Corporation (714) 939-6887.



1. Pecora Ultra-Block or equal fire safing joint system used in conjunction with acrylic latex sealants (AC-20 FTR), polyurethanes or silicones as approved by the manufacturer based on hardness or flexibility of the joint required. Alternate mineral wool safing must comply with approved system design.
2. Fire Resistant Sealants:
  - a. Movement - Non-Traffic Joints: SpecSeal 'Pensil 300' (PEN300) silicone sealant non- slump, self-leveling or Dow Corning (3M) - "Firestop Sealant".
  - b. Non-Movement Joints: 3M-"Fire Barrier Caulk CP25 and Putty 303".
- G. Fire Retardant Foam: UL tested and listed, conforming to ASTM E119 for rating of penetration to be sealed, 3M-"2001 RTV Firestop Foam" or equal.
- H. Fire Retardant Spray Mastic: Maximum flexibility, 500 cycles requirements, Class II & III Approval per ASTM E1966 & UL 2079. Water-based formulation containing no halogens, solvents or asbestos. Wall and floor / wall assemblies rated up to 4 hours, Hilti CP 672 Speed Spray, or equal. .

#### 2.04 INCIDENTAL REQUIREMENTS AND MATERIALS

- A. Staining Characteristics: All joint fillers, primers or other materials used in conjunction with sealants shall be of such composition as to not cause staining of the sealant or the materials that they are applied.
- B. Compressible Joint Filler: As recommended by the sealant manufacturer for use in conjunction with the sealant. Size closed cell joint backing for joint width plus 25 percent.
- C. Primers: As recommended by the sealant manufacturer for use in conjunction with the sealant for application onto the various types of materials that the sealers applied.
- D. Cleaners: Provide where required in lieu of primers, as recommended by the sealant manufacturer. Use types that will not stain or damage building materials they are to be adhered to.

### 3.00 EXECUTION

#### 3.01 EXAMINATION

Examine substrate surfaces to receive sealant system and associated work and conditions under which work will be installed. Do not proceed with sealants until unsatisfactory conditions have been corrected in a manner acceptable to installer. Starting work within a particular area will be construed as applicators acceptance of existing substrate surface conditions.

#### 3.02 PREPARATION

- A. Comply with manufacturer's latest written requirements, recommendations and specifications for cleaning, surface preparation and priming. Remove loose foreign materials that could impair adhesion or proper performance of sealants.

- B. Prime joint substrates where recommended by joint sealant manufacturer or where required by pre-construction joint sealant substrate tests. Confine primers to areas of joint sealant bond. Do not allow spillage or migration onto adjoining surfaces.
- C. Apply epoxy primers to all concrete surfaces to which joints are to be sealed. Surfaces between poured in place concrete walls and columns are to be primed prior to sealant application to increase adhesion and decrease possible failure due to thermal or structural movements or exposure to environmental temperatures.
- D. Prevent contact of sealant with adjoining surfaces that would be permanently stained or damaged by contact of the sealant or by cleaning materials / methods required to remove excess sealant.

### 3.03 APPLICATION

- A. Install backing and sealants to ensure proper preparation and application in accordance with ASTM C1193 and manufacturers written recommendations for each sealant type and substrate or as directed by manufacturers technical field representative.
- B. Accurately install joint backing to provide support of sealants during application and at a position required to produce the uniform cross sectional shape and depth of installed sealants relative to designated joint thickness and widths necessary to achieve the required width to depth ratios that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of backing rod.
  - 2. Do not stretch, twist, puncture or tear back-up rod.
  - 3. Install bond breaker tape where backer rod can not be used do to shallow joint depth and to prevent three-sided adhesion.
- C. Install sealants by proven techniques using caulking guns with proper nozzles, using sufficient pressure that results in sealants directly contacting and fully wetting joint substrates. Completely fill recesses provided for each joint configuration providing uniform cross sectional shapes and depths relative to joint widths and to assure/obtain uniform adhesion free of air pockets, voids, embedded matter, ridges and sags. During application keep tip of nozzle at bottom of joint forcing sealant to fill from bottom to top. Finish joints smooth, uniform and free of ridges, wrinkles, sags, air-pockets and embedded impurities.
- D. Tool sealants to form smooth uniform beads of concave configuration finished below the surface. Use tooling agents approved by sealant manufacturer. Remove excess sealants from surface adjacent to joint.
- E. Fire Retardant Foam and Sealant: Conform to manufacturer's printed directions for preparation and application of materials per applicable details for fire-rated penetrations. Seal all gaps, cracks and holes around the perimeter of materials penetrating the fire rated floors and walls.
- F. Fire Retardant Putty: Apply to thickness required for rating and type of construction in accordance with manufacturer's directions.

3.04 PROTECTION

- A. Protect joint sealants from contact with contaminating substances or from damage resulting from construction operations or other causes.
- B. Cut out and remove damaged or deteriorated joint sealants and repair so that areas are indistinguishable from original work.

END OF SECTION



## 1.00 GENERAL

### 1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to this Section.
- B. Furnish all labor, materials, services, equipments and appliances required to perform all work to complete the Contract, including but not limited to:
  - 1. Provide for the exterior exposed vertical sealing joint, from grade to under the parapet coping cap, between the Police Station plaster wall(s) and the concrete columns / structure west of Gridline 1 and at A.7 & C.3

### 1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 04220: Concrete and Concrete Finishes
- B. Section 07900: Sealants and Caulking
- C. Section 09220: Portland Cement Plaster System

### 1.03 REFERENCE STANDARDS

#### American Standards for Testing and Materials (ASTM)

- ASTM C794 Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants
- ASTM C881 Specification for Epoxy Resin Base Bonding Systems for Concrete
- ASTM D624 Test Method for Rubber Property - Tear Resistance
- ASTM D1056 Specifications for Flexible Cellular Materials - Sponge or Expanded Rubber
- ASTM D3575 Test Method for Flexible Cellular Materials Made from Olefin Polymers

### 1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Product Data: Manufacturer's specifications of joint system, epoxy adhesive and other data needed to prove compliance with the specified requirements. Provide a written statement from the manufacturer with recommendations for the proposed size (width and depth) of the joint proposed.
- C. Shop Drawings: Submit typical cross section(s) details indicating overall joint width critical to the proper placement and installation. Provide complete details and joint layout for all locations with installation requirements.
- D. Samples: Submit sections of materials showing actual size of the required joint width and cross section and if a miter is to occur demonstrate technique.
- E. Certificate: Submit certificate of completion of manufacturers training program and letter of approval from the manufacturer that completed installation complies with warranty requirements.

- F. Warranty: Submit copies of the manufacturers warranty for review by the Architect, jointly signed by the manufacturer and the (contractor / applicator / installer) indicating agreement between both parties to provide a joint and several warranty upon completion of the work. Conditions of the warranty will be used in evaluating / accepting the specified product and the reviewed submittal.

#### 1.05 REQUIREMENTS

- A. Expansion joints shall not be placed until the structure has undergone its short term anticipated post tensioning shortening and creep. Drawings indicate the design intent of the expansion joint system in its final configuration. If the Contractor places the expansion joint(s) prior to the time the structure undergoes its full short-term movement (shrinkage), Contractor shall replace all expansion joints that fail with the proper sized system without additional cost to the District. Coordinate with the Architect prior to execution.
- B. All components specified herein are to be of a single manufacturer, part of a standard proven expansion joint sealing system and qualifying for the warranty requested.

#### 1.06 QUALITY ASSURANCE

- A. Products specified/selected must conform to the material requirements, testing procedures and results as established by American Society for Testing and Materials (ASTM) in conformance with reference standards
- B. Applicator: The specified expansion joint system shall be installed by a licensed applicator, factory trained and certified in the proper installation of the specified expansion joint system.

#### 1.07 PRODUCT DELIVERY STORAGE AND HANDLING

- A. Delivery products in manufacturer's original intact labeled container.
- B. Store off ground protected from weather and construction activities.
- C. After installation, protect seals from damage until completion of structure.

#### 1.08 WARRANTY

Expansion joint system shall be free of defects and workmanship and shall remain watertight for a period of five (5) years after project acceptance.

#### 2.00 PRODUCTS

##### 2.01 MANUFACTURE

Furnish Emseal Joint Systems, LTD / Emseal Corporation 800.526.8365. Provide the Emseal – Colorseal, as distributed by NovaTec Associates, Inc. 714.962.8498, or equal (no known equal).

##### 2.02 SYSTEM

- A. System series design(s) shall conform to the manufacturers standard

specifications based on the selected system used for the project specific location. The joint seal shall be a low density impermeable, closed cell cross linked ethylene vinyl acetate polyethylene copolymer, nitrogen blown resilient, non-extrudable foam material, in color and held in place by a two component 100% solids modified epoxy adhesive. The design of the seal shall accommodate movements and variations in joint widths through compression and tension of its shape.

- B. The joint sealant is to be specially developed for dynamically moving joints. It must provide a flexible, durable, weather-tight seal with excellent bond strength when bonded between substrates.
- C. Base material without impregnation or sealers shall be weather and wear resistant impermeable closed cell, cross linked, ethylene vinyl acetate, low density polyethylene copolymer, nitrogen blown resilient, non-extrudable material.

### 2.03 MATERIALS

- A. Expansion Joint: Provide for the vertical sealing joint between the plaster wall and columns between structures, where indicated - Emseal Colorseal
- B. Epoxy Adhesive: Eva-Pox Bonder #1, (no known equal), two component, 100 % solids, modified epoxy adhesive meeting the following minimum requirements:

### 2.04 FABRICATION

- A. Seal profiles shall be shipped in the longest practical continuous lengths in manufacturer's standard shipping carton. Seals shall be cut to length on jobsite where required. Miter-cut or bend seal (depending on size) in the field to conform to directional changes unless otherwise contracted with expansion joint manufacturer.
- B. Epoxy Adhesive: Ship in manufactures labeled containers.

### 3.00 EXECUTION

#### 3.01 GENERAL

Field Conditions: Verify drawing dimensions with actual field conditions. Inspect related work and adjacent surfaces. Report to Architect any conditions which prevent proper execution of this work.

#### 3.02 PREPARATION

- A. Joint gap edges should be chamfered to help prevent small fractures and spalling. Edge spalling conditions should be repaired and allowed to properly cure prior to installation. The concrete sidewall must be sound and free of all contaminants.
- B. Prepare a roughened concrete column sidewall by disc grinding. Care should be taken to insure that coarse disc is used so as to produce an abraded surface. The gap openings should be blown out with clean air to remove dust.

### 3.03 JOINT PROFILE INSTALLATION

- A. Install the seal expansion joints in strict accordance with the manufacturers' published installation procedures and typical details.
- B. Install the seals in a neat, workmanlike manner. All surfaces to receive seals shall be free from dirt, water and any other loose foreign debris that may be detrimental to effective joint sealing.
- C. Prior to installation, the profile shall be uncoiled from shipment packaging and allowed to reach a relaxed condition. Lay out joint material next to its joint opening to check for appropriate length and width. Joint should be sized 25% larger than joint opening at near neutral but never less than 16% oversized or greater than 38% oversized. Heat-weld all directional changes and field splices. All welds shall be allowed to cool before mixing adhesive.
- D. Mask the areas adjacent to the joint opening. Be sure that the tape does not actually go into the joint opening but back approximately 1/8" from the joint edge.
- E. Apply approved epoxy adhesive continuously to both joint interfaces immediately prior to seal installation to provide watertight assembly. Begin at one end or at or at an intersection / corner. Coat the sidewalls of the joint interface with adhesive starting at the top surface to a depth equal to the lowest rib of the joint profile. Apply the epoxy adhesive to both sides of the concrete substrate surfaces to approximately 40 mils. Apply the epoxy bonder on both surfaces working it in the direction ahead of the joint material, not more than 20 feet ahead.
- F. Next apply the epoxy adhesive to both sides of the joint material. Apply enough to coat and fill the grooves on the joint material so that it covers the entire ribbed portion of the profile, approximately 40 mils thick. Install the coated material where the epoxy was initially applied on the substrate.
- G. The profile should then be inserted into the joint gap using a blunt tool to position it to the proper depth. The joint material should be installed 1/8" below the joint edge and should not protrude above the joint edge.
- H. Continue in the same direction as the epoxy was initially applied. Do not push at an angle or pull the material, which will stretch the material.

### 3.04 CLEANING

- A. Protect system from damage during construction.
- B. Clean the epoxy left on the surface of the material as soon as it is pushed into the desired depth. Do not allow the epoxy to cure before removing it. Use a clean trowel or a putty knife tilted at an angle opposite the direction of movement.
- C. After work is complete in adjacent areas, clean exposed surfaces of joint seal with suitable cleaner that will not harm or attack the seal profile or bonding epoxy as recommended by manufacturer.

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Hollow metal doors, including door louvers where shown or required.
  - 2. Pressed steel frames for doors and windows.
  - 3. Installation of hollow metal doors, pressed steel frames and finish hardware.
  - 4. U.L. labeled construction, where required.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 03300: Concrete and Concrete Finishes
- B. Section 04220: Concrete Unit Masonry
- C. Section 07900: Sealants and Caulking
- D. Section 08700: Finish Hardware
- E. Section 08800: Glass and Glazing
- F. Section 09110: Metal Framing and Furring
- G. Division 16 – Electrical, for low voltage activation of entry security doors

1.03 REFERENCE STANDARDS

- A. American National Standards Institute (ANSI)  
ANSI A115 Door and Frame Preparation
- B. American Society for Testing and Materials (ASTM)  
ASTM A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products  
ASTM A153 Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware  
ASTM A366 Standard Specification for Steel, Carbon, Cold-Rolled Sheet, Commercial Quality  
ASTM A526 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Commercial Quality  
ASTM A568 Standard Specification for General Requirements for Steel, Carbon and High-Strength Low-Alloy, Hot-Rolled Sheet and Cold-Rolled Sheet  
ASTM A569 Standard Specification for Steel, Carbon (0.15 Maximum Percent) Hot-Rolled Sheet and Strip, Commercial Quality  
ASTM E152 Standard Methods of Fire Tests of Door Assemblies
- C. National Fire Protection Association (NFPA) - NFPA 80 Fire Doors and Windows  
NFPA 252 Standard Methods of Fire Tests of Door Assemblies

- D. Underwriters Laboratories (UL) - UL 10(b) Fire Tests of Door Assemblies
- E. Steel Door Institute (SDI)
  - SDI 100 Standard Steel Doors and Frames
  - SDI 105 Recommended Erection Instructions for Steel Frames
- F. Hollow Metal Manufacturer's Association (HMMA)
- G. National Association of Architectural Metal Manufacturers (NAAMM) - NAAMM 861Guide
- H. CCR Title 24 and ADA Requirements
- I. American National Standards Institute (ANSI)
  - ANSI A17.1 Safety Code for Elevators, Dumbwaiter and Escalators
- J. State Fire Marshal Standard Std. 12-7-4

#### 1.04 REQUIREMENTS

- A. Provide doors and frames complying with Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames".
- B. Fire-Rated Assemblies: Provide fire-rated doors in strict accordance with the requirements of Underwriter's Laboratories or Warnock Hersey Inc. investigated and tested as fire door assemblies, complete with type of hardware to be used. Identify each fire door with recognized testing laboratory labels, indicating applicable fire rating of steel doors. Construct and install assemblies to comply with NFPA Standard No. 80.
- C. The width and height of exit doorways shall be not less than 3 feet in nominal width by 6 feet 8 inches in nominal height and shall be capable of opening such that the clear width is not less than 32 inches per building code section 1003.3.1.3.
- D. Coordinate the work of this section with the work of electrical systems for low voltage connection of the Police Station interior hallway door that are to be activated / released upon 'Buss-Through' signal.

#### 1.05 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Product Data: Submit manufacturer's technical product data substantiating that products comply with requirements, indicating construction, dimensions, hardware preparation, core, label compliance, galvanized coating, etc.
- C. Shop Drawings: Detail each different frame section type, door and frame fabrication and method of installation. Indicate dimensions, types of metal, gages, core, frame reinforcement, details of joints and connections, preparation to receive hardware. Detail conditions at openings, including all window frame and louver conditions.

- D. Provide a schedule relating the type of door and frame to be installed in each scheduled door opening or place of installation, using the same reference numbers for details and openings as those on the contract drawings. Indicate and be responsible for fire ratings / label at each penetration.

#### 1.06 QUALITY ASSURANCE

- A. Provide custom steel doors and door and window frames manufactured by a single firm specializing in the production of this type of work, unless otherwise accepted.
- B. Conform to the requirements of HMMA 861 and as supplemented in this section.
- C. Fire-Rated Door Assemblies: Units that comply with NFPA 80 (CBC) are identical to door and frame assemblies whose fire resistance characteristics have been determined per ASTM E152 (State Fire Marshal Std 12-7-4), and that are labeled and listed by UL, Warnock Hersey, or other testing and inspection agency acceptable to authorities having jurisdiction.

#### 1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver doors and frames palleted, wrapped or crated to provide protection during transport and job storage.
- B. Store doors and frames at the building site under cover in a dry location on minimum 4 inch high wood blocking. Provide 1/4 inch space between stacked doors to promote air circulation. Cover stacked units to avoid dampness or other wet construction work to protect from rusting.
- C. During and after installation, protect frames and doors from damage from construction activities. Damaged doors and frames will be rejected and must be replaced with new doors and frames without additional cost to District.

#### 1.08 GUARANTEE

Provide a written guarantee in approved form that all defective materials or workmanship reported within a period one year after final acceptance will be promptly repaired or replaced to the satisfaction of the District.

### 2.00 PRODUCTS

#### 2.01 MANUFACTURE

Products as manufactured by Amweld, Americraft, J-Door, Overly Manufacturing Co., Krieger Steel Products Co., Reliable, Steelcraft, Security Metal Products Corp. or approved equal are acceptable upon Architect's review of shop drawings.

#### 2.02 MATERIALS

- A. Cold-Rolled Steel Sheets: Commercial quality level carbon steel complying with ASTM A366.

- B. Hot-Rolled Steel Sheets and Strips: Commercial quality carbon-steel, pickled and oiled, complying with ASTM A569, free of scale, pitting or surface defects.
- C. Galvanized Steel Sheets: Zinc coated carbon steel sheets of commercial quality, complying with ASTM A526 and ASTM A525 with A60 galvanized alloyed coating designation, with minimum .0005 (.0003) inch average coating thickness per side.
- D. Supports and Anchors: Fabricate of not less than 16-gage sheet metal. Galvanize after fabrication to comply with ASTM A153, Class B.
- E. Inserts, Bolts and Fasteners: Manufacturer's standard units except hot-dipped galvanize items to be built into exterior walls; comply with ASTM A153, Class C or D as applicable.
- F. Shop Applied Paint: Provide a chemical pretreatment followed by a rust-inhibitive, air-dried primer, compatible suitable as base for specified finish paints or steel coatings on steel surfaces. Refer to Section 09870 and 09900.

### 2.03 DOORS

- A. General: Provide flush design doors, 1-3/4 inch thick, seamless hollow construction meeting NAAMM Standard HMMA 861, ANSI/SDI-100, unless otherwise indicated.
  - 1. For single acting swing doors, bevel both vertical edges 1/8 inch in 2 inches. For double acting swing doors, round vertical edges with 2-1/8 inch radius.
  - 2. Unless otherwise required for interview room acoustical door, provide filler or fiberboard, mineral-wool board, or other insulating material, as standard with the manufacturer, solidly packed full door height to fill voids between inner core reinforcing members.
  - 3. Reinforce doors with rigid tubular frame where stiles and rails are less than 8 inches wide. Form tubular frame with 16-gage steel welded to outer sheets.
- B. Doors: Fabricate doors of 2 stretcher leveled galvanized steel sheets not less than 18 gage, in conformance with ASTM A526, A60 coating. Construct doors rigid with smooth, flush surfaces, neat in appearance, without visible joints or seams on exposed faces or stile edges, except around glazed or louvered panel inserts, and free from defects, warp or buckle. Provide weep-hole openings in the bottom of doors to permit escape of trapped moisture. Interior doors shall be 18-gage cold rolled carbon steel conforming to ASTM A366. All doors shall be considered exterior unless indicated otherwise.
  - 1. Reinforce inside of doors with vertical galvanized steel sections not less than 22 gage. Space vertical reinforcing 6"oc and extend full door height. Spot weld at not more than 5"oc to both face sheets.
  - 2. Reinforce top and bottoms of doors with 18 gage horizontal steel channels welded continuously to outer sheets. Close top and bottom edges to provide flush, waterproof weather seal as integral part of door construction, or by addition of inverted steel channels.

- C. Glazing Molding Stops: Provide frame for glazed openings between face sheets continuously around perimeter of glass opening and weld to face sheets.
  - 1. Form frame with integrally formed stop on security side.
  - 2. Miter corners, weld and grind smooth.
  - 3. Do not overlap molding on face of door.
  - 4. Use 20 gage loose stop for flush glazing.
  - 5. Stops at windows shall be 5/8" by 1"
  - 6. Apply stop to frame with countersunk screws 6 inches on centers.
  
- D. Hardware Reinforcements: In accordance with ANSI/SDI 100, Table IV, Hardware reinforcing gages and Table V Hardware Locations, and per templates furnished by hardware supplier. Conform to approved hardware schedule and templates.
  - 1. Mortise, reinforce, drill and tap doors at factory for fully recessed hardware.
  - 2. Where surface mounted hardware is to be applied, doors shall have reinforcing plates only; drilling and tapping shall be done in the field by installer.
  - 3. Minimum gages for hardware reinforcing plates:
    - a. Hinges: 8 gage thick by 12 inch wide by 6 inches longer than hinge, secured by not less than 6 spot welds.
    - b. Lock Face, Mortise, Flush Bolts, Closers and Concealed Holders: 14 gage.
    - c. All Other Surface Mounted Hardware: 18 gage.
  
- E. Non-Rated Louvers: Louvers shall be stationary sight-proof type. Construct of minimum 20 gage galvanized steel, 1" deep inverted "V" chevron pattern with extended vanes and flush moldings. Provide 18-gage galvanized steel screen set in steel frames. Build into doors without use of applied moldings. Products as manufactured by Airolite, Construction Specialties, Overly, Ventilouwer or equal.

#### 2.04 PRESSED STEEL FRAMES

- A. Meet requirements of NAAMM Standard HMMA 861 and ANSI/SDI-100 for doors and ANSI/SDI-111 - A for windows, unless otherwise indicated.
  
- B. Fabricate frames of minimum 16 gage galvanized steel in conformance with ASTM A526 A60 coating, fully welded one-piece welded unit construction with corners mitered, reinforced continuously welded full depth and ground smooth, to a true plane, flush with surfaces of base metal and free of defects impairing strength, durability and appearance. Surfaces shall be free of warp, wave, buckle and other defects with edges, angles and corners square, clean and sharp. Interior frames shall be 16-gage cold-rolled carbon steel conforming to ASTM A366. All frames are to be considered exterior unless indicated otherwise. Knock-down type frames are not acceptable.
  - 1. Openings up to 4'-0" wide, with a 1-hour or less rating: 16 gage.
  - 2. Openings over 4'-0" wide, with greater than 1-hour rating: 14 gage.
  
- C. Finish Hardware Reinforcement: Minimum gages of steel reinforcing plates for the following hardware shall be:
  - 1. Hinges and Pivots: 8 gage thick by 12 inch wide by 6 inches longer than hinge, secured by not less than 6 spot welds, cut out, drilled and tapped.

2. Locks, Strikes, Mortise, Flush Bolts, and Closers: 14-gage.
  3. Surface Mounted Hold-Open Arms and Panic Devices: 14-gage.
- D. Head Reinforcing: Where installed in masonry, leave vertical mullions in frames open at top for grouting.
- E. Jamb Anchors: Furnish jamb anchors as required to secure frames to adjacent construction, formed of not less than 18-gage galvanized steel space not exceeding 24"oc.
1. Masonry Construction: Adjustable flat, corrugated or perforated, T-shaped to suit frame size with leg not less than 2 inches wide by 10 inches long. Arrange anchors to provide vertical adjustment to coincide with horizontal masonry joints. Furnish at least 3 anchors per jamb up to 7'-6" height; 4 anchors up to 8'-0" jamb height; one additional anchor for each 24 inches or fraction thereof over 8'-0" height.
  2. Metal Stud Partitions: Insert type with notched clip to engage back-to-back metal studs, welded to back of frames. Provide at least 4 anchors for each jamb for frames up to 7'-6" in height; 5 anchors up to 8'-0" jamb height; one additional anchor for each 24 inches of fraction thereof over 8'-0"
  3. In-Place Concrete and Masonry: Anchor frame jambs with minimum 3/8 inch bolts into expansion shields or inserts at 6 inches from top and bottom and 26"oc. Reinforce frames at anchor locations. Except for fire rated openings, apply removable stop to cover anchor bolts unless otherwise indicated.
- F. Floor Anchors: Attach 14-gage steel floor clips, spot welded to each jamb and punched for anchorage to floor for each jamb and mullion that extends to floor formed of not less than 14 gage galvanized steel as follows:
1. Monolithic Concrete Slabs: Clip type anchors with 2 holes to receive fasteners, welded to bottom of jambs and mullions.
  2. Separate Topping Concrete Slab: Adjustable
- G. Head Anchors: Provide 2 anchors at head of frames exceeding 42 inches wide for frames mounted in steel stud walls.
- H. Spreader Bars: Provide removable spreader bar across bottom of frame, tack welded to jambs. Do not remove steel spreader until frames are securely anchored in place, square and plumb.
- I. Rubber Door Silencers: Except on weather stripped doors, drill stop in strike jamb to receive 3 silencers on single door frames and drill head jamb stop to receive 4 silencers on double door frames. Install plastic plugs to keep holes clear during construction.
- J. Plaster Guards: Provide 24-gage steel plaster guards or dust cover boxes, welded to frame at back of finish hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.

## 2.05 STOPS AND MOLDINGS

- A. Provide formed, fixed stops and moldings integral with frame around glazed panels. Provide steel channel shaped, drilled and countersunk for 1/4" flat head bolts.
- B. Provide removable molding formed of not less than 20-gage steel sheets matching steel of frames. Secure with countersunk machine screws spaced uniformly not more than 12"oc. Form corners with butted hairline joints.

## 2.06 FABRICATION

- A. Fabricate hollow metal units to be rigid, neat in appearance and free from defects, warp or buckle. Accurately form metal to required sizes and profiles. Weld exposed joints continuously; grind fill, dress and make smooth, flush and invisible.
- B. Exposed Fasteners: Provide countersunk holes for exposed screws and bolts.
- C. Finish Hardware Preparation:
  - 1. Prepare doors and frames to receive finish hardware, including cutouts, reinforcing, mortising, drilling and tapping in accordance with final 'Finish Hardware Schedule' and templates provided by hardware supplier. Comply with applicable requirements of SDI 107 and ANSI A115 series specifications.
  - 2. Reinforce doors and frames to receive surface applied hardware. Drilling and tapping for surface applied finish hardware may be done at project site.
  - 3. Locate finish hardware in accordance with governing codes and in conformance with "Recommended Locations for Builders Hardware for Custom Steel Doors and Frames," published by Door and Hardware Institute.
  - 4. Contractor shall coordinate the weight of the acoustical doors that require to be fitted with either 3 or 4 heavy-duty bearing hinges or a continuous hinges, as required to properly swing the door, in order to prepare the frame accordingly.
- D. Shop Priming: Clean, treat and prime exposed surfaces of steel doors and frames including galvanized surfaces.
  - 1. Clean steel surfaces of mill scale, rust, oil, grease, dirt and other foreign materials before application of primer.
  - 2. Apply pretreatment to cleaned metal surfaces, using cold phosphate solution (SSPC-PT2), or hot phosphate solution (SSPC-PT4). No zinc chromate-vinyl butyryl solutions.
  - 3. Apply shop coat of primers within the time limits recommended by pretreatment manufacturer. Apply a smooth even coat of primer for a uniform dry film thickness of not less than 0.7 mils. Comply with primers and/or intermediate coats in conformance with Section 09870 or 09900.

## 3.00 EXECUTION

### 3.01 GENERAL REQUIREMENTS

Verify drawing dimensions with actual field conditions. Inspect related work and adjacent surfaces. Report to the Architect all conditions that prevent proper execution of this work.

### 3.02 FRAME INSTALLATION

- A. Comply with provisions of SDI-105 "Recommended Erection Instructions for Steel Frames and in accordance with NAAMM Standard HMMA 840 and 861
- B. Install frames and accessories in accordance with manufacturer's instructions, approved shop drawings, and in conformance with all reference standards and as required by these Specifications.
- C. Install work complete, accurately in position, straight, plumb, level, in true alignment without warp or twist securely anchored, weather-tight and close fitting.
- D. Installation in Prepared Concrete / Masonry Openings: Openings shall be sized to provide a 1/4" open joint between outside edge of frame and adjacent construction to receive caulking. Provide dimpled holes centered on stop and "Z" type spacers spot-welded to frame at each point of anchorage. Anchor frames with 3/8" expansion bolts into expansion shields or inserts at 6 inches from top and bottom and 26 inches o.c. Reinforce frames at anchor locations. Except for fire rated openings, apply removable stop to cover anchor bolts unless otherwise indicated.
- E. Installation in Masonry Walls: Erect frames in position, plumbed and securely braced with clip angles attached to floor or sill. Provide at least 3 adjustable masonry anchors per jamb with sufficient adjustment to permit placing anchors in joints without bending. Install horizontal spreaders to keep jambs from bowing as frames are being filled with grout or mortar where required. Adjustable anchors include masonry wire anchors and masonry T-shaped anchors. Erect masonry after frames are installed and fill frame with grout mortar as erection of wall progresses.
- F. Installation of Metal Stud Partitions: Insert type with notched clip to engage back-to-back metal studs, welded to back of frames. Provide at least 4 anchors for each jamb for frames up to 7'-6" in height; or Install at least 3 wall anchors per jamb, at hinge and strike levels. Attach wall anchors to studs with two 5/8" No. 10 tapping screws. Place frames in metal construction prior to enclosing wall or ceiling. Set frames accurately, plumbed, aligned and braced securely until permanent anchors are set.
- G. Floor Anchors: Use masonry anchorage devices and machine screws. Powder actuated fasteners may be used where approved in advance by the Architect.

### 3.03 DOOR INSTALLATION

- A. Fit hollow metal doors accurately in frames within clearances specified in SDI-100.
  - 1. Jambs and Heads: 3/32 inch.
  - 2. Meeting Edges, Pairs of Doors: 1/8 inch.
  - 3. Bottom: 3/8 inch where no threshold or carpet.
  - 4. Bottom: 1/8 inch at threshold or carpet.



- B. Place fire-rated doors with clearances as specified in either CBC Section 713 or NFPA Standard No. 80.
- C. Install doors and frames complete with all finish hardware specified under Section 08700 - Finish Hardware. Install labeled doors in compliance with testing agencies requirements for the indicated class.

#### 3.04 HARDWARE

- A. All heights and locations shall be in compliance with applicable handicap codes of jurisdiction including CCR Title 24 Amendments to the Building Code and Americans with Disabilities Act (ADA). Consult the Architect of any discrepancies prior to installation. Non-conforming work shall be replaced at no additional cost to Owner.
- B. Location of Hardware:
  - 1. Door Latch Sets: Centered 38" above floor.
  - 2. Cylinder Deadlocks: 44 " above floor.
  - 3. Cross Bar of Panic Bolt: Centered 36" above floor.
  - 4. Top Hinge: Top edge 5" below head of frame.
  - 5. Bottom Hinge: Lower edge 10" above floor.
  - 6. Intermediate Hinges: Equidistant between top and bottom hinges.

#### 3.05 SEALANT

Seal and caulk perimeter of door and window frames where shown or required to fill space between frame and adjoining material. Sealant materials and applicable requirements of Section 07900 apply to this work.

#### 3.06 FINAL ADJUSTMENTS

- A. Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition. Remove and replace defective work including doors and frames that are warped, bowed or otherwise unacceptable.
- B. All materials and quality of work is subject to review by the inspector retained by the Owner.

#### 3.07 TOUCH UP

- A. Immediately after erection, touch up abraded surfaces by sanding smooth any rusted or damaged areas of prime coat and applying touch up with the same material used for shop priming.
- B. Leave all exposed surfaces clean and in proper condition for finish coating / painting

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including, but not limited to, these major items:
  - 1. Prefinished aluminum door frames for Police Station interior use, where indicated

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 07900: Caulking and Sealants
- B. Section 08100: Hollow Metal Doors and Frames
- C. Section 08205: Wood Doors
- D. Section 08700: Finish Hardware

1.03 REFERENCE STANDARDS

- A. American National Standards Institute (ANSI)  
ANSI A115 Door and Frame Preparation
- B. American Society for Testing and Materials (ASTM)  
ASTM B221 Specification for Aluminum Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
- C. Architectural Aluminum Manufacturers Association (AAMA)  
AAMA 603 Voluntary Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum.
- D. National Association of Architectural Metal Manufacturers (NAAMM) - NAAMM 861Guide
- E. CCR Title 24 and ADA Requirements

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Product Data: Submit manufacturer's technical product data substantiating that products comply with requirements, inclusive of fabrication and installation instructions.
- C. Shop Drawings:
  - 1. Demonstrate frame thickness and configuration, location of cutouts for hardware, reinforcement and finish. Show profiles, types, dimensions,

- anchorage construction, relationship to adjacent structure and interface with adjacent materials.
- 2. Standard installation details for typical conditions
- 3. Details of connections to special construction and other custom features.

D. Provide a schedule relating the type of door and frame to be installed in each scheduled door opening or place of installation.

E. Samples: Provide clips in full range of manufacturer's standard finishes for Architects color selection. Resubmit two (2) samples 12" long of aluminum framing members in selected finish for verification.

#### 1.05 QUALITY ASSURANCE

Manufacturer: Provide aluminum frames manufactured by a single firm specializing in production of this type of work for a minimum of five (5) years.

#### 1.06 SEQUENCING

Do not begin fabrication of doors or frames until hardware templates have been received from hardware supplier.

#### 1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Deliver frames and doors packaged to provide protection during transit, and storage at project site. Protect frames damage from construction activities

B. Store at site in dry location on wood blocking or on suitable floors in vertical position. Do not store in any portion of the building until after dampness or other wet construction work has been completed and that portion of building has dried out. D. Do not use covering material that will cause discoloration of aluminum finish.

C. Damaged frames will be rejected and must be replaced with new frames without additional cost to District.

#### 1.08 ENVIRONMENTAL REQUIREMENTS

Maintain temperature and humidity in areas of installation within reasonable limits, as close as possible to final occupancy standards. If necessary, provide artificial heating, cooling and ventilation to maintain required environmental conditions

#### 1.09 GUARANTEE

Provide a written guarantee in approved form that all defective materials or workmanship reported within a period one year after final acceptance will be promptly repaired or replaced to the satisfaction of the District.

#### 2.00 PRODUCTS

#### 2.01 MANUFACTURER

Provide products as manufactured by Western Integrated. Comparable products as manufactured by ACI (Architectural Components, Inc.), (714) 528-4800, Alumax, Dual Lock Partition Systems, Inc. (800) 678-0566; Wilson Partitions (213) 721-4663, or approved equal will be considered upon Architect approval.

## 2.02 MATERIALS

- A. Aluminum Members: All component shapes shall be extruded from standard alloys conforming with reference standards from controlled alloy billets of 6063 T5 or 6463 T5; comply with ASTM B221, with minimum thickness of .062 inch. Fabricate to shapes as required for each application, for knock down field assembly.
- B. Fasteners: Provide fasteners of aluminum, stainless steel or zinc plated steel or other non-corrosive materials which are compatible with aluminum components, hardware and anchors in accordance with ASTM A164
- C. Components: Formed from a minimum of 0.062 inch thick aluminum consisting of a head section, two jamb sections, two corner aluminum reinforcing angles, three hinge backup plates with a minimum thickness of 0.125.
- D. Provide door frames with continuous, nylon backed wool / mohair pile / mute or vinyl sound and light seal around perimeter.

## 2.03 FABRICATION

- A. All frame members shall arrive at the job site pre-machined, mortised, drilled and tapped for 4-1/2" x 4-1/2" square hinge, 2-3/4" cylindrical or 4-7/8" A.S.A. strike locations and other hardware. Provide 1/8" thick aluminum strike and hinge back-up, pre-mounted on jambs.
- B. Provide corner alignment clips for precise butt or mitered connections.
- C. Fabricate all components to allow for secure installation without exposed fasteners. Frame design must permit installation over prefinished wall assemblies.
- D. Supply prefinished and mitered snap-on trim as part of each frame.
- E. Furnish door hardware under "Hardware" Section.

## 2.04 FRAMES

- A. Western Integrated Materials Series 300, 400, 401, 402, 700, 701 Frames: Provide frames with the following characteristics:
  - 1. Rectilinear Design
  - 2. 1-1/2", 2", 3" or 4" face profiles
  - 3. Trim: 1" with 3/8" return, 1-1/4" with 5/8" return, 1-1/2" with 5/16" return, 1-7/16" with 3/8" return, 2" with 5/16" return, 3" with 5/16" return, 4" with 5/16" return
  - 4. Series 300 Throat Sizes: 3", 3-1/4", 3-3/8", 3-1/2", 3-3/4", 4-1/2", 4-5/8", 4-3/4", 4-7/8", 5", 5-1/4", 5-1/2", 6", 7-1/4"

5. Series 400 Throat Sizes: From 3" to 6"
6. Series 401 Throat Sizes: From 6" to 7-1/2"
7. Series 402 Throat Sizes: From 7-1/2" to 9-1/2"
8. Series 700 Throat Sizes: From 3-3/4" to 5-1/2"
9. Series 701 Throat Sizes: From 5-1/2" to 8-3/8"

## 2.05 FINISH

- A. Factory finish extruded frame and door components so that any part exposed to view upon completion of installation will be uniform in finish and color. Prefinish in factory-applied finish(es) as selected by Architect.
- B. Clear Anodic Coating – All Interior Door Frames: Comply with AAMA 611 – Commercial, AAM12C22A21 clear anodized coating, 0.4 mil minimum thickness.
- C. Dark Bronze Anodic Coating – Exterior Door Frames Only: Comply with AAMA 611 – Commercial, AAM12C22A24 bronze anodized coating, 0.4 mil minimum thickness.

## 3.00 EXECUTION

### 3.01 GENERAL REQUIREMENTS

Verify drawing dimensions with actual field conditions. Verify that wall surfaces to receive frames are smooth, flat and proper size to receive work. Wall thickness shall not exceed standard tolerance of +/-1/16". Report to the Architect all conditions which prevent proper execution of this work.

### 3.02 FRAME INSTALLATION

- A. Install frames in accordance with manufacturers instructions, approved shop drawings, and in conformance with all reference standards and as required by these Specifications. Strictly adhere to maintaining specified wall thickness to insure dimension does not exceed frame throat size specified.
- B. Securely anchor to partitions with screws of the type recommended by the manufacturer. Set frames level, plumb and in true alignment, without warp or twist and close fitting.
  1. Use concealed installation clips to assure that splices and connections are tightly butted and properly aligned.
  2. Secure clips to main structural extrusion components and not to snap-in or trim members.
  3. Do not use screws or other fasteners that will be exposed to view when installation is complete.
- C. Installation of Metal Stud Partitions: Install at least 3 wall anchors per jamb, at hinge and strike levels.

### 3.03 HARDWARE

Contractor shall be responsible that all heights and locations to be in compliance with applicable handicap codes of jurisdiction including CCR Title 24 Amendments to the

Building Code and Americans with Disabilities Act (ADA) requirements. Consult the Architect of any discrepancies prior to installation. Non-conforming work is to be replaced at no additional cost to District.

3.04 FINAL ADJUSTMENTS

- A. Check and readjust operating finish hardware items, leaving door frames undamaged and in complete and proper condition.
- B. All materials and quality of work is subject to review by inspectors retained by the District.

3.05 CLEANING

- A. Wash all soiled surfaces with mild soap solution, rinse with clean water, and wipe dry. Do not use any harsh cleaning agents, abrasives for cleaning.
- B. Touch up marred areas so that touch-up is not visible from a distance of 4 feet. Remove and replace frames that can not be satisfactorily adjusted.

3.06 PROTECTION

Provide protection required to assure that frames and doors will be without damage or deterioration upon substantial completion of the project.

END OF SECTION





1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division 1 apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Solid core wood doors
  - 2. Acoustical wood doors
  - 3. Installation of wood doors and hardware therefore.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 06200: Finish Carpentry
- B. Section 08700: Finish Hardware

1.03 REFERENCE STANDARDS

- A. AWI Architectural Woodwork Institute "Architectural Woodwork Quality Standards" and Section 100 S-11 "Relative Humidity and Moisture Content"
- B. NWWDA National Wood Window and Door Association I.S. 1-A, "Architectural Wood Flush Doors"
- C. American Society for Testing and Materials (ASTM)
- D. National Fire Protection Association (NFPA)

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Product Data: Submit manufacturer's product data for each type of product supplied. Include details of core and edge construction. At acoustic doors supply data on the STC rating provided with info on the perimeter seals, bottom seals and thresholds and for any glazed panel proposed.
- C. Shop Drawings: Indicate location, size and hand of each door, elevation of each kind of door, construction details not covered under 'Product Data' information, location and extent of hardware blocking and other pertinent data. Indicate dimensions and locations of mortises and holes for hardware, dimensions and locations of cutouts. At glazed panels provide the size and framing details.
- D. Certificates: Deliver to Architect signed certificates from suppliers of materials and manufactured items stating that materials and manufactured items conform

to standards set forth herein. In addition to certification, comply with added requirements specified herein.

- E. Samples: Corner sections of doors approximately 8" x 10" with door faces and edgings representing the typical range of color and grain for each species of veneer and solid lumber required.

#### 1.05 QUALITY ASSURANCE

Obtain each different type of flush wood doors through one source as manufactured by a single manufacturer.

#### 1.06 PROJECT CONDITIONS

Environmental Limitations: Do not deliver or install doors until conditions for temperature and relative humidity have been stabilized and will be maintained in storage and installation areas during the remainder of the construction period to comply with requirements of the referenced quality standard for Project's geographical location.

#### 1.07 DELIVERY, STORAGE AND HANDLING

- A. Protect doors from damage during transportation to site. Comply with the requirements of referenced standards and manufacturers written instructions. Store doors received at the site, in a clean, dry, well ventilated area; not in a damp, moist or freshly plastered area. Store doors flat on level surface, do not stand on edge.
- B. During and after installation, protect doors from damage. Individually wrap or package doors in protective plastic bags or cardboard cartons. Damaged doors will be rejected and shall be replaced with new doors without additional cost to Owner.
- C. Doors and protective covers shall be individually marked indicating product type and project specific scheduled opening number.

#### 1.08 GUARANTEE

Provide door manufacturers standard written guarantee, signed by the manufacturer, installer and Contractor, to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4" in a 42" x 84" section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3 inch span, against delamination or do not comply with tolerances in referenced quality standards. Warranty shall be in effect for the life of the installation.

### 2.00 PRODUCTS

#### 2.01 MANUFACTURERS

Provide doors as manufactured by Eggers Industries, Graham Manufacturing Corporation, Haley Brothers, Inc., Mohawk Flush Doors, Inc., Marshfield formerly Weyerhaeuser Co., or approved equal. Acoustical door as indicated below.

## 2.02 MATERIALS

- A. Provide solid wood block core consisting of kiln-dried wood blocks or strips of single species in random lengths not more than 2-1/2" wide glued together in tight and well-staggered rows at solid core doors. Entire unit shall be abrasive planned before veneering. Provide doors, transoms and fixed panels of type, sizes and design indicated, 1-3/4" thick unless designated otherwise
- B. Provide solid hardwood strips, minimum 3/4" (1" for particleboard and 2-1/2" for hollow core) wide at vertical edge stiles (same species of wood as face veneer at stain grade maple doors) and 1-1/8" minimum width at top and bottom rails. Glue stiles and rails to core. Finger-jointing of exposed vertical edge stiles is not permitted.
- C. Factory-fabricate doors using Type I (waterproof) adhesives, conforming to design and dimensions on the drawings. Provide 18 gage metal stops at openings in doors for glass panels where indicated.
- D. Paint Grade Finish:
  - 1. Premium grade hardwood faces with veneer not less than 1/28" thick.
  - 2. Faces of interior doors may be made of continuous sheets of hardboard which meet or exceed the requirements for 1/8 inch tempered hardboard in accordance with the latest edition of ANSI A135.4 (PS 58), "Basic Hardboard". Smooth, straight, non-textured, seamless finish.
- E. Stain Grade Finish: Premium grade Maple hardwood veneer, not less than 1/8" thick. Veneer cutting and matching methods as selected by Architect.
- F. Solid Core Doors:
  - 1. Particleboard: Conforming to ANSI A208.1, LD-1 or CS236, minimum 28 pounds per cubic foot density.
  - 2. Blocking: Provide wood blocking at particleboard core doors as follows:
    - a. 5" top-rail blocking at doors indicated to have closers.
    - b. 5" bottom rail blocking at doors indicated to have kick, mop or armor plates.
    - c. 5" mid-rail blocking at doors indicated to have exit devices.
- G. Frames for Glass Openings: Metal framing as provided in Section 08800 – Glass and Glazing
- H. Acoustical Door: Provide door as manufactured by Ambico Limited (888) 423-2224.
  - 1. Acoustically rated, sound retardant / deadening core doors shall be certified under ASTM E90-87 and E413-80 standards. Provide a minimum STC-41 rated assembly complete with a gasketing package inclusive of threshold, door sweep/door bottom and seal gasketing.
  - 2. Heavy-weight door assemblies shall be equipped with heavyweight ball bearing hinges or a continuous hinge to properly support the swing of the door.
  - 3. Vision Panel: Provide a 8" x 20 vertical vision panel, with reinforced / security two-way mirror glazing, per Section 08800.

- a. Provide frame for glazed openings between face sheets continuously around perimeter of glass opening
- b. Form frame with integrally formed stop on security side.
- c. Do not overlap molding on face of door.
- d. Use 20 gage loose stop for flush glazing.
- e. Stops at windows shall be 5/8" by 1"
- f. Apply stop to frame with countersunk screws 6 inches on centers.

## 2.04 FABRICATION

- A. Factory fit doors to suit frame opening sizes indicated with the following uniform clearances and bevels:
  1. Provide clearances for doors, except fire doors, of 3/32" at jambs and heads, and 5/8" at bottom unless indicated or specified otherwise.
  2. Provide clearances for fire doors to comply with requirements of NFPA 80, as required by the authority having jurisdiction.
  3. Where metal edge strips, dividers or thresholds occur, provide 1/8" clearance to underside of door.
  4. Acoustical doors shall have 3/32" clearance between the jamb of the frame and the hinge edge of the door, with a 1/4" clearance at the top of the door and the lock edge. The clearance at the bottom of the door should be 1/8" – 7/16" from the finish floor or 1/8" – 3/16" from the top of the threshold to the bottom of the door. The lock edge should have a 3 degree or 1/8" in 2" bevel. The hinge edge, top of door and door bottom should be square.
- B. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame shop drawings and hardware templates.
  1. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
- C. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required. Trim openings with moldings of material and profile indicated.

## 3.00 EXECUTION

### 3.01 EXAMINATION

- A. Examine installed door frames before hanging doors. Verify that door frames comply with indicated requirements for type, size, location and swing characteristics and have been installed with plumb jambs and level heads.
- B. Reject doors with defects.

### 3.02 INSTALLATION

- A. Install wood doors to comply with manufacturer's written instructions, referenced quality standards, and as indicated. Install fire-rated doors in corresponding fire-rated frames according to NFPA 80.

- B. Align and fit doors in frames with uniform clearances and bevels as indicated below. Do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors. Machine door blanks to accept the scheduled hardware. Seal cut surfaces after fitting and machining.
1. Clearances: Provide 1/8 inch at heads, jambs and between pairs of doors. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold. Comply with NFPA 80 for fire-rated doors.
  2. Bevel non-fire-rated doors 1/8 inch in 2 inches (32 deg.) At lock and hinge edges.
  3. Bevel fire-rated doors 1/8 inch in 2 inches (32 deg.) on lock edge; trim stiles and rails only to extent permitted by labeling agency.
- C. Acoustical Doors: The performance of an acoustical door depends on the compatibility and the quality of the installation of all of the components including the wall, door frame, gasketing, hardware and door. Contractor shall coordinate all adjoining materials and construction in order to validate the integrity of the assembly.
- D. Hardware:
1. For installation refer to Section 08700 - Finish Hardware. Obtain required templates from hardware supplier. Coordinate placement with the metal frame supplier so that doors and frames are properly fitted and equipped when installed, 3/64" maximum tolerance allowed in placing hardware.
  2. Acoustical doors shall be factory equipped with the proper hardware and gasketing required to provide the certified STC rating or installed with the correct components to accomplish the same.

### 3.03 HARDWARE

- A. Install finish door hardware specified in "Finish Hardware" Section.
- B. Accurately fit hardware, securely apply, carefully adjust and install in accordance with manufacturer's instructions.
- C. Provide and use boring jigs, mortising tools and other special equipment and appliances as required for proper installation of hardware.
- D. When required, remove and replace doors so door bottoms and tops may be painted.
- E. Remove hardware until painting is completed, then reinstall.
- F. Location of Hardware: All heights and locations shall be in compliance with applicable handicap codes of jurisdiction. Consult the Architect of any discrepancies prior to installation. Non-conforming work shall be replaced at no additional cost to Owner.
1. Locks and Latches (Cylindrical, Mortise, Units, Integral): 42" from finish floor to centerline of strike.
  2. Door Pulls: 42" from finish floor to centerline of grip.
  3. Push Plate: 45" from finish floor to centerline of plate.

4. Push-Pull Bar: 42" from finish floor to centerline of bar or centerline between bars and combination.
5. Panic Devices (Mortise Rim): 42" from finish floor to centerline of strike.
6. Top Hinge: To industry / manufacturer's standard, but not greater than 11-3/4" from head of frame to centerline of hinge.
7. Bottom Hinge: To industry / manufacturer's standard, but not greater than 13" from finish floor to centerline of hinge.
8. Intermediate Hinge: Equally spaced between top and bottom hinge.
9. Deadlocks Only (Cylindrical, Mortise, Rim): 44" from finish floor to enterline of cylinder.
10. Deadlocks (with separate Latch-set and/or Pull): 44" from finish floor to centerline of cylinder.
11. Acoustical doors shall be fitted with the heavy-duty bearing hinges 3 or 4, or a continuous hinges, as required to properly swing the door.

Coordinate with Section 08100 for H.M. frame fabrication

Note: When wood doors are used with hollow metal frames, hinge location on door is governed by location of hinge preparation on frame.

### 3.04 ADJUSTING AND PROTECTING

- A. Operation: Re-hang or replace doors that do not swing or operate freely.
- B. Finished Doors: Refinish or replace doors damaged during installation.
- C. Protect doors as recommended by door manufacturer to ensure that wood doors are without damage or deterioration at the time of 'Substantial Completion'.

END OF SECTION

## 1.00 GENERAL

### 1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division 1 apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Access doors and panels not furnished under Division 15 and 16.
  - 2. Coordination with mechanical and electrical trades requiring access and with those trades providing installation.

### 1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 04220: Concrete Unit Masonry
- B. Section 09110: Metal Framing and Furring
- C. Section 09250: Gypsum Wallboard
- D. Section 09310: Tile Work
- E. Section 15410: Plumbing Piping

### 1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
  - ASTM A167 Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet and Strip
  - ASTM A366 Standard Specification for Steel Sheet, Carbon Cold-Rolled, Commercial Quality.
  - ASTM A591 Standard Specification for Steel Sheet Electrolyte Zinc Coated, for Light Coating Mass Applications.
  - ASTM A653 Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-iron Alloy Coated (Galvannealed) by the Hot-Dip Process
  - ASTM A924 Specifications for General Requirements for Steel Sheet, Metallic Coated by the Hot-Dip Process

### 1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Product Data: Indicate size, type, door assembly, details of construction relative to materials, individual components, profiles, finishes and fire protection ratings (if required), based on location and surface on which installed.
- C. Schedule: Include types, general locations, sizes, wall and ceiling construction details, latching or locking provisions and other data pertinent to installation.
- D. Certificates: Deliver signed certificates from manufacturer stating that items requiring rated assemblies conform to testing laboratory requirements and in

conformance to all regulatory agencies having jurisdiction.

#### 1.05 QUALITY ASSURANCE

- A. Single Source Responsibility: Obtain access doors / panels for the entire project from one source and as manufactured by one single manufacturer.
- B. Fire Rated Assemblies: Units that comply with NFPA 80 are identical to door and frame assemblies tested for fire test response characteristics per test method as indicated below, and are labeled and listed by UL, Warnock Hersey, or other testing and inspection agency acceptable to authorities having jurisdiction. Test method for vertical installations to comply with ASTM E152.
- C. Access panels installed in rated walls or ceilings are to maintain the fire barrier ratings of the combustible, non-combustible assemblies they are installed. Rated panels shall carry UL or Warnock Hersey Labels.

#### 1.06 COORDINATION

- A. Contractor shall review contract documents with sub-trades to determine the necessary extent where access panel assemblies will be required for access to concealed equipment / utilities.
- B. Coordinate shop drawings and product data submittals with trades requiring access panel installations with relation to specific location, sizes, types, supporting substrates and adjoining finishes.
- C. Clarify design intent with the Architect to determine assembly finishes and product options prior to execution.

#### 1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

Store, handle and protect access panels, before, during and after installation from damage affecting finish or operation.

### 2.00 PRODUCTS

#### 2.01 MANUFACTURE

Select the specified product as manufactured by Karp, Nystom, Larsen's, Milcor, JLI, Williams Brothers Corporation, Access Doors Direct, or equal meeting the specified requirements.

#### 2.02 MATERIALS

- A. Steel Sheet: ASTM A366 commercial quality, cold-rolled steel with baked-on rust inhibitive primer.
- B. Zinc Coated Steel Sheet: ASTM A591 electrolytic zinc coated steel sheet with Class C coating and phosphate treatment to prepare surface for painting.
- C. Stainless Steel Sheet: ASTM A666 Type 304 temper rolled stock with No.4 finish



according to ASTM A480.

- D. Cylinder locks shall be flush, key operated with automatic dust shutter and a stainless steel cam. Key lock cylinders to Owner's requirements.

## 2.03 ACCESS DOORS AND PANELS

- A. Flush Access Doors with Exposed Trim: Units consisting of steel or stainless steel frame with exposed trim flange integral with frame, 3/4" to 1-1/2" inch wide overlapping surrounding finished surface. Continuously welded construction with welds ground smooth and flush. Furnish required attachment devices and fasteners to fasten access panels to supporting substrate indicated. Door shall have a continuous piano type hinge.
- B. Trim-less, Flush Access Doors for Gypsum Board: Units consisting of frame, concealed gypsum board edge trim with face flange formed to receive joint compound. Door constructed with a concealed spring pin or continuous piano type hinge. Recessed panels are to be installed where indicated for appearance to be indiscernible with expose of only the narrow frame edges. Provide type required for material being applied.
- C. Recessed Door for Plaster: Units consisting of frame with concealed edge trim, recessed door and hardware. Cement plaster access doors are to be recessed 2 inch and lined with 2.5lbs.sq.yd. flat, galvanized expanded steel lath allowing surrounding plaster to continue over face of door. Reinforce panel as required to prevent buckling. Plaster casing bead zinc coated steel with flange formed of flat expanded metal lath. Door constructed with concealed pivoting rod type hinge.
- D. Insulated Fire Rated Access Doors: Provide units consisting of frame, trim, welded pan-type door, minimum 2 inch thick mineral fiber insulation and hardware, including automatic closer (strong coil spring), Flush mounted paddle latch with interior latch release mechanism operated by either a ring turn or flush key device (keyed alike) and continuous non-exposed standard or type piano hinge with stainless steel pin(s). Fabricate from cold-rolled steel prime coated with a rust-inhibitive electrostatic powder coat with baked enamel finish or stainless steel with a #4 satin finish. Trim to minimum 1" wide x 16 gage flange overlapping surfaces surrounding frame. Include factory attached masonry anchors 4 to 8 depending on door size. The fire-protection rating shall be U.L. 1.5 hour "B" Label for 2 hour walls, with a temperature rise not exceeding 250 deg F. at the end of 30 minutes.  
Access Doors Direct 'Acudor FW-5050, Karp KRP-150FR, Milcor Style UFR, Williams Brothers 'WB FR 800', or equal.

## 2.04 FABRICATION

- A. Manufacture assemblies as integral units ready for installation.
- B. Locking Devices: Furnish required number to hold door in flush, smooth plane when closed.
  - 1. Cylinder Lock: Furnish 2 keys per lock and key all locks alike.
  - 2. Recessed Panel Doors: Provide access sleeves for each locking devices. Furnish plastic grommets and install in holes cut through finish.

### 3.00 EXECUTION

#### 3.01 PROJECT CONDITIONS

- A. Coordinate installation requirements related to installation, size of opening to receive door and frame assembly, location of supports, inserts and anchoring devices.
- B. Correct interference's or lack of adequate clearance effecting installation prior to execution.

#### 3.02 INSTALLATION

- A. Install access panels per manufacturers' printed installation instructions.
- B. Coordinate with concrete unit masonry construction to install frame anchors at the time of wall erection. Set frames accurately in position and attached securely to supports. Align panels plumb and level so finished surface of panels is in plane with adjacent finished materials.
- C. Install concealed frame access doors flush with adjacent finish surfaces

#### 3.03 ADJUST AND CLEAN

Check installed assemblies adjusting hardware for proper operation. Remove and replace frames and/or doors that are warped bowed or otherwise damaged.

#### 3.04 SCHEDULE

- A. Provide access panel assemblies of type, size and finish as required based on project specific application and in conformance with the Architects design intent.
- B. Provide assemblies as required to gain access to concealed plumbing valves and controls for either HVAC or electrical systems.
- C. Provide either zinc-coated steel access doors at exterior locations.
- D. Provide stainless steel access doors at damp locations and either the same or recessed panel assemblies within tiled surfaces less susceptible to moisture.
- E. Provide flush exposed, trim-less or recessed steel access assemblies in exterior locations (parking structures) as required by Architect based on project specifics.

END OF SECTION

1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to the work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. (Manually /electrically) operated overhead non-insulated rolling / steel fire doors, inclusive of all bottom bars, guides, brackets, hoods, operating mechanisms, and any special features.
  - 2. Rolling steel service doors.
  - 3. Operating devices, guides, fittings and fastenings.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 05500: Miscellaneous Metal
- B. Section 08700: Finish Hardware

1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
  - ASTM A366 Standard Specification for Commercial Steel (CS) Sheet, Carbon (0.15 Maximum Percent) Cold-Rolled
  - ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  - ASTM E152 Methods of Fire Tests of Door Assemblies
- B. National Fire Protection Association (NFPA)
  - NFPA 80 Installation of Fire Doors and Assemblies
  - NFPA 252 Standard Method of Fire Tests of Door Assemblies
- C. Underwriter's Laboratories – UL 10b Fire Tests of Door Assemblies

1.04 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide overhead coiling doors capable of withstanding the effects of gravity loads and the following loads and stresses without evidencing permanent deformation of door components.
- B. Operation-Cycle requirements: Design overhead coiling door components and operator to operate for not less than 50,000 cycles.

1.05 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340

- B. Shop Drawings: Provide drawings in sufficient detail to show fabrication of doors and frames, indicating gages and types of metal, finish, precise locations and spacings of all embedded anchor bolts, sleeves, hardware locations or other features required in the concrete or masonry, backings, etc., together with all noted variances from the intended square, plumb and level indicated opening.
  - 1. All mountings shall be clearly designated, including interface of the work of adjacent trades. Indicate special components that are not fully dimensioned or detailed in manufacturer's product data.
  - 2. Wiring Diagrams: Detail wiring for power, signal, and control systems. Differentiate between manufacturer-installed wiring and between components provided by door manufacturer.
  
- C. Product Data: Submit a complete list of materials for each type and size of overhead coiling door and accessory. Provide manufacturer's recommended rough-in diagrams, installation procedures, operating instructions, a parts list and maintenance instructions.
  - 1. Include setting drawings, templates and installation instructions for built-in or embedded anchor devices.
  - 2. Summary of forces and loads on walls and jambs.
  - 3. Motors: Show nameplate data and ratings, characteristics, mounting arrangements, size and location of winding termination lugs, conduit entry and grounding lug and coatings.
  - 4. Fire-Rated Doors: Information describing fire release system, including testing and resetting instructions.
  
- D. Samples: Provide 12 inch x 12 inch section of multiple slats to demonstrate material weight, profile, finish, slat design and construction.
  
- E. Certificates: Deliver signed certificates from manufacturer stating that items conform to standards set forth herein and in conformance to requirements of the Building Code regulatory agencies having jurisdiction and compliance to approved testing agencies.

#### 1.06 QUALITY ASSURANCE

- A. Provide overhead coiling doors as complete units furnished by one manufacturer, including hardware, accessories, mounting and installation components. Furnish overhead coiling door units by one manufacturer for the entire project. Coordinate with miscellaneous metal for supply of the supporting steel tubes and/or angles and the required priming requirements.
  
- B. Manufacturer Qualifications: ISO 9001:2000 registered and a minimum of five years experience in producing grilles of the type specified.
  
- C. Where labeled openings are scheduled or are required by governing codes, construct doors and frames in strict accordance with the requirements of the NFPA 80 and bearing Underwriter's Laboratories 10b, Warnock Hersey, Factory-Mutual or other testing agency label. Doors shall bear a (1-1/2 hour) rating label. Attach labels for the indicated classification. Firelocks shall be installed on doors over 13'-7" wide to positively hold the curtain in the guides.
  
- D. Installer is to be an authorized representative of the overhead coiling door

manufacturer for both installation and maintenance of units required for this Project. The installation shall conform to all printed recommendations of the manufacturer and to applicable rulings of the National Board of Fire Underwriters.

#### 1.07 REQUIREMENTS

- A. Coordinate fabrication requirements with the selected manufacturer so that the door width indicated on the drawings is of standard manufacture.
- B. Manufacturer shall review drawings and specifications for Architects intended application. Discrepancies with their products shall be noted prior to bidding. District is entitled to the product, fabrication, operation, and function specified herein as a minimum. District will not accept a lesser product without credit, nor pay for changes required to accommodate alternate products or equipment.

#### 1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

Use all means necessary to handle, store and protect the materials of this Section before, during and after installation from damage affecting operation or finish.

#### 1.90 MAINTENANCE

Comply with NFPA 80, Chapter 15-2.4.3. All rolling fire doors shall be inspected and tested annually to check for proper operation and full closure. Resetting of the release mechanism shall be done in accordance with the manufacturer's instructions. A written record is to be maintained and available to the authority having jurisdiction.

#### 1.10 GUARANTEE

- A. Provide written guarantee that all defective materials, finishes, special mechanisms or quality of work reported within a period two (2) years after final acceptance will be promptly repaired or replaced to the satisfaction of the Architect.
- B. Maintenance: Submit for District consideration and acceptance of a maintenance service agreement for installed products.

### 2.00 PRODUCTS

#### 2.01 MANUFACTURE

Products shall comply with the requirements specified herein, for fabrication, function and operation. Products as manufactured by the following will be considered if meeting the listed requirements, Cookson, Cornell Iron Works, Lawrence Roll-Up Doors, Inc. / Pacific Rolling Door, McKeon Door West, Inc., Overhead Door Corporation, R & S Rolling Doors or approved equal.

#### 2.02 MATERIALS

- A. Curtain: Interconnected, interlocking strip steel (Grade 40) slats shall be cold rolled formed in continuous lengths, galvanized steel conforming to ASTM A653, or as required to be meet design wind loads or fire ratings. The proper gage shall

be chosen as follows:

1. 22 gage with 2-1/4" h x 5/8" d, if door width does not exceed 18'-4" and the door height does not exceed 18'-4".
  2. 20 gage if door width is between 18'-5" and 24'-4" and door height is between 18'-5" and 24'-4"
- B. Endlocks: Fabricate interlocking sections with high strength nylon or cast iron endlocks on alternate slats each secured with two 1/4" (6.35 mm) rivets. Provide windlocks as required to meet specified wind load, and resistance against lateral movement. Design door construction to satisfy minimum wind-load of 20psf or 87 mph in the fully closed position.
- C. Bottom Bar: Reinforced with two 1-1/2" x 1-1/2" or 2" x 2" x 1/8" either galvanized steel, stainless steel, back to back, mechanically joined, to suit type of slats. Provide flexible rubber, vinyl or neoprene weather seal and cushion bumper. Slope bottom of door with floor. Provide motor operated doors with combination bottom astragal and sensor edge.
- D. Counterbalance Shaft Assembly:
1. The barrel shall be steel tubing of not less than 4" diameter. Oil tempered torsion springs shall be capable of correctly counter balancing the weight of the curtain and shall have both a main and an auxiliary spring. The barrel shall be designed to limit the maximum deflection to .03" per foot of opening width. The springs shall be adjusted by means of an exterior wheel.
  2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 30 lbs. Springs to be designed to include an overload factor of 25% and for ease of operation. Provide wheel for applying and adjusting spring torque. Spring tension to be adjustable from outside of end bracket plate. Ball bearings are to be sealed to minimize wear of pipe shaft rotation around inner shaft.
- E. Bracket Plates: Carrying pipe counterbalancing shaft to be steel not less than 1/4" thick and bolted to the wall angle with minimum 1/2" fasteners.
- F. Guide/Wall Angles: Consisting of 3 steel angles (thickness based on size) bolted together with 3/8" fasteners to form a channel for the curtain to travel. The wall angle portion shall be continuous and fastened to the surrounding structure with minimum 1/2" fasteners. Top of inner and outer guide angles to be flared outwards to form bellmouth for smooth entry of curtain into guides. Provide removable guide stoppers to prevent over travel of curtain and bottom bar.
- G. Gears: Cast iron with teeth cast from machine cut patterns. The pinion gear shall not be less than a 3" pitch diameter. The gear ratio shall be designed for a maximum effort of not more than 30 pounds.
- H. Hoods: Form of minimum (24 gage galvanized steel with G90 zinc coating), complying with ASTM A653, to entirely enclose coiled curtain and operating mechanism at opening head and act as a weather seal. Contour to suit end brackets to which hood is attached. Roll and reinforce top and bottom edges for

stiffness. Provide closed ends for surface mounted hoods and fascia for any portion of between jamb mounting projecting beyond wall face. Provide intermediate support brackets as required to prevent sag.

- I. Locking:
  - 1. Manual Chain Hoist: Padlockable chain lock keeper mounted on guide angle.
  - 2. Locking Options: Padlockable slide bolt on coil side of bottom bar at each jamb extending into slots in guides. Provide interlock switches on motor operated units.
  
- J. Hardware: Provide all mortise cylinders, compression rings, blocking rings, bushings and cams, as required for proper and complete installation in full coordination with the door manufacturer and contractor, to meet the requirements of the Owner. Electric switch locks operators for the rolling doors "on-off" and momentary keyed switch functions are to be housed in standard weather resistant box. Verify requirements for circuitry variations, voltage and amperage ratings. Units are to be grand master keyed per Owners selection.

1	Electric Switch	Type as required	630	SCH
1	Cylinder	Type as required		

Coordinate exact make, model and keying with finish hardware supplier. Switches are to be interior and/or exterior as required for fire department electric over-ride emergency access
  
- K. Finish - Galvanized Steel: Sheet steel, zinc coated (galvanized) by the hot dip process conforming to G90 coating ASTM A653 with minimum 1.25 oz/sq. ft. coating. Repair of damaged hot dip galvanizing coating to conform to ASTM A780.
  
- L. Weatherstripping:
  - 1. Bottom Bar: Replaceable, bulb-style, compressible EDPM gasket extending into guides.
  - 2. Bottom Bar, Motor Operated Doors: Weather/sensing edge within neoprene or rubber astragal extending full width of door bottom bar.
  - 3. Guides: Vinyl strip sealing against fascia side of curtain.
  - 4. Hood: Neoprene/rayon baffle to impede air flow above coil.
  - 5. Lintel Seal: Nylon brush seal fitted at door header to impede air flow
  
- M. Smoke Seals: Provide UL listed and tested smoke seal perimeter gaskets.

2.03 ROLLING AUTOMATIC FIRE DOOR

- A. The door shall contain all standard equipment noted in the manufacturer's printed specifications and as noted above. In addition the door shall conform to U.L. Class B 1-1/2 hour requirements minimum governing such application and shall bear that U.L. label. All guides are to be box type assembled of galvanized steel angles and channels.
  
- B. Rolling doors shall be equipped with an automatic closing device inoperative during normal door operations, governor complying with NFPA 80, smoke detector and tied to the building fire alarm system and central panel. Include smoke detectors and interconnecting wiring if any, to door. Provide easy test and

reset release mechanism, designed to be activated by the following:

1. Temperature rise and melting point of 165 deg F replaceable fusible links, interconnected and on both sides of wall of door opening.
2. Building fire alarm and detection system and door holder release devices.

- C. Slats: Gage of material to satisfy Underwriter's Laboratories requirements.
- D. Endlocks: Designed to prevent passage of flames.
- E. Governor: Door to be equipped with an oscillating governor as required to control speed of descent. Provide manufacturers standard adjustable delayed action release device.

#### 2.04 ROLLING SERVICE DOORS

- A. The door shall contain all standard equipment noted in the manufacturer's printed specifications, and as noted above.
- B. High-Cycle Springs: Satisfy a minimum of 50,000 cycles.

#### 2.05 MANUAL DOOR OPERATORS

- A. Provide manual operators, unless electric door operators are indicated. When not shown, provide chain hoist operator unit.
- B. Chain Hoist Operator:
  1. Provide manual chain hoist operator consisting of endless steel hand chain, chain pocket wheel and guard, and gear reduction unit with a maximum 35 lbf effort for door operation. Provide alloy steel hand chain with chain holder secured to operator guide.
  2. All chain operated fire doors shall have an automatic closing device. Sure-Close Release Spring and Whisper Governor to control the downward speed of the door which shall become operational upon the fusing of a 160 degree fusible link. The door shall have an average closing speed of not less than six (6) inches per second and not more than twenty-four (24) inches per second as indicated in NFPA Bulletin 80. The Whisper Governor shall be fail-safe, maintenance-free, fully enclosed and warranted for the life time of the door. Once the door has closed, it should be able to be reset by one person on one side of the door only.
  3. Chain operated doors shall open and close with a maximum of 30 pounds of effort utilizing an endless chain and cast iron reduction gears.

#### 2.06 ELECTRIC (POWER) DOOR OPERATORS

- A. Provide electric door operator assembly of size and capacity recommended and provided by the door manufacturer for door and operational life specified, with electric motor and factory pre-wired motor controls, starter, gear reduction unit, solenoid operated brake, clutch, remote control stations, control devices, integral gearing for locking door and accessories required for proper operation. Comply with NFPA 70.
- B. Electrically operate doors with heavy duty wall, hood, or bracket mounted,



jackshaft, gear-head hoist type door operator unit consisting of electric motor, enclosed worm-gear running-in-oil primary drive, chain and sprocket secondary drive and auxiliary chain hoist and floor level disconnect. Provide high-starting torque, reversible, continuous duty, Class A insulated electric motor, with NEMA MG1, with overload protection, sized to start, accelerate and operate door in either direction, from any position at not less than 2/3 fps or more than 1 fps, without exceeding nameplate ratings or considering service factor.

1. Electrical characteristics are 120 single phase or (208, 277, 480) volt, 3 phase.
  2. Provide unit with heavy duty, hoist-type motor, gears designed to AGMA standards, running in multi-temperature lubricant, mechanical self-adjusting brake, rotary limit switch to set open and close positions, NEMA 1 motor controller with over-current protection.
- C. Provide control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24 V, ac or dc.
- D. Remote Control Station: Provide momentary-contact, 3 button control station with push button controls labeled Open - Close - Stop. Provide interior units, full guarded, surface mounted, heavy duty type, with general purpose NEMA ICS 6, Type 1 enclosure. Mount controller and/or push-button or 3-position key station and furnish disconnect switch, conduit and wiring in accordance with wiring diagram furnished. Coordinate with the fire department for exterior emergency access electric override operation.
- E. Obstruction Detection Device: Provide each motorized door with indicated external automatic safety sensor able to protect full width of door opening. Activation of sensor immediately stops and reverses downward door travel.
1. Sensor Edge: Provide each motorized door with an automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor immediately stops and reverses downward door travel. Connect to control circuit using manufacturers standard take-up reel or self-coiling cable.
  2. Provide pneumatically or electrically actuated automatic bottom bar.
- F. Limit Switches: Provide adjustable switches, interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

### 3.00 EXECUTION

#### 3.01 EXAMINATION

The manufacturer shall verify at the site, all conditions affecting the work of this Section and shall obtain all accurate dimensions covering all parts thereof.

#### 3.02 INSTALLATION

- A. Install doors and operating equipment complete with necessary hardware, jamb and head mold strips, anchors, inserts, hangers, and equipment supports by manufacturer or by authorized installer in conformance with manufacturers printed directions, approved shop drawings and as specified herein.

- B. Erect plumb, square and true in the openings, permanently secured and anchored in proper position with guides accurately aligned and faced, and with all operating devices and equipment properly connected and adjusted to function smoothly and perfectly for long life under hard use.
- C. Coordinate as required with work of other sections to assure proper and adequate provision in the work of those trades for interface with work of this Section.
- D. Fire door installation to be in compliance with the latest NFPA Bulletin 80.

### 3.03 TYPE OF MOUNTING

The doors shall be mounted, as shown and as required. All mountings shall be clearly designated on the shop drawings and erection diagrams. Verify that motor operators have the adequate clearance indicated and required for a proper installation and operation.

### 3.04 ADJUSTMENT AND TESTING

- A. Upon completion of the installation, lubricate bearings and sliding parts and adjust doors to operate easily, free from warp, twist or distortion, and fitting weather tight for entire perimeter.
- B. Upon completion of installation, perform a minimum of ten (10) complete open-close test cycles, working all manual and motor operators, hardware, switches, etc., making all necessary adjustments for trouble-free operation.
- C. Test door closing when activated by detector or alarm connected fire release system. Reset door closing mechanism. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Fire doors are to be drop tested and witnessed by the Architect, for normal operation after installation.
- E. Train Owner's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, preventative maintenance and procedures for testing and resetting release devices.
- F. Return to project between 60 to 90 days following acceptance of work to inspect operation and make any necessary adjustments. This follow-up inspection is in addition to manufacturer's normal warranty.

### 3.05 CLEAN UP

Keep the job site in a neat, safe and orderly condition, free from debris. Wipe all surfaces free of marks. Repair scratched surfaces with same finish to match manufacturer. Replace defective or damaged materials, at not cost to District.

END OF SECTION

1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to the work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Aluminum storefront doors and window wall framing system complete, including rails, furring block and shims, accessories, reinforcements, etc.
  - 2. Brackets, clips, attachments, fasteners and anchorage devices needed for support of work of this Section.
  - 3. Complete design, (drawings / calculations), fabrication and installation responsibility.
  - 4. Install hardware for doors under this Section.
  - 5. Protection of metal against galvanic action.
  - 6. Caulking and sealants.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 05500: Miscellaneous Metal
- B. Section 07900: Sealants and Caulking
- C. Section 08700: Finish Hardware
- D. Section 08800: Glass and Glazing

1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
  - ASTM A36 Standard Specification for Structural Steel
  - ASTM A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
  - ASTM A446 Standard Specification for Steel Sheet, Zinc Coated (Galvanized) by the Hot-Dip Process, Structural (Physical Quality).
  - ASTM B136 Method of Measurement of Stain Resistance of Anodic Coatings on Aluminum.
  - ASTM B137 Test Method for Measurement of Mass of Coating on Anodically Coated Aluminum.
  - ASTM B209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - ASTM B221 Standard Specification for Aluminum-Alloy Extruded Bars, Rods, Wires, Shapes and Tubes.
  - ASTM B244 Method for Measurement of Thickness of Anodic Coatings on Aluminum and of Other Nonconductive Coatings on Nonmagnetic Basis Metals with Eddy-Current Instruments.
  - ASTM E283 Standard Specification for Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors.

- ASTM E330 Standard Specification for Standard Test Method for Structural performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
- ASTM E331 Standard Specification for Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.
- ASTM E783 Standard Method for Field Measurement of Air Leakage Through Installed Exterior Windows and Doors.

- B. National Architectural Aluminum Materials Manufacturers (NAAMM).
- C. American Architectural Manufacturers Association (AAMA).
- D. California Building Code (CBC) – Chapter 24 A, Section 2404 and CBC Chapter 35 reference to Uniform Building Code Standards.

#### 1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Product Data: Manufacturers standard details and fabrication methods, data on finishing, hardware and accessories and recommendations for maintenance and cleaning of exterior surfaces.
- C. Submit to DSA required drawings with calculations as required for deferred approval, refer to Section 01100 - Special Project Procedures.
- D. Shop Drawings:
  1. Complete fabrication and erection details showing the construction of all items furnished including system component sections, dimensions, components within assembly, framed opening requirements and tolerances, anchorage, fasteners, provisions for expansion and control joints, glazing details, installation, connections to adjacent work and details where adjoining construction abuts or penetrates the system. Where items must fit spaces previously constructed, take measurements at the site, not from drawings.
  2. Draw elevations, plans, wall layout, extrusions and other detailed conditions, profiles, moldings, dimensions and reinforcements. Indicate weep-hole locations and anticipated isolation of dissimilar material.
  3. Provide dimensioned die drawings for all aluminum extrusions. In the event that extrusion profiles are not finalized, provide die drawings for the profiles contemplated at that time. If profiles are revised, provide revised die drawings with the first calculations or shop drawing submittal which follows the revision. Die drawings shall show all profile dimensions, metal thickness, alloy and temper.
- E. Structural Calculations: Submit engineering calculations verifying the structural performance of the framing support system verifying the framing assembly's ability to meet or exceed design and code requirements. Structural calculations shall be sealed by a licensed professional engineer in the State of California, prepared in compliance with referenced documents and these specifications.

Test reports are not an acceptable substitute for calculations. Calculations shall include the following:

1. Analysis for all applicable loads on framing members and analysis of attachment to structure.
2. Analysis for all applicable loads on anchors, including anchors.
3. Section property computations for framing members.
4. Indicate that anchorage and structural sections have been designed to withstand stresses specified hereinafter under Article 1.06 "Design Criteria". The Engineer may use standard tables of the manufacturer for the aluminum sections being used, subject to review by the Architect.
5. Coordinate and provide glass manufacturers wind and thermal stress analysis, and center deflection calculations showing that specified maximum probabilities of breakage are not exceeded.

F Test Reports: Provide certified test reports from a qualified independent testing laboratory showing that aluminum framing systems have been tested in accordance with specified test procedures and comply with performance characteristics indicated.

G Samples:

1. Submit samples 12 inch in length of approved section, demonstrating aluminum extrusions, plates and sheets in specified finish. Submit sufficient quantity of samples to demonstrate the extreme limits of color range within which the production materials will be prepared.
2. Glass, refer to Section 08800 -Glass and Glazing.
3. Sealant in specified color.
  - a. Sealants used between window wall framing and building unit, refer to Section 07900 - Sealants and Caulking
  - b. Sealants used for glazing work, refer to Section 08800 - Glass and Glazing.

H Hardware Schedule: Submit complete hardware schedule organized into sets based on hardware specified. Coordinate hardware with doors, frames and related work to ensure proper size, thickness, hand, function and finish. Include item name, name of the manufacturer and complete designations of every item required for each door opening.

#### 1.05 QUALITY ASSURANCE

- A. Manufacturer shall be regularly engaged in the engineering, manufacturing, fabrication, finishing and installation of window wall work and accessories of the same magnitude as required for this project. When requested, provide proof for finishing and installing work of this type for at least five (5) years. Selected manufacturer shall not subcontract the work.
- B. Comply with the requirements and recommendations and all standards by NAAMM, AAMA and ASTM.
- C. Framing systems shall be designed, fabricated and installed so that component materials are able to withstand structural loading, thermal movement, wind loads and deflection without buckling, failure of joint seals, undue stress on structural

elements, damaging loads on fasteners, reduction of performance, stress on glass or other detrimental effects.

- D. Single Source Responsibility: Obtain aluminum framing systems from one source and from single manufacturer.

## 1.06 DESIGN CRITERIA

- A. Design Responsibility: The contractor / manufacturer is responsible for methods and means of joining, fabrication, assembly, structural strength, erection and for compliance with all design criteria, including structural performance, air infiltration and water penetration requirements indicated. This responsibility includes compliance with requirements of this Section and with applicable portions of Section 07900 - Sealants and Caulking.

1. Architectural drawings are diagrammatic. The architectural details shown are intended as a guide for the aesthetic and interfacing requirements of the various components of the wall to and with other work. The requirements shown by the details are intended to establish basic dimensions of the module and the sight lines, jointing and profiles of members. The Contractor is responsible for the design and engineering of the system within these aesthetic parameters. The drawings are not to be construed as engineering design, or adequate to meet the engineering design requirements.
2. It is recognized that the architectural design details do not cover some conditions or modifications, which may be required. It is, however, intended that conditions not detailed shall be developed through the Contractor's shop drawings to the same level of aesthetics and in compliance with performance criteria as indicate for detailed areas and as stipulated in these specifications. The Contractor, by accepting a contract for the work, acknowledges this and agrees that the Architect shall have the final say as to all matters whether detailed or not on the architectural design details.
3. Proprietary section profile(s) drawn shall not be considered as an exclusion right of the manufacturer detailed. Alternate manufacturers from that drawn or those listed will be considered acceptable if their system design conforms to indicated design intent / profiles and meets all design and load criteria specified and other conditions of usage anticipated.
4. Manufacturer's innovative detailing to accommodate difficult conditions shall not act to relieve manufacturer of responsibility to conform to code and design requirements.
5. System design adequacy shall be demonstrated by complete framing and glazing calculations. Incorporate glass thickness, methods of glazing with indication of proposed dimension of glazing rebate, framing anchors, framing sections, supports, etc.
6. Submit design calculations for approval in accordance with the Aluminum Association's, Aluminum Construction Manual, Specifications for Aluminum Structures, specific for the proposed pertinent framing alloy, and as specified herein.
7. Meet or exceed all applicable code requirements including CCR Title 8 - CBC requirements demonstrating compliance therewith.

- B. Design Wind Loads

Design Pressure - (lb./ft.)

- |    |            |        |         |  |
|----|------------|--------|---------|--|
|    |            | Inward | Outward |  |
| 1. | All levels | 30     | 30      |  |
2. Provide assemblies capable of withstanding wind pressures of inward and outward acting normal to plane of wall. Wind load design shall meet or exceed the CBC code requirements. Design wind load shall incorporate a safety factor of 2.5 for glass.
- C. Structural Tolerances: Design framing systems to provide component materials to accommodate thermal expansion and contraction movement resulting from metal surface temperature range of 180 deg. F. (100 deg C) when building structure is maintained at constant temperature.
- D. Performance Requirements:
1. Deflection: 1/175th of span of any member, but not to exceed 1/2", for wind loads both parallel and normal to the plane of the wall. Accommodate 3/8" differential vertical live load movement of floors.
  2. Uniform Wind Load: Deflection of framing members to comply with ASTM E330 with safety factor of 1.5 times design wind pressure (positive and negative). Deflection of any member carrying its full dead load shall not exceed amount that will reduce glass bite below 75 percent of design dimension and shall not reduce edge clearance between member and fixed panel, glass or other fixed member above to less than 1/8 ".
  3. Uniformity of Surface: Offset from true alignment between consecutive components in line shall not exceed 1/16", except that at abutting materials, offset shall not exceed 1/32".
  4. Water Penetration: Provide framing systems with no uncontrolled water penetration (excluding operable door edges) as defined in the test method when tested in accordance with ASTM E331 at inward test pressure differential of 6.24psf. Drainage system to be complete with weeps, baffles and gutters to prevent accumulation of water.
  5. Air Leakage: Rate of air infiltration to be not more than 0.06psf of fixed area (excluding operable door edges) when tested in conformance with ASTM E283, based on static pressure differential and wind velocity, at an inward test pressure differential of 6.24psf.
  6. Condensation Resistance: Where framing members are "thermal-break" construction, provide units tested for thermal performance in accordance with AAMA 1503 showing condensation resistance factor (CRF) of not less than 45.
  7. Thermal Transmittance: Provide framing systems that have overall U-value of not more than 0.65 BTU/(hr.x sq. ft. x deg F) at 15 mph exterior wind velocity when tested in accordance with AAMA 1503.
  8. Glazing Rebate: Provide 1/8" thick glazing bead or gasket each face of glass; minimum depth 1/2" deeper than glass thickness. Comply with California Building Code Chapters 24 and 35.
- E. Drainage System:
1. Provide complete system with weeps, baffles and gutters to prevent accumulation of water.
  2. Design to resist pumping action of design temperature variations and wind pressures.

1.07 PROJECT CONDITIONS

- A. Verify openings by accurate field measurements before fabrication and record measurements on shop drawings. Coordinate fabrication schedule with construction progress/operations to avoid delays in the work.
- B. Where necessary, proceed with fabrication without field measurements and coordinate fabrication tolerances to ensure a proper fit.

#### 1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver, store, handle and protect system components and assemblies so as to prevent damages at all times.
- B. All materials delivered to the site shall be stored in spaces provided. Materials shall be stored neatly, properly stacked and protected from damage.
- C. Deliver other materials, except bulk materials, to project site in manufacturers unopened containers with name, brand, type, grade and color fully indicated. Store bulk materials to protect them from the effects of weather, soiling or contamination.
- D. Provide wrapping to protect pre-finished aluminum surfaces.

#### 1.09 GUARANTEE/WARRANTY

Contractor shall furnish an unconditional guarantee on all portions of window walls, against evidence of abnormal deterioration, leakage of water or air, structural failure of components, deterioration or discoloration of finish in excess of normal weathering and aging, improper installation and failure of the work to fulfill specified performance requirements, and any other defects for a period of two (2) years after final acceptance of building. Make good any defects during said guarantee period without cost to District.

#### 2.00 PRODUCTS

##### 2.01 MANUFACTURER

- A. Glazing Support and Framing: System materials detailed establish design intent, basic sizes, types and profiles. Products as manufactured by Arcadia, Architectural Products, Guaranteed Products, Kawneer, PPG Industries Inc., Sun Valley Products, United States Aluminum Corporation, Inc., Vistawall or equal will be acceptable provided manufacturer meets the design criteria specified herein and as required by elevator / building codes.

\*\*\* NOTE: Coordinate with contract documents / drawings and detailing and manufacturer model number indicated call-outs with those specified herein to avoid conflict. Discrepancies are to be brought to the Architects attention prior to execution.

1. Provide aluminum captured face offset framed and glazed in-board / reverse mounted glazing system to be 2-1/2" x 5 framing sections. Fabricate to dimensions and shapes as indicated with any modifications as detailed or required.
2. Stile-and-Rail Storefront Doors: Provide 1-3/4 inch thick medium stile 3-1/2 inch nominal width tubular frame fabricated with mechanical joints using heavy inserted reinforcing plates and concealed tie-rods or j-bolts.



Fabricate doors to facilitate replacement of glass without disassembly of stiles and rails. Provide snap-on extruded aluminum glazing stops with exterior stops anchored and non-removable. Entrance doors as manufactured by Kawneer Company, Inc., Model 350, United States Aluminum, Model 400, or approved equal.

## 2.02 MATERIALS

- A. Aluminum Members: Provide 6063 T5 alloy and temper, or as recommended by the manufacturer for strength, corrosion resistance and base for specified finish. Comply with ASTM B221 for aluminum extrusions, ASTM B209 for aluminum sheet or plate, and ASTM B211 for aluminum bars, rods and wire. Not less than 0.125 inches thick for framing and not less than 0.050 inches thick for glazing moldings.
- B. Fasteners: Aluminum, non-magnetic stainless steel, zinc plated steel or other material warranted by the manufacturer to be non-corrosive and compatible with aluminum components, hardware, anchors and other components.
  - 1. Reinforcement: Where fasteners screw-anchor into aluminum members less than 0.125 inches thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard non-corrosive pressed-in-splined grommet nuts.
  - 2. Exposed Fasteners: Do not use exposed fasteners except for application of hardware. Use Phillips flat head machine screws that match the finish of member or hardware being installed.
- C. Concealed Flashing: 0.0179 inch (26 gage) minimum dead-soft stainless steel or 0.026 inch thick minimum extruded aluminum of alloy and type selected by manufacturer for compatibility with other components.
- D. Brackets and Reinforcements: Provide high-strength aluminum brackets and reinforcements where use of aluminum is not feasible provide nonmagnetic stainless steel or hot dip galvanized steel complying with ASTM A123.
- E. Gaskets and Weather Stripping: All gaskets and weather stripping shall be neoprene, complying with ASTM D2000 or molded PVC complying with ASTM D2287. All gaskets, weather stripping and spacers shall have continuous mechanical engagement to framing members. All weather strips and gaskets shall be continuous with vulcanized/molded corners.
  - 1. Sponge gaskets and weather stripping or spacers shall be extruded black neoprene with a hardness of 40 durometer Shore-A, and conform to ASTM C509. Sponge gaskets shall be compressed 20% to 35% in the final installed position.
  - 2. Dense gaskets and weather stripping shall be extruded black neoprene conforming to ASTM C864 with a hardness of 75 durometer Shore-A, for hollow profiles and 60 for solid profiles.
- F. Glass and Glazing: Comply with Section 08800.
- G. Perimeter Sealant: Comply with Section 07900 - Sealants and Caulking.

1. All exterior sealants shall be silicone. Colors shall be as selected by the Architect from manufacturer's standard palette with the choice of custom colors.
2. Internal sealants that contact exterior perimeter sealants must be compatible and adhere to the perimeter sealant. Internal sealants used to seal glass pockets, end dams and gutters shall be silicone. Splice details shall be silicone and/or a non-curing, non-hardening, non-skinning butyl. Splice details to accommodate the anticipated movement of the joint.

## 2.03 HARDWARE

- A. Contractor shall verify and coordinate with drawing details, aluminum framing sections detailed, and the hardware schedule indicated for the correct application of system components. Coordinate framing sections indicated / detailed against conflict with the hardware indicated / intended. Coordinate for proper operation / function. Doors shall be equipped with the correct hardware per Section 08710, hinges (continuous rotation, butt, in-set / off-set pivots, etc.); closers (i.e. surface mounted, overhead or recessed / concealed); correct application of door stops, etc.
  1. The hardware scheduled or listed herein is to be used only as a guide and not pressured to be accurate and/or complete. Contractor shall coordinate with the hardware supplier / experienced architectural hardware consultant to review the project's hardware requirements to furnish all items of finish hardware required for the entire project, even though some items may have inadvertently been omitted from the drawings and schedule of this specification
  2. Submittal review of this section, regardless of the hardware schedule submitted as part of the work of this section or under the scope of work of a related section by the Architect does not relieve the contractor / hardware supplier from the responsibility of furnishing the job complete, without extra cost to the Owner.
- B. Refer to Section 08710 - Finish Hardware for coordination of requirements for hardware items other than those indicated / presumed to be provided by the aluminum entrance door manufacturer under the work of this section. It is not to be construed that the Architect is responsible for means and methods assignment
- C. Provide heavy duty hardware units as indicated, scheduled, or required for operation of each door, including following items of sizes, number and type recommended by manufacturer for service required.
  1. Offset Pivot Sets: Comply with ANSI A156.4, Grade 1. Provide exposed parts of cast aluminum alloy. Provide top, bottom, and intermediate pivots
  2. Single-Acting, Independently Hung, Concealed Overhead Closers:
    - a. Comply with ANSI A156.4, Grade 2. Provide concealed arm and track.
    - b. Comply with ADA requirements.
    - c. Provide auxiliary stop where door cannot swing 180 degrees.
    - d. Manufacturer and Model: LCN "2030 Pacer", Norton "Series 7900", Yale "Series 4500" or approved equal.
  3. Door Stop: Floor or wall mounted door stop, as appropriate with integral rubber bumper; comply with ANSI A156.16 Grade 1.

4. Cylinders indicated in Section 08710, removable / 6-pin, unless indicated otherwise for keying into the building system.
5. Deadlocks: Mortised maximum security deadlock with minimum 1 inch long pivoted bolt and stainless steel strike box; comply with ANSI A156.5 Grade 1.
6. Automatic Flush Bolts: Edge mortised automatic flush bolts at top of inactive leaf and bottom of active leaf of pair of doors; use in combination with single point, center-mounted deadlock in the active leaf, concealed rod mechanism in the lock stile of the inactive leaf, one-stage locking and unlocking of both leaves by actuation of deadlock.
7. Thresholds: Extruded aluminum threshold of size and design indicated, complete with anchors and clips, coordinated with pivots and floor concealed closers. Comply with ADA requirements.

## 2.04 FABRICATION

### A. General:

1. Fabricate aluminum components to designs, sizes and thickness indicated on the drawings. Variable dimensions are indicated with maximum and minimum dimensions required to achieve design requirements and coordination with other work.
2. Fabricate in complete units, where possible. Provide stiffeners when required concealed within extrusions. Conceal all welds, fasteners and anchors. Provide for weep drainage to the exterior. Framing / panels shall have no uneven surfaces, waves or oil-canning with edges hand filed.

### B. Thermal Break: Fabricate framing systems with an integrally concealed, low conductance thermal barrier located between exterior materials and exposed interior members to eliminate direct metal-to-metal contact.

### C. Prefabrication: Complete fabrication, assembly, finishing, hardware application and other work to the greatest extent possible before shipment to the project site. Disassemble components only as necessary for shipment and installation.

1. Perform fabrication operations, including cutting, fitting, forming, drilling and grinding of metal work to prevent damage to exposed finish surfaces. Complete these operations for hardware prior to application of finishes.
2. Do not drill and tap for surface mounted hardware items until time of installation.
3. Fabricate frames allowing for minimum clearances and shim spacing around perimeter of assembly.
4. Rigidly fit and secure joints and corners with screw and spline. Make joints and connections flush, hairline and waterproof.
5. Handle glazing stops carefully to prevent damage or marking and secure accurately in place. Glass and glazing work shall be done in accordance with procedures recommended in Glazing Manual of Flat Glass Marketing Association.

### D. Reinforcing: Install reinforcing as required for hardware and as necessary for performance requirements, sag resistance and rigidity.

### E. Dissimilar Metals: Comply with NAAMM minimum standards for "Protection of Metals." Where aluminum materials are placed in contact with, or fastened to

dissimilar metals or where aluminum materials are placed in contact with, or built into, concrete or masonry, apply one coat of alkali resistant bituminous paint or a suitable sealant, or a non-absorptive plastic or elastomeric tape or a gasket between the surfaces to conceal aluminum and steel surfaces in contact with cementitious or dissimilar materials.

F Fasteners: Conceal fasteners wherever possible.

G Weather Stripping:

1. Exterior doors; provide compression weather-stripping against fixed stops.
2. Interior doors and other locations without weather-stripping; provide neoprene silencers on stops to prevent metal-to-metal contact.

## 2.05 FINISHES

A. It is the intention of this specification that the color variation between adjacent parts of the same finish be imperceptible to the naked eye under normal daylight conditions. Contractor shall submit samples defining the full range of variation of color that can be anticipated in the work. Samples shall be on lengths of extrusions not less than 12" and on sheet/plate/panels not less than 24" square. Pieces abutting or within 6" of each other in the construction shall not vary in color by more than 2 the range so as the variation to be imperceptible to the naked eye under normal daylight conditions. Parts shall be carefully inspected in the shop and graded for assembly compatibility and marked for installation location.

B. Anodized Finish: Architectural Class II or I anodic coating

1. Give aluminum a caustic etch followed by anodic / permanodic treatment to produce a high-density aluminum oxide coating.
2. Provide a minimum coating thickness of 0.7 mils, as measured per ASTM B244, with a density of at least 32 mg. per square inch when measured per ASTM B137. Conform to AAMA 607 for a Class 1 coating.
3. Seal coating per ASTM B136
4. Certify that coating conforms to this specification  
AA-M12C22A34/AA-M12C22A44; Anodized finish color shall be  
Colornodic (AB6 Dark Bronze / AB7 Standard Dark Bronze)

## 3.00 EXECUTION

### 3.01 EXAMINATION

Examine substrates and supports for compliance with code requirements, installation tolerances and other conditions that effect installation of the aluminum framing. Do not proceed with installation until unsatisfactory conditions are corrected.

### 3.02 INSTALLATION

- A. Install framing and anchorage in accordance with manufacturer's instructions, approved shop / erection drawings in conformance with reference standards and as required by these specifications.
- B. Install work of this section complete, straight, plumb, level, true to line and in proper alignment, without warp, twist or rack, securely anchored and weather

tight. Set frames with all joints drawn up tight, close fitting and securely in place. Provide templates for setting anchors and for holding critical erection dimensions.

- C. Supporting brackets shall be designed to provide three-dimensional adjustment for accurate location. Once properly positioned all connections shall be rigidly fixed by welding or other positive mechanical means.
- D. Expansion anchorage shall be so designated to provide for thermal and building movements. Anchorage design shall provide for unrestricted movement. Nylon slip pads or washers shall be used at all thermal or dynamic anchors.
- E. Pack fibrous insulation in shim spaces around perimeter of assembly to maintain continuity of thermal barrier. Install seal / vapor barrier flashing membrane materials and sill flashings where applicable.
- F. Isolate aluminum from other metal surfaces to protect against corrosion or electrolytic action at points of contact.
- G. Set sill members in a bed of sealant to provide weather-tight construction. Allow 3/8 inch for caulking between system and adjacent construction at heads, jambs and sills of system. Before applying sealant, clean contact surfaces. Sealant shall be tooled to fill the joint and provide a smooth finished surface adhered to both sides of the joint. Three-sided adhesion is not permitted. Install in accordance with Section 07900 - Sealants and Caulking.
- H. Refer to Section 08800 - Glass and Glazing for installation of glass indicated to be site glazed into doors and framing and not pre-glazed by manufacturer.

### 3.03 HARDWARE

Install finish hardware on doors in conformance with manufacturer's instructions. Adjust operating hardware for smooth trouble free operation.

### 3.04 FIELD QUALITY CONTROL

- A. Tolerances:
  - 1. Variation from Plane: Do not exceed 1/8 inch in 12 feet of length or 1/4 inch in any total length.
  - 2. Offset from Alignment: Maximum offset from true alignment between two identical members abutting end to end in line shall not exceed 1/16 inch.
  - 3. Diagonal Measurements: Maximum difference in diagonal measurements shall not exceed 1/8 inch.
  - 4. Offset at Corners: Maximum out-of-plane offset of framing at corners shall not exceed 1/32 inch.
  - 5. Clearance between the framing member and door must be at least 1/16".

### 3.05 CLEANING

- A. Clean the completed system, inside and out promptly after installation, exercise care to avoid damage to coatings. Remove protective material from pre-finished aluminum surfaces.

- B. Wash exposed surfaces using a solution of mild detergent in warm water applied with soft, clean wiping cloths. Take care to remove dirt, mastic and smears from corners. Wipe surfaces clean.
- C. Remove excess sealant by moderate use of mineral spirits or other solvent acceptable to sealant manufacturer.
- D. Repair scratched surfaces using the manufacturers supplied materials to match specified factory finish. Touch-up procedure is to be acceptable to the Architect with repairs not visible from a distance greater than five feet.

3.06 HARDWARE SCHEDULE – Coordinate with project specifics, contract drawings and the hardware group requirements of Section 08710.

- A. All new doors, frames and hardware shall conform to Title 24 Accessibility Access Regulations and California Building Code, Section 1004
- B. When the door has a closer, the sweep period of the closer shall be adjusted so that from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3" from the latch, measured to the landing edge of the door (1133B.2.5.1)
- C. Provide 105 degree hold opens at glass storefront doors
- D. Provide all door hardware for active and inactive door leaves
- E. Consult District regarding keying

END OF SECTION

1.00 GENERAL1.01 SUMMARY

- A. Section Includes
1. Door Hardware, including electric hardware.
  2. Storefront and entrance door hardware.
  3. Gate Hardware.
  4. Power supplies for electric hardware.
  5. Remote button release hardware.
  6. Padlocks.
- B. Related Sections
1. Section 06200 - Finish Carpentry: Finish Hardware Installation
  2. Section 07900 - Joint Sealers – exterior thresholds
  3. Section 08100 - Metal Doors and Frames
  4. Section 08200 - Wood Doors
  5. Section 08400 - Entrances and Storefronts
  6. Section 16200 - Electrical Power
  7. Section 16722 - Fire/Life-Safety System
- C. Specific Omissions: Hardware for the following is specified or indicated elsewhere.
1. Windows.
  2. Cabinets, including open wall shelving and locks.
  3. Toilet accessories, including grab bars.
  4. Installation.
  5. Rough hardware.
  6. Conduit, junction boxes & wiring.

1.02 REFERENCES

Use date of standard in effect as of Bid date.

- A. American National Standards Institute – ANSI 156.18 – Materials and Finishes.
- B. BHMA – Builders Hardware Manufacturers Association
- C. DHI – Door and Hardware Institute
- D. NFPA – National Fire Protection Association
1. NFPA 80 – Fire Doors and Windows
  2. NFPA 105 – Smoke and Draft Control Door Assemblies
  3. NFPA 252 – Fire Tests of Door Assemblies
- E. UL – Underwriters Laboratories
1. UL10C – Positive Pressure Fire Tests of Door Assemblies.
  2. UL 305 – Panic Hardware
- F. WHI – Warnock Hersey Incorporated
- G. 2007 State of California Building Code
- H. Local applicable codes
- I. SDI – Steel Door Institute
- J. WI – Woodwork Institute
- K. AWI – Architectural Woodwork Institute

L. NAAMM – National Association of Architectural Metal Manufacturers

1.03 CONDITIONS – DSA Requirements

- A. Gates: Gates in path of travel must comply with exit door requirements (CBC Section 1133B.1.1.4 / ADAAG 4.13.3) Specify hardware that does not require pinching, grasping, or twisting motion to operate and provide solid kick plates 10" minimum high. Clear space below gate shall be 3" maximum above paving on both sides of the gate. The maximum effort to operate the gates shall not exceed 5 lbs.
- B. Door Hardware:
1. Mounting height of latching hardware shall be 30" to 44" A.F.F. per CBC Section 1133B.2.5.2.
  2. Pressure to operate doors shall not exceed: 5lbs for exterior doors, and 5 lbs for interior doors. When fire doors are required, the maximum effort to operate the doors shall not exceed 5 lbs except that, when approved by the appropriate administrative authority, the maximum effort required to operate the doors may be increased not to exceed 15 lbs. CBC Sections 1008.1.2. and 1133B.2.5 / ADAAG 4.13.11
  3. Door closers, when provided, shall have sweep period adjusted so that from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3" from the strike. CBC Section 1133B.2.5.1
  4. All hardware shall meet the requirements of CBC Sections 1133B.2.1, 1133B.2.5.1 and 1008.1.8.
  5. Thresholds shall comply with CBC Sections 1008.1.6 and 1133B.2.4.1.
  6. Floor stops shall not be located in the path of travel and 4" maximum from walls. DSA Policy 99-08
- C. Exit Devices
1. Panic hardware shall comply with CBC Section 1008.1.9 (consider that if the device is mounted lower than 36" AFF, the clear opening may be restricted to less than the 32" required opening). Panic bar shall be mounted above 36" to 44" above finished floor surface.
  2. The unlatching force shall not exceed 15 lbs applied in the direction of travel.
  3. Panic hardware shall not be provided with "Night Latch" (NL) function per DSA Interpretation 10-08 DSA / AC (External) dated 12/09/08.

1.04 SUBMITTALS & SUBSTITUTIONS

- A. SUBMITTALS: Submit six copies of schedule per Section 01300 / 01340. Only submittals printed one sided will be accepted and reviewed. Organize vertically formatted schedule into "Hardware Sets" with index of doors and headings, indicating complete designations of every item required for each door or opening. Include following information:
1. Type, style, function, size, quantity and finish of hardware items.
  2. Use BHMA Finish codes per ANSI A156.18.
  3. Name, part number and manufacturer of each item.
  4. Fastenings and other pertinent information.
  5. Description of door location using space names and numbers as published in the drawings.



6. Explanation of abbreviations, symbols, and codes contained in schedule.
  7. Mounting locations for hardware.
  8. Door and frame sizes, handing, materials, fire-rating and degrees of swing.
  9. List of manufacturers used and their nearest representative with address and phone number.
  10. Catalog cuts.
  11. Wiring Diagrams.
  12. Manufacturer's technical data and installation instructions for electronic hardware.
- B. Bid and submit manufacturer's updated/improved item if scheduled item is discontinued.
- C. Deviations: Highlight, encircle or otherwise identify deviations from "Schedule of Finish Hardware" on submittal with notations clearly designating those portions as deviating from this section.
- D. If discrepancy between drawings and scheduled material in this section, bid the more expensive of the two choices, note the discrepancy in the submittal and request direction from Architect for resolution.
- E. Substitutions per Division 1. Include product data and indicate benefit to the Project. Furnish operating samples on request.
- F. Items listed with no substitute manufacturers have been requested by District to meet existing standard.
- G. Furnish as-built/as-installed schedule with closeout documents, including keying schedule, wiring diagrams, manufacturers' installation, adjustment and maintenance information, and supplier's final inspection report.

#### 1.05 QUALITY ASSURANCE

- A. Qualifications
1. Hardware supplier: direct factory contract supplier who employs a certified architectural hardware consultant (AHC), available at reasonable times during course of work for project hardware consultation to District, Architect and Contractor.
    - a) Responsible for detailing, scheduling and ordering of finish hardware. Detailing implies that the submitted schedule of hardware is correct and complete for the intended function and performance of the openings.
- B. Hardware: Free of defects, blemishes and excessive play. Obtain each kind of hardware (latch and locksets, exit devices, hinges and closers) from one manufacturer.
- C. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.

- D. Fire-Rated Openings: NFPA 80 compliant. Hardware UL10C / California State Fire Marshal Standard 12-7-4 (positive pressure) compliant for given type/size opening and degree of label. Provide proper latching hardware, non-flaming door closers, approved-bearing hinges, and resilient seals. Coordinate with wood door section for required intumescent seals. Furnish openings complete.
  - 1. Note: scheduled resilient seals may exceed selected door manufacturer's requirements.
  - 2. See 2.6.E for added information regarding resilient and intumescent seals.
- E. Furnish hardware items required to complete the work in accordance with specified performance level and design intent, complying with manufacturers' instructions.

#### 1.06 DELIVERY, STORAGE AND HANDLING

- A. Delivery: coordinate delivery to appropriate locations (shop or field).
  - 1. Permanent keys and cores: secured delivery direct to District's representative.
- B. Acceptance at Site: Items individually packaged in manufacturers' original containers, complete with proper fasteners and related pieces. Clearly mark packages to indicate contents, locations in hardware schedule and door numbers.
- C. Storage: Provide securely locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, dust, excessive heat and cold, etc.

#### 1.07 PROJECT CONDITIONS AND COORDINATION

- A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical the same operation and quality as type specified, subject to Architect's approval.
- B. Coordination: Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents. Furnish related trades with the following information:
  - 1. Location of embedded and attached items to concrete.
  - 2. Location of wall-mounted hardware, including wall stops.
  - 3. Location of finish floor materials and floor-mounted hardware.
  - 4. Locations for conduit and raceways as needed for electrical, electronic and electro-pneumatic hardware items. Fire/life-safety system interfacing. Point-to-point wiring diagrams plus riser diagrams to related trades.
  - 5. Manufacturer templates to door and frame fabricators.

- C. Check Shop Drawings for doors and entrances to confirm that adequate provisions will be made for proper hardware installation. Do not order hardware until the submittal has been reviewed by the frame and door suppliers for compatibility with their products.

#### 1.08 WARRANTY

- A. Part of respective manufacturers' regular terms of sale. Provide manufacturers' written warranties:
  - 1. Locksets: Three years
  - 2. Exit Devices: Three years
  - 3. Closers: Ten years
  - 4. Hinges: One year
  - 5. Other Hardware Two years

#### 1.09 COMMISSIONING

- A. Conduct these tests prior to request for certificate of substantial completion:
  - 1. With installer present, test door hardware operation with climate control system at rest and while in full operation.
  - 2. With installer, access control contractor and electrical contractor present, test electrical hardware systems for satisfactory operation.
  - 3. With installer and electrical contractor present, test hardware interfaced with fire/life-safety system for proper operation and release.

#### 1.10 REGULATORY REQUIREMENTS

- A. Locate latching hardware between 34" to 44" above the finished floor, per California Building Code, Section 1008.1.8.2 and 1133B.2.5.2.
  - 1. Locate panic hardware between 36" to 44" above the finished floor.
- B. Handles, pull, latches, locks, other operating devices: readily openable from egress side without tight grasping, tight pinching, or twisting of the wrist to operate. California Building Code 1008.1.1.
- C. Adjust doors to open with not more than 5.0 lbs pressure to open at exterior doors and 5.0 lbs at interior doors. As allowed per California Building Code, Section 1133B.2.5, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15 lbs.
- D. Adjust door closer sweep periods so that from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches from the latch, measured to the landing side of the door, per California Building Code Section 1133B.2.5.1.
- E. Smooth surfaces at bottom 10" of push sides of doors, facilitating push-open with wheelchair footrests, per California Building Code Section 1133B.2.6.

- F. Door opening clear width no less than 32", measured from face of frame stop, or edge of inactive leaf of pair of doors, to door face with door opened to 90 degrees. Hardware projection not a factor in clear width if located above 30" and the hardware projects no more than 4". California Building Code Section 1133B.2.2, 1133B.2.3, and 1008.1.1.
  - 1. Exception: doors not requiring full passage through the opening, that is, to spaces less than 24" in depth, may have the clear opening width reduced to 20". Example: shallow closets.
- G. Door opening clear height no less than 80" measured from top of sill to bottom of frame header stop. Projections into clear opening height not to exceed 4". California Building Code Section 1133B.2.2 and 1008.1.1.
- H. Thresholds: floor or landing no more than 1/2" below the top of the threshold of the doorway. Change in level between 1/4" and 1/2": beveled to slope no greater than 1:2 (50 percent slope). California Building Code Section 1133B.2.4.1.
- I. Floor stops: Do not locate in path of travel. Locate no more than 4" from walls, per DSA Policy #99-08 (Access).
- J. Pairs of doors: limit swing of one leaf to 90 degrees to protect persons reading wall-mounted tactile signage.

## 2.00 PRODUCTS

### 2.01 MANUFACTURERS

- A. Listed acceptable alternate manufacturers: submit for review products with equivalent function and features of scheduled products.

ITEM:	MANUFACTURER:	ACCEPTABLE SUB:
Hinges	(IVE) Ives	Bommer, Stanley
Key System	(CYB) Cyber Lock - Videx	District Standard
Locks	(SCH) Schlage	District Standard
Exit Devices	(VON) Von Duprin	District Standard
Closers	(LCN) LCN	District Standard
Auto Flush Bolts	(IVE) Ives	DCI
Coordinators	(IVE) Ives	DCI
Silencers	(IVE) Ives	Rockwood
Push & Pull Plates	(IVE) Ives	Rockwood
Kickplates	(IVE) Ives	Rockwood
Floor/Wall Stops	(IVE) Ives	Rockwood
Thresholds	(PEM) Pemko	NGP, Zero
Seals & Bottoms	(PEM) Pemko	NGP, Zero
Aluminum Door Locks	(ADA) Adams Rite	None
Push Button	(SCE) Schlage Electronics	Or Equal

## 2.02 HINGING METHODS

- A. Drawings typically depict doors at 90 degrees, doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-degree opening. Advise architect if 8-inch width is insufficient.
- B. Conform to manufacturer's published hinge selection standard for door dimensions, weight and frequency, and to hinge selection as scheduled. Where manufacturer's standard exceeds the scheduled product, furnish the heavier of the two choices, notify Architect of deviation from scheduled hardware.
- C. Conventional Hinges: Steel or stainless steel pins and concealed bearings. Hinge open widths minimum, but of sufficient throw to permit maximum door swing.
1. Out-swinging exterior doors: non-ferrous with non-removable (NRP) pins and security studs.

2. Non-ferrous material exteriors and at doors subject to corrosive atmospheric conditions.

### 2.03 LOCKSETS, LATCHSETS, DEADBOLTS

- A. Mortise Locksets and Latchsets: as scheduled.
  1. Chassis: cold-rolled steel, handing field-changeable without disassembly.
  2. Latchbolts: 3/4 inch throw stainless steel anti-friction type.
  3. Lever Trim: through-bolted, accessible design, cast lever or solid extruded bar type levers as scheduled. Filled hollow tube design unacceptable.
    - a) Spindles: security design independent breakaway. Breakage of outside lever does not allow access to inside lever's hubworks to gain wrongful entry.
  4. Furnish solid cylinder collars with wave springs. Wall of collar to cover rim of mortise cylinder.
  5. Thumbturns: accessible design not requiring pinching or twisting motions to operate.
  6. Deadbolts: stainless steel 1-inch throw.
  7. Electric operation: Manufacturer-installed continuous duty solenoid.
  8. Strikes: 16 gage curved steel, bronze or brass with 1 inch deep box construction, lips of sufficient length to clear trim and protect clothing.
  9. Scheduled Lock Series and Design: Schlage L series, 06A design.
  10. Certifications:
    - a) ANSI A156.13, 1994, Grade 1 Operational, Grade 1 Security.
    - b) ANSI/ASTM F476-84 Grade 31 UL Listed.

### 2.04 EXIT DEVICES / PANIC HARDWARE

- A. General features:
  1. Independent lab-tested 1,000,000 cycles.
  2. Push-through push-pad design. No exposed push-pad fasteners, no exposed cavities when operated. Return stroke fluid dampeners and rubber bottoming dampeners, plus anti-rattle devices.
  3. 0.75-inch throw deadlocking latchbolts.
  4. End caps: impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.
  5. No exposed screws to show through glass doors.
  6. Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.
  7. Releasable in normal operation with 15-lb. maximum operating force per California State Fire Marshal Standard 12-10-3, and with 32 lb. maximum pressure under 250-lb. load to the door.
  8. Where devices span over door lite frame and the face of the selected lite manufacturer's frame is raised from the face of the door, furnish panic hardware manufacturer's fitted shims or glass-bead kits at no additional cost to the project.
  9. Comply with CBC Section 1003.3.1.9.
- B. Specific features:

1. Lever Trim: breakaway type, forged brass or bronze escutcheon min .130" thickness, compression spring drive, match lockset lever design.
2. Fire-Labeled Devices: UL label indicating "Fire Exit Hardware". Vertical rod devices less bottom rod (LBR) unless otherwise scheduled.

## 2.05 CLOSERS

### A. Surface Closers: [4011/4111]

1. Full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.
2. ISO 2000 certified. Units stamped with date-of-manufacture code.
3. Independent lab-tested 10,000,000 cycles.
4. Non-sized and adjustable. Place closers inside building, stairs and rooms.
5. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
6. Advanced Variable Backcheck (AVB): where scheduled, these units commence backcheck at approximately 45 degrees.
7. Adjustable to open with not more than 5.0lbs pressure to open at exterior doors and 5.0lbs at interior doors. As allowed per California Building Code, Section 1133B.2.5, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15lbs.
8. Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.
9. Extra-duty arms (EDA) at exterior doors scheduled with parallel arm units. EDA arms: rigid main and forearm, reinforced elbow.
10. Exterior door closers: tested to 100 hours of ASTM B117 salt spray test, furnish data on request.
11. Exterior doors: seasonal adjustments not required for temperatures from 120 degrees F to -30 degrees F, furnish checking fluid data on request.
12. Non-flaming fluid, will not fuel door or floor covering fires.
13. Pressure Relief Valves (PRV) not permitted.

## 2.06 OTHER HARDWARE

- A. Automatic Flush Bolts: Low operating force design.
- B. Kick Plates: Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.
- C. Door Stops: Provide stops to protect walls, casework or other hardware.
  1. Unless otherwise noted in Hardware Sets, provide floor type with appropriate fasteners. Where floor type cannot be used, provide wall type. If neither can be used, provide overhead type.
  2. Locate overhead stops for maximum possible opening. Consult with District for furniture locations. Minimum: 90deg stop / 95deg deadstop. Note degree of opening in submittal.

- D. Seals: Finished to match adjacent frame color. Resilient seal material: polyurethane, polypropylene, nylon brush, silicone rubber or solid high-grade neoprene as scheduled. Do not furnish vinyl seal material. UL label applied to seals on rated doors. Substitute products: certify that the products equal or exceed specified material's thickness and durability.
1. Proposed substitutions: submit for approval.
  2. Solid neoprene: MIL Spec. R6855-CL III, Grade 40.
  3. Non-corroding fasteners at in-swinging exterior doors.
  4. Fire-rated Doors, Resilient Seals: UL10C / UBC Standard 7-2 compliant. Coordinate with selected door manufacturers' and selected frame manufacturers' requirements. Where rigid housed resilient seals are scheduled in this section and the selected door manufacturer only requires an adhesive-mounted resilient seal, furnish rigid housed seal at minimum, or both the rigid housed seal plus the adhesive applied seal. Adhesive applied seals alone are deemed insufficient for this project where rigid housed seals are scheduled.
  5. Fire-rated Doors, Intumescent Seals: Furnished by selected door manufacturer. Furnish fire-labeled opening assembly complete and in full compliance with UL10C / UBC Standard 7-2. Where required, intumescent seals vary in requirement by door type and door manufacture -- careful coordination required
- E. Thresholds: As scheduled and per details. Comply with CBC Section 1133B.2.4.1. Substitute products: certify that the products equal or exceed specified material's thickness. Proposed substitutions: submit for approval.
1. Exteriors: Seal perimeter to exclude water and vermin. Use sealant complying with requirements in Division 7 "Thermal and Moisture Protection". Non-ferrous 1/4inch fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors (SS/FHSL).
  2. Fire-rated openings, 90min or less duration: use thresholds to interrupt floor covering material under the door where that material has a critical radiant flux value less than 0.22 watts per square centimeter, per NFPA 253. Use threshold unit as scheduled. If none scheduled, request direction from Architect.
  3. Acoustic openings: Set units in full bed of Division-7-compliant, leave no air space between threshold and substrate.
  4. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.
  5. Fasteners: Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws: full-thread. Sleeve nuts: full length to prevent door compression.
- F. Silencers: Interior hollow metal frames, 3 for single doors, 4 for pairs of doors. Omit where adhesive mounted seal occurs. Leave no unfilled/uncovered pre-punched silencer holes.

## 2.07 FINISH

- A. Generally BHMA 626 Satin Chromium.



1. Areas using BHMA 626 to have push-plates, pulls and protection plates of BHMA 630, Satin Stainless Steel, unless otherwise noted.
- B. Door closers: factory powder coated to match other hardware, unless otherwise noted.
- C. Aluminum items: match predominant adjacent material. Seals to coordinate with frame color.

## 2.08 KEYING REQUIREMENTS

- A. Key System: Existing Videx CyberLock key control system, interchangeable core type. Contact Kevin Spencer @ Tustin Lock and Safe (714-397-4512) for keying instructions & costs. Furnish temporary construction-keyed and permanent cylinders & cores. Contractor to demonstrate to the District that temporary keys no longer operate the locking cylinders at the end of the project. Permanent keys and cores: use secured shipment direct from point of origination to District.
  1. For estimate: 3 keys per change combination, 5 master keys per group, 5 grand-master keys, 3 control keys.
  2. For estimate: VKC stamping plus "Do Not Duplicate".
- B. Bitting List: use secured shipment direct from point of origination to District upon completion.

## 3.00 EXECUTION

### 3.01 ACCEPTABLE INSTALLERS

- A. Can read and understand manufacturers' templates, suppliers' hardware schedules and printed installation instructions. Can readily distinguish drywall screws from manufacturers' furnished fasteners. Available to meet with manufacturers' representatives and related trades to discuss installation of hardware.

### 3.02 PREPARATION

- A. Ensure that walls and frames are square and plumb before hardware installation. Make corrections before commencing hardware installation.
- B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.
  1. Notify Architect of code conflicts before ordering material.
  2. Locate levers, key cylinders, t-turn pieces, touchbars and other operable portions of latching hardware between 30 inches to 44 inches above the finished floor, per CBC Section 1133B.2.5.1.
  3. Where new hardware is to be installed near existing doors/hardware scheduled to remain, match locations of existing hardware.

### 3.03 INSTALLATION

- A. Install hardware per manufacturer's instructions and recommendations. Do not install surface-mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation. Remove and reinstall or replace work deemed defective by Architect.
  - 1. Gaskets: install jamb-applied gaskets before closers, overhead stops, rim strikes, etc; fasten hardware over and through these seals. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.
  - 2. When hardware is to be attached to existing metal surface and insufficient reinforcement exists, use RivNuts, NutSerts or similar anchoring device for screws.
  - 3. Use manufacturers' fasteners furnished with hardware items, or submit Request for Substitution with Architect.
  - 4. Replace fasteners damaged by power-driven tools.
- B. Locate floor stops no more that 4 inches from walls and not within paths of travel. See paragraph 2.2 regarding hinge widths, door should be well clear of point of wall reveal. Point of door contact no closer to the hinge edge than half the door width. Where situation is questionable or difficult, contact Architect for direction.
- C. Core concrete for exterior door stop anchors. Set anchors in approved non-shrink grout.
- D. Locate overhead stops for minimum 90 degrees and maximum allowable degree of swing.
- E. Drill pilot holes for fasteners in wood doors and/or frames. Center-punch hole locations before using self-drilling type screws to prevent skating. Replace screws that are not centered in their holes.
- F. Lubricate and adjust existing hardware scheduled to remain. Carefully remove and give to District items not scheduled for reuse.

#### 3.04. ADJUSTING

- A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.
  - 1. Hardware damaged by improper installation or adjustment methods: repair or replace to District's satisfaction.
  - 2. Adjust doors to fully latch with no more than 1 pound of pressure.
  - 3. Adjust delayed-action closers on fire-rated doors to fully close from fully-opened position in no more than 10 seconds.
  - 4. Adjust door closers per 1.9 this section.
- B. Inspection: Use hardware supplier's consultant or consultant's agent. Include supplier's report with closeout documents.
- C. Final inspection: Installer to provide letter to District that upon completion installer has visited the Project and has accomplished the following:
  - 1. Re-adjust hardware.

2. Evaluate maintenance procedures and recommend changes or additions, and instruct District's personnel.
3. Identify items that have deteriorated or failed.
4. Submit written report identifying problems

### 3.05 DEMONSTRATION

- A. Demonstrate mechanical hardware and electrical, electronic and pneumatic hardware systems, including adjustment and maintenance procedures.

### 3.06 PROTECTION / CLEANING

- A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion.
- B. Clean adjacent wall, frame and door surfaces soiled from installation/reinstallation process.

### 3.07 SCHEDULE OF FINISH HARDWARE

- A. See door schedule in drawings for hardware set assignments.
- B. Miscellaneous Material:

#### HW SET: 01

8	EA	HINGE	5BB1HW 4.5 X 4.5	652	IVE
1	SET	HEAD/THRESHOLD BOLT	4015 X 4085	603	ADA
1	EA	DEADLOCK	MS1850S	628	ADA
2	EA	MORTISE CYLINDER	KEY TO EXISTING SYTEM	626	CYB
1	EA	CYLINDER GUARD	MS4043	603	ADA
4	EA	OFFSET DOOR PULL	8190-0 X BTB MOUNTING	630	IVE
2	EA	SURFACE CLOSER	4011	689	LCN
2	EA	SECURITY FLOOR STOP	FS18L	BLK	IVE
1	SET	DOOR SEALS	PROVIDED BY STOREFRONT MANUFACTURER		
1	EA	THRESHOLD	AS DETAILED	AL	PEM
2	EA	EXIT INDICATOR	4089	130	ADA

#### HW SET: 02

3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	FIRE EXIT HARDWARE	98L-NL-F 996L	626	VON
1	EA	RIM CYLINDER	KEY TO EXISTING SYTEM	626	CYB
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	SECURITY FLOOR STOP	FS18L	BLK	IVE
1	EA	HEAD SEAL	2891AS	AL	PEM
1	EA	JAMB SEAL	290AS	AL	PEM
1	EA	DOOR SWEEP	315CN	AL	PEM
1	EA	THRESHOLD	AS DETAILED	AL	PEM

HW SET: 03

3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP	630	IVE
1	EA	PANIC HARDWARE	98L-NL 996L	626	VON
1	EA	RIM CYLINDER	KEY TO EXISTING SYTEM	626	CYB
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	SECURITY FLOOR STOP	FS18L	BLK	IVE
1	EA	HEAD SEAL	2891AS	AL	PEM
1	EA	JAMB SEAL	290AS	AL	PEM
1	EA	DOOR SWEEP	315CN	AL	PEM
1	EA	THRESHOLD	AS DETAILED	AL	PEM

HW SET: 04 - NOT USED

DOOR NUMBER:

EACH TO HAVE:

NOT USED

HW SET: 05

		HINGES	PROVIDED BY GATE MANUFACTURER		
1	EA	PANIC HARDWARE	22EO	689	VON
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	SECURITY FLOOR STOP	FS18L	BLK	IVE

HARDWARE PLATE & REINFORCEMENTS REQUIRED ON GATE FOR HARDWARE INSTALLATION.

HW SET: 06

3	EA	HINGE	5BB1 4.5 X 4.5	630	IVE
1	EA	STOREROOM LOCK	L9080L 06A	626	SCH
1	EA	MORTISE CYLINDER	KEY TO EXISTING SYTEM	626	CYB
1	EA	SURFACE CLOSER	4011	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	DOME STOP	FS436/438 (AS REQ'D)	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 07

3	EA	HINGE	5BB1 4.5 X 4.5	630	IVE
1	EA	STOREROOM LOCK	L9080L 06A	626	SCH
1	EA	MORTISE CYLINDER	KEY TO EXISTING SYTEM	626	CYB
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	DOME STOP	FS436/438 (AS REQ'D)	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 08 - NOT USED

DOOR NUMBER:

EACH TO HAVE:

NOT USED

HW SET: 09

3	EA	HINGE	5BB1HW 5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	L9080L 06A	626	SCH
1	EA	MORTISE CYLINDER	KEY TO EXISTING SYTEM	626	CYB
1	EA	SURFACE CLOSER	4011	689	LCN
1	EA	KICK PLATE	8400 10" X 1" LDW	630	IVE
1	EA	DOME STOP	FS436/438 (AS REQ'D)	626	IVE
1	SET	SEALS	PK55BL	BLK	PEM
1	EA	THRESHOLD	AS DETAILED	AL	PEM

HW SET: 10 - NOT USED  
DOOR NUMBER:

EACH TO HAVE:

NOT USED

HW SET: 11

6	EA	HINGE	5BB1 4.5 X 4.5	630	IVE
1	SET	AUTO FLUSH BOLT	FB31P	630	IVE
1	EA	DUST PROOF STRIKE	DP2	626	IVE
1	EA	STOREROOM LOCK	L9080L 06A	626	SCH
1	EA	MORTISE CYLINDER	KEY TO EXISTING SYTEM	626	CYB
1	EA	ASTRAGAL	357SP	600	PEM
2	EA	SURFACE CLOSER	4031	689	LCN
2	EA	KICK PLATE	8400 10" X 1" LDW	630	IVE
2	EA	DOME STOP	FS436/438 (AS REQ'D)	626	IVE
2	EA	SILENCER	SR64	GRY	IVE

HW SET: 12

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	L9080L 06A	626	SCH
1	EA	MORTISE CYLINDER	KEY TO EXISTING SYTEM	626	CYB
1	EA	SURFACE CLOSER	4011	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	DOME STOP	FS436/438 (AS REQ'D)	626	IVE
1	SET	SEALS	PK55BL	BLK	PEM
1	EA	THRESHOLD	AS DETAILED	AL	PEM

HW SET: 13

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	PRIVACY SET	L9040 06A L583-363	626	SCH
1	EA	SURFACE CLOSER	4011 DEL	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW	630	IVE
1	EA	WALL STOP	WS407CCV	630	IVE

HW SET: 13A

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
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1	EA	CLASSROOM LOCK	L9070L 06A	626	SCH
1	EA	MORTISE CYLINDER	KEY TO EXISTING SYTEM	626	CYB
1	EA	SURFACE CLOSER	4011 DEL	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW	630	IVE
1	EA	DOME STOP	FS436/438 (AS REQ'D)	626	IVE

HW SET: 14

2	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	ELECTRIC HINGE	5BB1 4.5 X 4.5 TW4	652	IVE
1	EA	EU STOREROOM LOCK	L9080LEU 06A	626	SCH
1	EA	MORTISE CYLINDER	KEY TO EXISTING SYTEM	626	CYB
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	DOME STOP	FS436/438 (AS REQ'D)	626	IVE
1	SET	SEALS	PK55BL	BLK	PEM
1	EA	POWER SUPPLY	PS902		SCE
1	EA	BUTTON MINI BOX	660-PB		SCE

WIRING BY OTHERS.

HW SET: 15

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	OFFICE LOCK	L9050L 06A L583-363	626	SCH
1	EA	MORTISE CYLINDER	KEY TO EXISTING SYTEM	626	CYB
1	EA	DOME STOP	FS436/438 (AS REQ'D)	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 16

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	L9080L 06A	626	SCH
1	EA	MORTISE CYLINDER	KEY TO EXISTING SYTEM	626	CYB
1	EA	DOME STOP	FS436/438 (AS REQ'D)	626	IVE
3	EA	SILENCER	SR64	GRY	IVE

HW SET: 16A

3	EA	HINGE	5BB1HW 5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	L9080L 06A	626	SCH
1	EA	MORTISE CYLINDER	KEY TO EXISTING SYTEM	626	CYB
1	EA	SURFACE CLOSER	4111 EDA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	DOME STOP	FS436/438 (AS REQ'D)	626	IVE
1	SET	SEALS	PK55BL	BLK	PEM
1	EA	THRESHOLD	AS DETAILED	AL	PEM

HW SET: 17

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	L9080L 06A	626	SCH
1	EA	MORTISE CYLINDER	KEY TO EXISTING SYTEM	626	CYB
1	EA	DOME STOP	FS436/438 (AS REQ'D)	626	IVE

HW SET: 18 - NOT USED  
DOOR NUMBER:

EACH TO HAVE:

NOT USED

HW SET: 19

3	EA	HINGE	5BB1HW 5 X 5	652	IVE
1	EA	STOREROOM LOCK	L9080L 06A (FOR 2-3/4" DOOR THICKNESS)	626	SCH
1	EA	MORTISE CYLINDER	KEY TO EXISTING SYTEM	626	CYB
1	EA	SURFACE CLOSER	4011	689	LCN
1	EA	DOME STOP	FS436/438 (AS REQ'D)	626	IVE

DOOR SEAL, BOTTOM SEAL & THRESHOLD TO BE PROVIDED BY SOUND DOOR MANUFACTURER.

HW SET: 20

3	EA	HINGE	5BB1 4.5 X 4.5	652	IVE
1	EA	STOREROOM LOCK	L9080L 06A	626	SCH
1	EA	MORTISE CYLINDER	KEY TO EXISTING SYTEM	626	CYB
1	EA	SURFACE CLOSER	4011 DEL SRI	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	MOP PLATE	8400 4" X 1" LDW	630	IVE
1	EA	DOME STOP	FS436/438 (AS REQ'D)	626	IVE

HW SET: 21

6	EA	HINGE	5BB1HW 5 X 4.5 NRP	630	IVE
2	EA	CANE BOLT	0524.00023 PADLOCKABLE (OR EQUAL)	603	RIC
2	EA	PADLOCK	KS43F3200	452	SCH
2	EA	PRIMUS CORE ONLY	20-740 "0" BITTED"	626	SCH

HW SET: 22

1 ALL HARDWARE BY DOOR MANUFACTURER

END OF SECTION





1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Glass and glazing of the following areas:
    - a. Tinted laminated glass at the elevator tower / shaft window wall
    - b. Clear laminated elevator cab glazing with interior protective film cover.
    - c. Reflective dual-tempered glazing at the Police Station
    - d. Laminated glass at the Police Station - Dispatch / Hallway window counter with fabricated speak holes
    - e. Two-way mirror vision security panel glazing in the Police Station Hallway Door.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 07900: Sealants and Caulking.
- B. Section 08100: Hollow Metal Doors and Frames
- C. Section 08410: Aluminum Storefront and Window Wall Systems
- D. Section 14240: Hydraulic Passenger Elevators

1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
  - ASTM C509 Specification for Cellular Elastomeric Preformed Gasket
  - ASTM C864 Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks and Spacers.
  - ASTM C998 Test for Glass Under Static Loads by Non-Destructive Methods
  - ASTM C1036 Specification for Flat Glass
  - ASTM C1048 Specification for Heat-Treated Flat Glass-Hs, Ft, Coated and Uncoated.
  - ASTM C1172 Specification for Laminated Architectural Flat Glass
- B. American National Standards Institute (ANSI) Z97.1 Safety Performance Specifications and Methods of Test for Safety Glazing Materials Used in Buildings.
- C. Architectural Aluminum Manufacturers Association (AAMA) CWS-12, Structural Properties of Glass
- D. Underwriters Laboratories, Inc. (UL)
  - UL 10(b) Fire Tests of Door and Window Assemblies

- E. Glass Association of North America Guidelines (GANA).
- F. CPSC 16CFR 1201 - Consumer Product Safety Commission Standard on Architectural Glazing Materials.
- G. California Code of Regulations (CCR) - Title 8, Subchapter 6 - Elevator Safety Orders, Article 8, 'Machinery and Equipment for Power Cable-Driven Passenger and Freight Elevators', Section 3034 'Car Enclosures and Car Doors and Gates'.
- H. California Elevator Code (CEC)
- I. California Building Code (CBC) – Chapter 24

#### 1.04 DESIGN REQUIREMENTS

Where glass thicknesses are not indicated, provide thickness based on the wind pressures required by California Code of Regulations (CCR) Title 24 Part 2, California Building Code (CBC) Section 1613. Wind pressure shall be assumed to have one minute duration. Upon first application of design wind load for the specified duration, probability of breakage shall not exceed 8/1000 for vertical glass and 1/1000 for sloped glass. Probability of breakage relative to glass thermal stress shall not exceed 8/1000 for vertical glass and 1/1000 for sloped glass.

#### 1.05 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Product / Test Data: Manufacturer's technical data sheets for each material and fabricated product proposed. Provide glass manufacturers or composite glazing fabricators certified independent testing laboratory data sheets for reporting current testing criteria and performance results obtained for each different type of glazing lite and from each different heat lot manufactured for all glass proposed. Cross-reference each sample to each specific data sheet and the respective structural calculation used to establish the submitted glass thickness. Results are to be based on the actual performance characteristics of materials tested under conditions including specific framing sections experienced in the project. Comply with CCR Title 8 and other specified requirements.
- C. Samples: Provide 10 inch square samples of each type of glass (color range and thickness), reflective coating, laminated glass, two-way mirror, and of protective window film. Include 6-inch samples of each glazing gasket proposed and at least 3-inch long samples of all sealant proposed to be used. Install between samples of the materials to be glazed and be fully cured.
- D. Shop Drawings: Show details of each type of glazing system indicating sizes, shapes, materials and quantities. Show details indicating sealant thickness and profile bite on glass, glass edge clearance, rabbet depth and thickness of glass. Identify gasket materials, side spacer blocks and setting blocks. Show weepage system in glass pockets. Details shall be full scale and fully drawn.
- E. Calculations: Provide structural calculations for each different sized opening on each different elevation of the structure and for each different type of glass specified to justify thickness submitted complies with the minimum code

requirement for the size, wind loading and additionally increased to conform to the contract documents.

- F. Test Data:
1. Provide glass manufacturers or composite fabricators certified independent testing laboratory data sheets for reporting the testing criteria and performance results obtained for each glazing material supplied and from each different heat lot manufactured. Reference each data sheet to justify structural calculations used in establishing glass thickness submitted based on the actual performance characteristics under test conditions in the project specific framing sections.
  2. Submit test reports from the manufacturer of the reflective glass demonstrating compliance with the performance requirements of this section.
- G. Provide affidavit from the contractor certifying that each lite is glazed in accordance with approved plans, shop drawings and specifications. Provide an as-built schedule identifying each light and where safety glazing was utilized each by specific location.

#### 1.06 QUALITY ASSURANCE

- A. Each piece of glass shall be of domestic manufacture labeled with the manufacturer's name, strength, grade, thickness, type and quality for each type of glass used. Mark tempered, heat strengthened and laminated glass with etched or ceramic fired permanent identification labels. Label shall remain intact until directed otherwise by the project Owner's special inspector.
- B. Comply with all building, fire and safety codes relating to the work and ASTM C1048. Safety glazing shall conform to the requirements of Federal rules and regulations titled "Safety Standards for Architectural Glazing Materials" (16 CFR Part 1201) and ANSI Z97.1. Use tempered glass for safety glazing unless shown otherwise. Provide certification that the glazing installed conforms to the referenced standards.
- C. Each glass type shall match the approved samples, be uniform in appearance free from irregularities and differences in appearance when viewed from exterior. Glass not in compliance with this requirement shall be replaced with conforming glass at no additional cost to the Owner.
- D. Assume responsibility for the glass and glazing and coordination with each component of related work. Demonstrate not less than five (5) years successful experience of similar work to this project. Provide at least one person who shall be thoroughly trained and experienced in the skills required who shall be completely familiar with the specified referenced standards and the requirements of this work. That designated person shall personally direct all installation performed under this Section.

#### 1.07 RESPONSIBILITY

- A. The glazing details / sizes shown on the drawings or indicated herein are intended as a guide for the aesthetic and interfacing requirements of the glass

and glazing to and with surrounding framing work. The requirements shown by the details are intended to establish basic minimum dimensions, locations of glass panels and locations of different glass types. Contractor is responsible for the design, engineering and code compliance of the glass and glazing work within these minimum physical and aesthetic parameters. The drawings are not to be construed as engineered design.

- B. Architectural design does not cover all conditions or modifications that may be required. It is intended that conditions not detailed shall be developed through the shop drawings to the same level of aesthetics and in compliance with performance criteria as indicated for detailed areas and as stipulated in these specifications. Contractor acknowledges and agrees that the Architect shall have the final approval to all matters whether detailed or not on the design details.

#### 1.08 IDENTIFICATION

- A. Required on each lite a manufacturers label designating name and brand, the type, quality, grade and thickness of each glass. When approved by enforcement agency labels may be omitted. Tempered / safety glazing glass shall have a permanently etched manufacturers label readable from the interior per California Building Code Chapter 24 requirements.
- B. Laminated safety glazing shall be marked as required by ANSI Z97.1 or 16 CFR, Part 1201 Section 1201.5.

#### 1.09 PROTECTION

Protection of Glass: Identify glass which has been installed with tapes or strings. Suspend identifications near but not in contact with glass. Tapes may be attached to sash at head, jamb or sills with non-staining adhesive. Marking or coating glass with soap, cleansing powders or other materials will not be permitted. Replace glass which becomes stained because of marking or taping on surfaces are to be replaced at no additional cost to Owner.

#### 1.10 DELIVERY AND STORAGE

- A. Deliver glass to the jobsite with manufacturers labels showing thickness, quality, type, location and/or other denotation that identify where glass is to be used.
- B. Deliver glazing gaskets, blocks, spacers, tapes and other glazing items in manufacturer's original unopened packages or containers.
- C. All delivered items whether F.O.B. job site for unloading and installation by others or whether fabricated and installed by the Contractor shall be properly crated. Crates shall be marked with installation location, fabrication numbers and shop drawing references as applicable.
- D. Store glass in dry well-vented location at a temperature maintained above dew point. Minimize the handling of glass and protect from soiling, atmospheric condensation and other moisture.

- E. Remove from the job site and replace with acceptable material all cracked, broken, chipped or otherwise damaged glass and all glazing and sealing materials unfit for use.

## 1.11 WARRANTY

- A. Submit signed copies of written warranty to repair or replace defective materials and workmanship in conjunction with this work during the specified warranty period.
  - 1. Defective materials and workmanship include evidence of abnormal deterioration, aging or weathering of the work, leakage of water or air, structural failure of components including glass breakage resulting from exposure to normal loads and forces, failure of operating parts to function normally, deterioration or discoloration of finish in excess of normal weathering and aging and failure of the work to fulfill specified performance requirements for a period of five (5) years after acceptance by Owner. This warranty shall include all issues related to the use of urethane sealants between building components and does not apply to the extended warranty requirement hereafter for the use of silicone sealants.
  - 2. Laminated Composites:
    - a. The need for fully tempered glass as the outer lite of the safety glazing / laminated composite at the elevator tower curtain wall is not a requirement of the governing codes of jurisdiction, ANSI and CEC unless specifically required due to exposure or loading effects. The tempered interior lite of the elevator cab enclosure is however code required.
    - b. Specified hereafter is the requirement by the Architect that the outer lite be fully tempered out of concern for public safety. Contractor is to provide the required calculations based on project specifics to justify that the laminated composite glazing (required tempered outer lite / float glass interior lite) strength can be compensated to meet the project performance criteria by either increasing the thickness beyond the minimum thickness required or by any other means proposed.
  - 3. Reflective Glass (Low-E): Reflective glass shall be by a permanent process to render a permanent subtle reflectivity with crisp, consistent color. Guarantee for a period of ten (10) years against color shift, mottle or fade, cracking, peeling or other deterioration even when heat-treated or bent.

## 2.00 PRODUCTS

### 2.01 MANUFACTURE

Domestic manufacture as produced by Viracon, LOF Glass Inc., PPG Industries, Interpane Glass Company, AFG Industries, Guardian Industries, Oldcastle, Pilkington, Saint Gobain, or equal.

- 2.02 GLASS – The following types of glass specified herein are either materials or products used as specific glazing sections for the openings listed under the scope of work or herein specified as performance standards that are to be followed in using that particular

glass in a subsequent treatment or finished assembly component. Do not construe listing herein as a stand alone glazing that if not listed in the scope of work, need not be complied with.

A. General:

1. Provide and certify that type and thickness of glass shown on the Drawings or specified herein complies with reference standards and code requirements. Glass thickness indicated is the minimum required with actual sizes submitted based on the Contractor furnished calculations and justification of the performance criteria. Contractor shall as minimum, provide the glass thickness required to withstand design wind pressures per applicable codes and thickness increased to comply with the requirements indicated herein.
2. Where type or thickness or both are not shown on the Drawings or specified herein, provide type and thickness directed by the Architect. Failure of the Contractor to verify discrepancies will not relieve him of the responsibility of providing the most stringent requirement / selection requested by the Architect.

B. Float Glass: Comply with Federal Specification DD-G-452, ASTM C1036 Type I, Class 1, Quality q3 and shall be minimum 1/4" thick unless otherwise required thicker by glass manufacturer.

C. Heat-Strengthened Glass (Fully Tempered Glazing at the Police Station):

1. Float glass that is part of the overall laminated composite shall be minimum 1/4". Required thickness may increase due to thermal stress or structural requirements by glass manufacturer for fabrication to meet ASTM C1048, Federal Standard CPSC 16 CFR 1201, Federal Specification DD-G-1403, and ANSI Z97.1 CCR Title 24, Part 2, Section 2402
2. Heat strengthened glass shall be treated using a horizontal process to increase flexural strength not less than twice the strength before treatment. Warpage and tong marks are not permitted. The orientation of inherent roller marks in heat strengthening shall run horizontal not vertical when glass is in its installed position.
3. Provide fully tempered glass where indicated on the Drawings or as required to meet the safety glazing code requirements increasing glass thickness as necessary to meet other performance criteria.
  - a. Tempered glass shall conform to ASTM C1048, CPSC 16 CFB, Federal Specification DD-G-1403 and ANSI Z97.1 fabricated from float glass. If required, heat absorbing glass where indicated shall be fabricated from Type I, Class 2 Style B and in the color indicated / selected by the Architect.
  - b. Sizes and Cutting: Prior to tempering process cut float glass to required sizes, verified by on-site measurement of the openings to be glazed making allowances for required edge clearance. Cut and process edges in accordance with industry standards. Do not cut or treat post-tempered edges in the field.

D. Reflective Glass: PPG "Solarcool Medium (20%) Bronze" or equal, unless selected otherwise by the Architect. .

- E. Laminated Glass: Laminated composite shall consist of two lites for a minimum total thickness of 5/16" safety glazing with a tolerance of +/- 1/32 inch. The inner and outer lites must be float glass (heat-treated). The outer lite may be tinted or reflective but the overall composite shall not have a rated strength and impact resistance not less than a 1/4 inch float glass. Heat-treated glass may be substituted as a component of the system to increase performance as needed to meet performance criteria. Heat-treated glazing may be either annealed, heat strengthened or fully tempered.
1. Parking Structure Elevator Tower Curtain Wall Glazing: Provide clear, bronze tinted laminated glass as selected by Architect conforming to ASTM Type I Class 2, consisting of a minimum 1/8" float (heat treated / annealed) glass inside face and a 1/8" minimum outer face of heat treated fully tempered glass laminated under heat and pressure to a inter-core of clear polyvinyl butyral (PVB) 60 mils thick to form a minimum total composite of minimum 5/16" thick, increased to meet the required structural or established aesthetic criteria. For project specific larger sizes, provide detail-specific calculations and increased glass thickness required to meet those requirements.
  2. Elevator Cab(s): Provide a clear laminated glass composite conforming to ASTM Type I Class 2, consisting of a minimum 1/4" heat-treated fully tempered inside face and a 1/4" minimum outer face of impact resistance rating not less than a 1/2 inch float glass. Laminate under heat and pressure to inter-core of clear polyvinyl butyral (PVB) 60 mils thick to form a composite minimum total thickness of 9/16". Additionally elevator cab interior glazing shall be protected from vandalism by application of the specified protective window film.
- F. Low-Emissivity – (Low-E):
1. Provide solar heat-gain control, high visible light transmittance and glare control in a clear or a color as selected by the Architect. Manufacture by a permanent pyrolytic deposition or the vacuum deposition process to render a permanent subtle reflectivity with crisp, consistent color. Manufacturer shall not be by the soft coat color process. Guarantee against color shift, mottle or fade, even when heat-treated or bent. Product to be 'Eclipse Advantage', as manufactured by Pilkington Building Products (800) 221-0444; 'Pyrolytic' as manufactured by Pilkington (800) 221-0444, Viracron Solarscreen, or equal.
  2. Low emissivity coating shall be free of pinholes having a diameter greater than 1/16 inch and visible at a distance of 6 feet. Pinholes with a diameter between 3/64 inch and 1/16 inch will be allowed only within 3 inches of the edge. Large clusters or close spacing of smaller pinholes will not be allowed in any area through which a person would normally be looking. Scratches with a length of 3 inches or greater and visible at a distance of 10 feet will be permitted only within 3 inches of the edge. A scratch is defined as either (1) a single scratch, (2) a scratch that skips i.e. starts, stops, starts, etc. with a total cumulative length of 3 inches or greater, or (3) a number of scratches closely grouped together with a total cumulative length or greater.
- G. Insulating Glass:
1. Factory-fabricated units consisting of double glazed / sealed composites consisting of minimum 1/4" thick tinted glass (as selected by Architect)

with low emissivity coating on the #2 side of the exterior lite and a minimum 1/4" thick clear glass interior lite separated by a minimum 1/2 inch air space between the lites. Units shall conform to Class CBA of IGCC and ASTM E576, ASTM E773 and ASTM E774.

2. Inner and outer lites of each insulating composite shall be annealed, heat strengthened or fully tempered as required for structural performance, design pressures and/or as recommended by the glass manufacturer to insure against heat breakage due to project exposure.

H. Two-way Security Surveillance Mirror: Type of lite as selected by the Architect / District

1. Acrylic: Provide a High Reflectivity and Light Transmittance, high clarity mirror-grade acrylic coated with a semi-transparent see thru finish. Material to be a Durable Pyrolytic Surface, PMMA sheet, 1/4" thick. Manufactured by Pilkington "Mirropane - Transparent Mirror" 419-787-4526; Shenzhen Aulen Ornament & Mirror Co., Ltd; or equal. Physical properties shall conform to the following minimum standards:

Specific Gravity	ASTM D792	Value 1.19
Optical Refractive	ASTM D542	Value 1.49
Light Transmittance	ASTM D1003	Total 92 / Haze 2

Because the acrylic, mirror surface is easy to scratch, back the installed unit with a piece of 1/8" thick tempered glass.
2. Glass: 1/4" thick clear float glass with transparent reflective metallic coating on viewer's side, LOF "Mirropane EP", Guardian "Transparent Mirror" or equal. If glass is selected by the Architect, unit shall be fabricated into a laminated assembly for vandal resistance, in conformance with 2.02E above

## 2.04 GLAZING MATERIALS

- A. Glazing Gaskets: Gaskets and resilient clips shall be the snap in type or other approved device, sized as required for glass thickness. Provide section profile and shore hardness required for a watertight long maintenance free service life.
  1. Cellular Glazing Gaskets: ASTM C509 Type II, black molded or extruded closed cell, skinned neoprene gaskets.
  2. Elastomeric Compression Glazing Gaskets: ASTM C864 extruded flexible EPDM gaskets.
  3. Vinyl Compression Glazing Gaskets: ASTM D2287 non-rigid extruded vinyl chloride copolymer compound molding.
- B. Setting Blocks: Extruded neoprene of 70-90 Shore-A, durometer hardness, minimum 4" long sized per GANA guidelines unless indicated otherwise. Provide blocks manufactured by Frank Lowe Rubber & Gasket (800) 777-0202, or equal.
- C. Spacer Shims: Extruded neoprene of 50-60 Shore-A, durometer hardness, sized and profiled for intended use unless indicated otherwise. Provide shims manufactured by Frank Lowe Rubber & Gasket (800) 777-0202, or equal.
- D. Glazing Sealants – For Wet Seal: Use a one-part non-acidic moisture or neutral curing silicone sealant with Shore hardness in conformance with industry standards, complying with FS TT-S-001543, Class A. Exposed glazing material



shall be colored black unless otherwise selected by the Architect. Sealants and tapes must be fully compatible with contacted surfaces and finishes.

1. Exterior Glazing - One-Part Non-Acid Curing Medium Modulus Silicone
    - a. Type S; Grade NS; Class 25; Uses NT, G, A, as applicable for use indicated. Tensile strength shall not be less than 45 or more than 75psi at 100 percent elongation when tested per ASTM D412 after 14 days at 77 degrees and 50 percent relative humidity.
    - b. Provide one of the following: "791" by Dow Corning Corp, "Silpruf, SCS1000 or Ultra-Glaze 400" by General Electric Corp., "Spectrum 2" by Tremco Inc., "Rhodorsil 70" by Rhone-Poulenc, "Spectrum 1" by Tremco or equal.
  2. Interior Glazing
    - a. One-Part Low Modulus Silicone Sealant: "Silglaze N 2500" by General Electric Company, or equal.
    - b. One-Part Acrylic Glazing Sealant - Water based acrylic emulsion sealant; non-sag, mildew resistant, paintable, complying with ASTM C834.
  3. Building Surrounds: For caulking and sealant of joints between aluminum framing and adjoining building component materials. Refer to Section 07900 – Caulking and Sealants.
- E. Glazing Tapes: Use extruded / preformed butyl rubber, non-staining and non-migrating solvent-free, 100 percent solids poly-isobutylene based formulation (coiled on release paper) with a continuous integral shim of a Shore 'A' hardness of 40-60 that is a minimum 1/16 inch by 1/2 inch in size. Tape shall comply with AAMA A804.1 or A807.1. Tape shall compress to the shim without excessive force being required to avoid pressure points or breakage. Provide "440 Tape" by Tremco; "Extru-Seal" by Pecora, "PTI 303 Spacer Rod Tape" by Protective Treatments, Inc., or equal
- F. Compressible Preformed Filler Rod Gaskets: Closed-cell sponge or plastic foam conforming to ASTM C509, and dense neoprene / synthetic rubber gaskets conforming to ASTM C864, proven to be compatible with sealants used that is flexible and resilient to 25-40 percent for the foam and 5-10psi compressive strength for the neoprene with minimum 25 percent elongation.
- G. Cleaners, Primers and Sealers: Type as recommended by sealant or gasket manufacturer.

## 2.05 OTHER MATERIALS

- A. Protective (Safety/Solar) Window Film: Provide on the interior of each glass backed elevator cab a minimum of 7 mil clear vandal resistant security film meeting the performance specifications of the selected manufacturer/product. Product to be 'Vandal Shield' manufactured by Graffiti Removal Inc. (714) 901-3993; SEC07 manufactured by Johnson Window Films, Inc. (800) 448-8468 / (310) 631-6672; GE Polymershapes Film Business (800) 562-5967; CPFilms (800) 255-8627; 'Makrolon' by Sheffield Plastics Inc. (800) 254-1707; 3M Scotchclad, or equal.

- B. Speak holes shall be 8"od and 3"id stainless steel louver type, Model No. 444 manufactured by Nissen and Co., or equal.
- C. Two-way Security Surveillance Mirror Cleaner: Novus 1 cleaner and Novus Polish Mates. Do not use Windex or other corrosive agents on the acrylic mirror. Do not soak in water.

### 3.00 EXECUTION

#### 3.01 EXAMINATION

Examine the framing that is to receive glazing to ensure compliance with manufacturing and installation tolerances, including those for size, squareness, offsets at corners, presence and functioning of weep system, for minimum face and edge clearances, and for effective sealing of joinery. Do not proceed until unsatisfactory conditions have been corrected.

#### 3.02 STANDARDS AND PERFORMANCE

- A. Conform to glazing requirements of CBC with UBC standards and to procedures of GANA and SIGMA.
- B. Comply with combined recommendations and technical reports by manufacturers of glass and glazing products as used in each glazing system and with recommendations of GANA except where more stringent requirements are indicated by the specifications or the framing system.
- C. Watertight and airtight installation of each glass product is required. Each installation must withstand the temperature changes and specific wind loading that are maximum characteristics for the project site area. Installation shall also include associated impact loading that must be factored for operating sash and doors to preclude system failure, loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials or any other defects in the work.
- D. Install insulating glass units to comply with the recommendations by Sealed Insulating Glass Manufacturers Association, except as otherwise specifically indicated or recommended by glass and sealant manufacturers. Insulating glass units shall be installed in such manner to adequately drain the glazing rabbit.
- E. Glazing channel dimensions are intended to provide for necessary bite on glass, minimum edge clearance and adequate sealant thickness with tolerances. Adjust as required to conform to minimum bite detailed in the shop drawings as specified herein and GANA guidelines.
- F. Ensure watertight installation without rattling. Verify glass sizes before cutting and fit within tolerance of 1/32 inch per 1/8-inch thickness. Provide tight and true installation within glazing members. Set glass without springing with convex side to exterior.

#### 3.03 PREPARATION

- A. Thoroughly clean glazing channels, stops, and rabbets receiving glazing materials from all foreign matter such as dirt, oil, grease, debris, obstructions and deleterious substances which impair the work.
  - 1. Remove protective coating that might fail in adhesion or interfere with bond of sealants using solvents that leave no residue. Use only clean lint free towels for wiping of surfaces.
  - 2. Comply with manufacturers' instructions for final wiping of surfaces immediately prior to application of primer and glazing compounds or tapes.
  - 3. Mask or otherwise protect surfaces adjacent to installation of sealants.
- B. Do not glaze when the ambient temperature and weather conditions cause frost or moisture /condensation on framing or during damp weather unless measures to eliminate these conditions are used. Clean glass free from dust, oil, etc. and wipe clean immediately before installation.
- C. Set glazing stops so as to avoid marking or defacing any portion of the frames, stops, settings, etc. Prime surfaces of openings where recommended by the sealant manufacturer. Prime surfaces to receive glazing compound in accordance with manufacturers' recommendations.
- D. All glazed openings shall be inspected prior to glazing to verify that openings are square and plumb in order that uniform face and edge clearances are maintained. Inspect all framing joint intersections to insure that the offset in the joinery will not impose undue edge pressure on the glass in accordance with GANA guidelines. Shop cut glass; cut clean, straight edges, free from chips and fissures.

### 3.04 INSTALLATION

- A. Inspect each piece of glass immediately prior to start of installation. Do not install items that are improperly sized, have damaged edges, are scratched, abraded or damaged in any way. Do not remove labels from glass until so directed by the Architect.
- B. Set all glass in a true plane, tight and straight with proper and adequate clearance, firmly anchored to prevent rattling and looseness with all edges cleanly cut. Set glass in a manner which produces the greatest possible degree of uniformity in appearance. Install glass so distortion waves or roller marks if present, run in the horizontal direction. Mixing of the direction will not be acceptable. Maintain minimum face distances on both sides of glass per GANA guidelines.
- C. Cut glass at factory to exact size with proper edge clearance so that glass will not contact frame at any point. Do not nip or seam the edges.
- D. Install setting blocks at quarter points or at location as recommended by GANA or glass manufacturer. In no case shall edge of block be closer than 6" to the vertical edge of the glass unless specifically approved otherwise. Setting blocks shall be restricted from lateral movement. Setting blocks at insulated glass units and laminated glass shall support both lights of glass.

1. Use blocks of proper size to support the glass in accordance with referenced guidelines.
  2. Provide spacers for all glass sizes larger than 50 inches to separate glass from stops, except where continuous glazing gaskets or felts are provided.
    - a. Locate spacers no more than 24" apart and no closer than 6" to corner.
    - b. Place spacers opposite one another.
    - c. Make bite of spacer on glass 1/4" or more.
- E. Glazing Channels:
1. Do not use two different glazing materials in the same joint unless approved in advance by the Architect.
  2. Install with tightly fitted corners and joints, flush with stops and edges in full contact with glass and frames.
  3. Install channel stops and retainer sizes indicated on Drawings. Secure to frames with screws at 3" from ends and 2'-0"oc maximum.
- F. Gasket Glazing: Where wedge-shaped gaskets are driven into one side of the channel to pressurize the sealant or gasket on the opposite side. Provide anchorage to ensure gasket will not "walk" out. Subject gaskets at corner conditions per gasket manufacturer's recommendations to prevent pull away at corners. Seal corner and butt joints with sealant.
- G. Set glass in exterior openings with glazing tape and sealant. Glaze other interior openings with glazing channels, glazing sealant or glazing tape. Prime and seal steel rebates with compatible material before installing glass.
- H. Glazing Tape:
1. Cut glazing tape to length and set against permanent stop 3/16 inch below sightline. Butt tape at corners and daub joint with butyl sealant.
  2. Rest glass on blocks and push against tape to attain full contact with glass perimeter.
  3. Place glazing tape on glass and install removable stop.
- I. Sealant Glazing:
1. Apply masking tape where required by glazing operation in continuous strips in alignment with joint edge. Remove tape immediately after joints have been sealed and tooled.
  2. Apply glazing sealants under pressure with hand or power actuated gun or other appropriate means. Use guns having nozzle of proper size and sufficient pressure to completely fill joint. Neatly point or tool all joint surfaces to provide the proper contour.
  3. Apply cap bead of medium modulus silicone sealant along exterior and interior void to uniform line. Force sealants into channel to eliminate voids and ensure complete "wetting" with "wash" away from glass. Tool or wipe sealant with solvent for smooth appearance eliminating stains and discoloration.
  4. Dry tool joints. Do not use water-wet tool or tooling solution.
- J. Two-way Security Surveillance Mirror: Install using standard glazing procedures.
1. Verify which is the coated surface by holding an object such as your fingernail against the mirror. If there is a gap between the object and its

reflection, it is the uncoated side. If there is no gap between the object and its reflection, it is the coated side.

2. In most installations, the uncoated side is closer to the people being observed.

### 3.05 CURING

Glazing sealants shall be cured in compliance with sealant manufacturer's instructions to obtain the required bond strength, internal cohesive strength and surface durability.

### 3.06 WINDOW FILM CLADDING

- A. Installation technique with regards to cleaning, prepping windows and installation / application of the approved film shall comply with manufacturer's recommendation.
- B. Methods of hanging / mounting of the film, positioning solution and squeegee technique, cutting / scribing, etc. shall render an installation that in no way damages the underlying glazing. Finished application shall be fully adhered without air bubbles, contamination, lint, marks or any other visible imperfections.

### 3.07 CLEANING AND POLISHING

- A. Upon completion of the glazing, thoroughly wash glass on interior and exterior of building to remove sealants, paint or other foreign matter. Completed installation shall be cleaned with water and a mild detergent as recommended by the glass manufacturer. Do not use abrasive materials.
- B. Window film(s) shall be cleaned in conformance with manufacturer recommendations. Provide District with a list of approved / acceptable products.
- C. Remove and replace broken, scratched, chipped, cracked, abraded or otherwise defective or damaged glass. Contractor is responsible for labor and materials required to repair or replacement of damage caused during the construction period, including those caused by natural causes, accidents or vandalism. Replace with new materials leaving the entire installation neat and clean. Dispose of excess materials and debris off site.
- D. Two-way Security Surveillance Mirror: Be careful because acrylic scratches fairly easily! Cleaning of dust should be done with compressed air (computer duster) to avoid leaving streaks. To clean oil or fingerprints, use Novus 1 cleaner and Novus Polish Mates. Novus 1 can heal light scuffs and scratches, and adds a protective coating to prevent future damage. Please see our website if you are interested in ordering Novus products. Do not use Windex or other corrosive agents on your mirror. Do not soak in water. Do not use Novus on the coated side unless it is necessary to clean oily residue.

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to the work of this section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including, but not limited to, these major items:
  - 1. Interior metal stud partition framing
  - 2. Channel framing.
  - 3. Suspended ceiling framing.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 09250: Gypsum Wallboard

1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM).
  - ASTM A446 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural (Physical) Quality.
  - ASTM A525 Standard Specification Requirements for Steel Sheet, Zinc-coated (Galvanized) by the Hot-Dip Process.
  - ASTM A641 Standard Specification Requirements for Steel Sheet, Zinc-Coated (Galvanized) Carbon Steel Wire.
  - ASTM C645 Standard Specification for Non-Load (Axial) Bearing Steel Studs, Runners (Track), and Rigid Furring Channels for Screw Application of Gypsum Board.
  - ASTM C754 Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum
  - ASTM C840 Specification for Application and Finishing of Gypsum Board
  - ASTM C955 Standard Specification for Load Bearing (Transverse and Axial) Steel Studs, Runners (Track) and Bracing or Bridging for Screw Application of Gypsum Board and Metal Plaster Base.
  - ASTM C1007 Standard Specification for the Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories.
- B. American Iron and Steel Institute (AISI).  
Specification for the Design of Cold Formed Steel Structural Members.
- C. California Building Code, CBC Chapter 22(A)
- D. International Code Counsel (ICC) Evaluation Report (ER) 4943P

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.

- B. Submit manufacturer's technical product data indicating all materials, gages, sizes, strength and protective finishes as applicable. Include ICC evaluation report (ER-4943P) approval or current test data and manufacturers recommended load table charts for each different section profile proposed. Manufacturers recommended installation procedures will become the basis for accepting or rejecting actual installation procedures.
- C. Test Reports: Certified laboratory test reports confirming performance characteristics of manufactured units proposed for use.
- D. Structural Calculations: Prepared by the manufacturer for approval by the Engineer, verifying the framing assembly's ability to meet or exceed design requirements.
- E. Shop Drawings: Indicate selection of framing components and accessories, shop coatings and steel thickness. Indicate details of fabrication, details of attachment, fasteners, spacing and installation of accessories.
- F. Samples: Framing component parts and accessory pieces shall be 12 inches long and tagged with name of part and manufacturer.

#### 1.05 REQUIREMENTS

- A. Installation of steel framing shall meet ASTM C754 and C840 standards.
- B. Steel studs, tracks and accessories shall be manufactured by a SSMS member. See ICC ER 4943-P for allowable stud heights, load characteristics and general framing requirements.

#### 1.06 QUALITY ASSURANCE

- A. Steel stud wall systems shall be designed to resist the basic load combinations specified in the referenced standards. The nominal shear value used to establish the allowable shear value or design shear value (Load and Resistance Factor Design), for wind and seismic loads shall be determined using established load and safety factors as set forth in Section 2219A Tables 22A –VIII-A-C.
  - 1. All boundary members, chords, collectors and connections thereto shall be proportioned to transmit the induced forces. Design to develop the full tensile strength of the member, or factor of safety times the otherwise prescribed seismic force.
  - 2. Framing members shall be of a minimum size, shape and of a minimum specified yield stress as listed.
  - 3. Fasteners between framing members and between the panels and the framing members shall be as specified. The fasteners along the edges in shear panels shall be placed not less than 3/8 inch in from panel edges. Screws shall be of sufficient length to ensure penetration into the steel stud by at least two full diameter threads.
  - 4. Vertical and diagonal members of the braced bay shall be anchored so that the bottom track is not required to resist uplift forces by bending of the track web.
  - 5. Both flanges of studs in a bracing panel shall be braced to prevent lateral torsional buckling. Wire tied bridging shall not be considered to provide



- such restraint.
6. Screws shall not be used to resist lateral forces by pullout resistance.
  7. Provisions shall be made for pretensioning or other methods of installation of tension-only bracing to guard against loose diagonal straps.
- C. Framing tolerances in excess of 3/16 inch in 10'-0" from true / square are not acceptable.
  - D. Metal framing system must conform to AISI Specifications. Coordinate information with drawings for limiting height and span tables and structural properties for design data.
  - E. Provide a system which provides for a positive attachment (Cyclic Anchoring Method ASTM C754) of studs to upper track.
  - F. Metal framing system design and installation must conform to AISI Specifications and in conformance with CBC Sections 1612 A/1613 A, 2217A/2218A Amendments and 2219A. Coordinate referenced design data and tables for structural properties and strength determination considerations for load, shear, tension, spacing, bracing and fastening criteria. Nominal shear values shall be multiplied by the appropriate strength reduction factor, to determine design strength or divided by the appropriate safety factor to determine allowable shear values as set forth in Section 2219A.3
  - G. Steel studs shall be installed plumb and true, with full bearing, of the proper gage, size and spacing as designed in conformance with drawings and calculations. Framing tolerances in excess of 3/16 inch in 10'-0" from true / square are not acceptable.
  - H. Bearing of studs, use of reinforcement clip angles, stiffeners, bridging, bracing, etc. shall be aligned, anchored, fastened, connected, etc., to insure that proper uniform distributed concentrated, compressive, axial or lateral and construction loads are anticipated and specifically addressed in the design calculations.
  - I. All fasteners shall be as designed for the specific applications. Verify number and size of fasteners. Connections shall be accomplished with self-drilling screws or welding so that the connection meets or exceeds the design loads required at that connection.
  - J. Welding shall be in conformance with CBC Section 2204A .8. Field abrasions and welds shall be touched-up, with approved galvanizing repair

#### 1.07 ANCHORAGE TO CONCRETE REQUIREMENTS

- A. Power Driven Shot Pins – Low Velocity:
  1. Powder-activated fasteners / anchors may not be shot or drilled into slabs without the prior written permission by the Architect/Structural Engineer, as to type and size of fastener and proposed location, unless indicated otherwise on the drawings. Operators shall be certified in accordance with California Industrial Safety Orders.
  2. Shot pins may be used for shear loads and they may be used in tension to support loads less than 100 pounds for minor loads like acoustical

ceilings, duct work, conduit, etc. Any shot anchors must have ICC approval for the type of concrete used on the job. Shot pins may not be used in concrete curbs.

3. The allowable loads shall be 100 pounds or 80% of ICC approved values, whichever is less. Qualification for use of all power-actuated tools must meet ANSI A10.3 standard as required by the manufacturer and all OSHA requirements.

## 1.08 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials with manufacturers identifying labels intact, affixed and legible. All steel sections shall have permanent recognized labeling.
- B. Store materials off ground in dry and well ventilated areas, covered and otherwise protected from physical damage. Support in a manner which will prevent a deflection set.
- C. Remove rejected items from the site that are bent, warped, dented or otherwise damaged and/or units exhibiting rusting or other damage to the finish not repairable by minor and conventional field touch-up procedures.

## 2.00 PRODUCTS

### 2.01 STEEL STUDS

- A. Products of Cemco, ClarkWestern Building Systems, Consolidated Fabricators, Design Shapes In Steel, Dietrich Industries, NEXFRAME, Steeler Inc, United Metal Products, United Steel Manufacturing, or equal.
- B. Studs: Corrosion resistant roll-formed "C" wide flanged, punched channel steel studs with 1d inch flanges with returns, depths as shown. Knurled flange faces. Comply with ASTM A446 and C645 and hot-dip zinc coated per ASTM A525.
  1. Exterior Studs: Refer to Section 05400. 16 gage, unless shown otherwise. Exterior studs are considered as load bearing.
  2. Interior Studs: Minimum 20-gage; 18 gage minimum at all door framing and at all locations where steel backing plates are required.
  3. 16 gage and heavier: Cold-formed steel conforming to Grade D specification with a minimum yield point of 50,000psi.
  4. 18 gage and lighter: Cold-formed steel conforming to ASTM A446, Grade A with a minimum yield of 33,000psi.
- C. Runner Tracks: Stud manufacturer's matching units (un-punched) of the type indicated and hot-dip zinc coated per ASTM A525. The top track shall comply with deep leg deflection track standards, ASTM C645 with a 2" deep top runner flange.
- D. Top Runner Slotted Track: Provide a deep legged slotted track with slots that allow for both upward and downward overall movement (minimum 1 inch, 2" plus/ 2" minus) of the structure without adversely affecting the positive attachment of

the framing members up to one inch of deflection. One member shall be used in lieu of a double track system. Track shall be provided in standard widths and gage sheet steel thickness as required by project conditions. Down standing legs shall be nominally 2-1/2 inches and shall be provided with 1/2" slots at 1 inch on center. Fire tested assemblies shall have U.L. and Warnock Hersey report approvals and conformance with reference standards. Manufactured by Slip-Track Systems, Inc., Fire Trak Corp. or approved equal.

- E. Backing Plates: Galvanized 3/16" thick steel, of proper size to accommodate fastenings, welded to steel studs. Provide backing plates for all equipment indicated on the Drawings or as indicated to be provided by Owner, such as cabinets, fixtures, equipment, railings, etc. Provide backing for equipment indicated as N.I.C. Verify exact requirements with appropriate trades.
- F. Screws and Fasteners: Provide cadmium plated steel type complying with Federal Spec. FF-S-111 stainless steel or other non-corrosive metal. Type or size as required for specific usage.

## 2.02 SUSPENSION SYSTEMS FOR CEILINGS

- A. Hanger Wire: No.9 gage galvanized annealed steel wire for supporting 12 square feet of ceiling; and No.8 galvanized annealed steel wire where supporting 16 square feet of ceiling or soffit. *OR AS SHOWN ON DRAWINGS.*
- B. Tie Wire: No.18 and No.16 double annealed, galvanized steel wire.
- C. Runner Channels: 1/2" (or larger) cold rolled steel, weighing not less than 475 lbs. per 1,000 lineal feet (for 1/2" size). Hot dip zinc coated per ASTM A525.
- D. Furring channels 1/2" and 3/4", as required and as indicated, cold rolled steel weighing not less than 475 lbs. and 300 lbs. per 1,000 lineal feet, respectively.
- E. Drywall Furring Channels: 25 gage screw-type "hat" shaped sections. Comply with ASTM C645 and hot dip zinc coated per ASTM A525.
- F. Finish of channels shall be an approved factory-applied bituminous paint or hot dip galvanized.

## 3.00 EXECUTION

### 3.01 ISOLATION

Where metal furring and lathing abuts (shaft framing) building horizontally or vertically, isolate the work (to prevent the transfer of loading and structural movement into the furring and lathing), so that slip on cushion-type joints will absorb the deflections or movements.

### 3.02 STEEL STUDS

- A. Set steel studs and fasten in place in accordance with the manufacturers specifications and recommendations and as required by applicable codes. Provide ceiling runners, floor runners and necessary anchoring devices as

required for adequate and proper installation.

- B. Set floor runners in a bead of sealant compound or compressible sealing tape. Seal ceiling runners, except where drawings call for studs to extend through ceilings.
- C. Accurately align runner track to the partition layout at both floor and at ceilings and secure at 42" minimum intervals. Secure runner track at each side of openings.
- D. Butt runner tracks, except leave clearance where base course of gypsum board is to run through at perpendicular planes.
- E. Friction fit studs to runner tracks by positioning and rotating into place. Provide positive attachment to tracks for studs located at partition corners and intersections and adjacent to openings, and for jack studs located above and below openings.
- F. Secure each stud to runner track at 16"oc with the proper number of stud shoes at top and bottom with either self-tapping screws, wired or crimped to stud, at both flanges or tack-welded to runner track.
- G. Reinforce and stiffen partitions with 3/4" (or larger as necessary) steel channels placed horizontally not more than 4'-0" apart; wire-tie or bolt stiffeners to inside surfaces of studs.
- H. Provide a substantial and adequate vertical reinforcing stiffener method at each side of all doors or other openings through partitions. Stiffeners shall consist of "boxed" studs securely bolted or spot welded together to form a structural element. Form corners and intersections of three "boxed" studs secured together to form a stiff structural element. On head of frame, install runner tracks; cut flanges at ends, bend web 90 degrees and screw attach jamb studs. Install jack studs over opening, spaced same as full-height studs.
- I. Install steel studs plumb, true to line.
- J. Place tracks as required for compliance with referenced standards, to give proper support for the covering material and as indicated on the drawings. Provide 1/2" minimum deflection space at top of partition and underside of structural slab, using a slotted top track, slotted. Install partition so slab may deflect without undue loading of studs.
- K. Provide minimum 20 gage stud and furring framing for walls that are to receive sheathing and tile, or as shown on the drawings.

### 3.03 METAL FURRING

- A. Space furring members 16 inches on center, except as otherwise indicated in these specifications or on the drawings.
- B. Frame both sides of expansion and control joints with metal furring, do not bridge the joint with runners, furring, or lathing.

- C. Install additional framing, furring and runners, as required to form openings and frames for other work as indicated.
- D. Splice continuous running members by overlapping and interlocking. Lap runner channels 12 inches and furring members 8 inches.

### 3.04 SUSPENDED CEILING FRAMING

- A. Secure hanger wires to structure using inserts or other approved rigid method. Space inserts to provide supports for hanger wires at 36"oc to carry 1/2" runner channels spaced 48" apart. Tie wires securely to inserts and around channels, using at least three turns.
- B. Install 1/2" runner channels (or larger where indicated) and adjust so that furring is in true and accurately level planes. Lap 1/2" runner channels at least 1/2", and 8" for 3/4" or 7/8" channels at splices and securely tie together with No. 16 wire, double wrapped at two inches from each end of splice. Main runners and cross runners shall not be let into or contact abutting partitions. Locate main runners 6" maximum from walls parallel to runners and 2" from wall to support ends of cross furring.
- C. Space cross furring channels or "hat" sections, as applicable, 16"oc (maximum) and in accordance with CBC requirements. Saddle-tie the cross-furring to each runner channel with not less than two strands of No. 16 tie wire. Lap furring channels 8" minimum at splices and tie with a double-wrap of tie wire 1" from ends of splice.
- D. Suspension under Ducts and at Special Conditions: Provide additional ceiling framing and trapeze where necessary in conjunction with mechanical and electrical to suspend ceiling where large ducts are installed. For hangers spaced from 48"oc to 66"oc (maximum), use No. 6 wire hangers and 2" channel runners. Wherever greater spans are required, the system shall be designed to support 10 lbs. per square foot live load. Members shall be sized accordingly and be subject to Architect's approval.
- E. Provide Donn Seismic Compression Post No VSA47 for use at splayed wire locations. Fasten to runner channels and floor/roof deck to manufacturer's recommendations.
- F. Install and align the perforated metal closure vent around the entire perimeter of the soffit, as detailed on the drawings, and as supplied under Section 05500, and access panel as supplied under Section 08305. Mask and tape exposed surfaces to avoid plaster damage prior to painting.

### 3.05 FASTENING AND ATTACHMENTS

- A. Anchorage of the tracks to the structure shall be with methods designed for the specific application. Size, penetration, type and spacing of anchorage shall be determined by design per CBC Chapter 19 A, Section 1923 A. Sizing and gage of stud tracks to comply with approved shop drawings in conformance with CBC Chapter 22 A.

- B. Welds to conform to AWS requirements and CBC Chapter 22 A, Section 2231 A. Welds may be butt, fillet, spot or groove type, determined by design calculations. All welds shall be touched up using zinc rich paint.
- C. Steel drill screws shall be of the minimum diameter indicated by design. Penetration through joined materials shall not be less than 2 full diameter exposed threads.
- D. Screws shall have a protective coating equivalent to cadmium or zinc plating ASTM A165 - Type NS for use in exterior assemblies.

### 3.06 ANCHORAGE TO CONCRETE

- A. Bolts and Studs Anchors:
  - 1. All bolts and headed stud anchors shall be accurately and securely set prior to placement of concrete, except as indicated in Section 1916.7.1. The strength of headed bolts and headed studs solidly cast in concrete shall be taken as the average of 10 tests with approved results for each concrete strength and anchor size.
  - 2. Drilled-in expansion bolts or chemical-type anchors:
    - a. When used in lieu of cast-in place bolts, the allowable shear and tension values and test loads shall be acceptable to building code requirements.
    - b. For sill plate applications, 10 percent of the anchors shall be tension tested.
    - c. All expansion anchors used for structural application shall be tension tested.
    - d. Expansion anchors shall not be used as hold-down bolts.
    - e. Expansion bolts used for non-structural applications such as equipment anchorage, 50 percent or alternate bolts in a group, including at least one-half the anchors in each group, shall be tension tested.
    - f. Tension testing shall be performed by the District's special inspector in the presence of the project inspector and a report of the test results submitted to the District and Architect. If any anchor shall fail the tension testing requirements, the additional testing requirements shall be acceptable to the Architect. These requirements shall also apply to bolts or anchors set in concrete with chemical if the long term durability and stability of the chemical material and its resistance to loss of strength and chemical change at elevated temperatures are established to the satisfaction of the Architect.
- B. Powder Driven Shot Pins – Low Velocity:
  - 1. The operator, tool and fastener shall be pre-qualified by the District's inspector. Inspector shall observe the testing of the first 10 fastener installations. A test "pull-out" load of not less twice the design load shall be applied to the pin in such a manner as not to resist the spalling tendency of the concrete surrounding the pin. Thereafter, random tests under the project inspector's supervision shall be made of approximately 1 in 10 pins.

2. If any pin fails testing, test all pins of the same category not previously tested until twenty (20) consecutive pass, then resume the initial testing frequency.

3.07 CLEAN-UP

At all times keep the premises clean and orderly. Upon final completion of work remove tools, equipment and unused materials and leave the work in a clean and orderly manner.

END OF SECTION





1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to the work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Metal lathing work.
  - 2. Metal lath accessories and components.
  - 3. Building paper / vapor barrier wrap of building elements

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 05400: Light Steel Framing
- B. Section 07113: Sheet Membrane Waterproofing
- C. Section 09220: Portland Cement Plaster

1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
  - ASTM A641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
  - ASTM A653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
  - ASTM C37 Standard Specification for Gypsum Lath.
  - ASTM C841 Standard Specification for Installation of Interior Lathing and Furring.
  - ASTM C954 Standard Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases to Steel Studs.
  - ASTM C1063 Standard Specification for Installation of Lathing and Furring for Portland Cement Plaster
  - ASTM C1136 Standard Specification for Flexible, Low Permeance Vapor Retarder for Thermal Insulation
  - ASTM C1338 Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings
  - ASTM E96 Water Vapor Transmission of Building Materials
  - ASTM E408 Standard Test Methods for Total Normal Emittance of Surfaces Using Inspection- Meter Technologies
- B. Federal Specifications
  - QQ-L-101C Metal Lath
  - UU-B-790A Building Paper, (Kraft, waterproofed, water repellant and fire resistant).
- C. Metal Lath/Steel Framing Association.

- D. California Lathing and Plastering Contractors Association Inc. (CLPCA)
- E. California Building Code – Chapter 25A  
Chapter 47 "Fire Resistive Standards"  
Chapter 48 "Wall and Ceiling Coverings"
- F. Underwriters Laboratories UL Listing R-3783, Vol.2
- G. International Code Council (ICC)  
ICC ER 1025 – Pyro Kure 615  
ICC ER 5550 - Structalath

#### 1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Submit a complete list of materials to be used including latest technical data to indicate physical characteristics of each product, indicating compliance with referenced documents and/or this specification.
- C. Shop Drawings: Contractor shall provide shop drawings (elevations / details) indicating type and project locations of all proposed control joints. Product submittals will not be approved without issuing these shop drawings. All detailed and additionally proposed control joint locations are subject to the Architects review.
- D. Submit 6" x 6" square samples of each of the different type of expanded metal lath, building paper and 6" long samples of each of the different lathing accessories indicating type/size/finish/fastening, along with samples of each of the different fasteners to be proposed for use on this project, as may be requested by the Architect for review prior to execution, including reveals, control or expansion joints, etc.

#### 1.05 QUALITY ASSURANCE

- A. Contractor shall review the architectural drawings for locations of indicated control joints. Where not indicated, Contractor shall indicate proposed types and locations in conformance with industry standards and experienced performance for this specific building type. Contractor will be responsible for the repair of all plaster cracking that could have been eliminated by installation of control joints, above and beyond those indicated, as applicable and in conformance with minimum industry standards.
- B. Contractor shall review project specific detailing to determine whether the addition of a flexible flashing membrane under the specified building paper/vapor barrier is recommended in conformance with best industry practices, at specific locations that may not be indicated. Coordinate and obtain Architects approval of the flexible membrane scope of work prior to application of the building code required weather barrier/building paper to form a water-shedding surface. Stucco is not to be considered a weather barrier.

- C. Installed minimum tolerances for the installation of framing furring accessories that vary from true plumb and infill lath that varies from true plane not to exceed 1/4 inch in 8'-0" as measured by straight edge placed at any location on the surface.
- D. Attachment to metal framing should be consistent with Table 25C of the CBC. The primary concern with attachment is to insure that the fasteners are solidly into the framing members. The wire may be fastened at (or adjacent to) the wire intersection or at the furring point. Fastening at the furring point is not necessary because minimum embedment (1/4") is maintained regardless of where the product is fastened. Initial placement of the lath should be installed with 1-1/2" (or longer) galvanized screws.

#### 1.06 SCHEDULING

- A. Do not install lath until pipes, conduits, vents, supports and other items concealed by the lath and plaster have been inspected, approved and unsatisfactory conditions corrected.
- B. Notify the Architect prior to installation of sheathing and lath, to allow for inspection of framing.

#### 1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

Materials shall be delivered in original packages / rolls bearing the name of the manufacturer and brand. Store materials in a place providing protection from damage and exposure to the elements.

#### 1.08 WARRANTY

Provide a one (1) year material and labor warranty that covers metal lath and lathing accessory materials against corrosion that would adversely affect appearance or performance of the plaster surfaces and painted finishes. Warranty must cover the installation for attachment/fastening of all materials against "pull-out" or "pop" that would cause cracking in the finished surface.

#### 2.00 PRODUCTS

##### 2.01 MATERIALS

- A. Metal Lath: Provide the following different types of lath, tagged showing manufacturer's brand and weight designation:
  - 1. Vertical Areas - Expanded Metal Lath: Provide non-paper-backed standard galvanized G60 zinc coating sheet steel slit and expanded diamond mesh metal flat / non-ribbed / dimpled-self-furring to gage lath 1/4" off the solid surface, weighing not less than (1/2" Systems - 2.5 lbs. per sq. yd.)(7/8" Systems - 3.4 lbs. per sq. yd.) sized 27" x 96"
  - 2. Horizontal Areas - Expanded / Self-Furring / Raised Rib Metal Lath: Provide galvanized sheet steel slit and expanded diamond mesh metal lath weighing not less than (1/2" Systems - 2.5 lbs. per sq. yd.) (7/8" Systems - 3.4 lbs. per sq. yd.) with integral 3/8" high self furring design holding the body of the lath not less than 1/4 or 3/8 inch away from

sheathing or wall. Inryco-Milcor "3/8" Stay-Rib Lath", Clark/Western "3/8-High-Rib Lath", Amico "3/8 Rib Lath (High Rib)", or equal.

- B. Hanger and tie wire to be galvanized and annealed low-carbon steel:  
FSQQ-W-461g. AS
1. Hanger wire No. 8 - .1620 inch
  2. Tie wire 18 gage - .0475 inch
  3. Tie wire 16 gage - .0625 inch
- C. Water / Vapor Weather Resistant Barrier - Black Paper: Waterproof asphalt treated core paper backing meeting FS UU-B-790a, Type 1, Grade D Kraft, Style 2 as manufactured by Fortifiber Building Systems Group, (800) 773-4777, Super Jumbo-Tex 60 Minute Building Paper or equal. Paper backing shall have flame spread rating of 25 or less when tested according to ASTM E84 and shall bear UL Label. Comply with CBC requirements for 2 layers.
- D. Self-Adhering rubberized asphalt core flexible flashing membrane used beneath the plaster assembly must meet Federal Specification UU-B790a, at horizontal plaster surfaces, similar to or equal to Vycor V40 water proof flashing membrane as manufactured by WR Grace, Inc. 866.333.3726; Fortiflash water proof flashing membrane as manufactured by Fortifiber, Inc. 800.773.4777, or equal. Refer to the work of Section 07113 – Sheet Membrane Waterproofing / Underlayment
- E. Lath Trim Accessories: Manufactured by U.S. Gypsum, Milcor, Superior, Delta Star, Keene Building Products, Clark Western Metal Lath or equal. All accessories shall be zinc alloy unless noted otherwise. Shapes used as grounds shall be sized and dimensioned to provide for required plaster thickness.
1. Corner Beads: CLPCA Detail 13-A-Small Nose Corner Bead, 26-gage zinc alloy with solid nosing not exceeding 3/16" and expanded or flanged at least 2-1/2" wide to suit application, Clark Western #1A, or equal.
  2. Casing Beads: CLPCA Detail 14-A-Square Casing Beads, 26-gage zinc alloy with expanded metal flange and inverted 'v' at plaster edge of face flange, Clark Western #66SF, or equal.
  3. Cornerites: CLPCA Detail 20-A-Expanded Metal Cornerite, 26-gage zinc alloy pre-formed interior corner reinforcement weighing 3.4 lbs. per sq. yd. of diamond mesh lath, 6" wide, Clark Western.
  4. Base Screeds: CLPCA Detail 12-Base or Parting Screeds, 26-gage zinc alloy expanded metal wings with flange thickness as required for plaster system.
  5. Weep Screed: 1/2" diameter weep holes, 26-gage zinc alloy / galvanized with 'X' dimension as required for plaster system thickness. Stockton Products #7, or equal
  6. Control Joints: CLPCA Detail 22-Control Joints 26-gage zinc alloy one piece, Type Milcor No.15, XJ15-3 or equal, with expanded metal wings and accordion folded flange, 1/4" slot and 1" grounds, Clark Western #15, or equal.
  7. Expansion Joints: CLPCA Detail 23-Expansion Joints, 26-gage zinc alloy one piece, No. 40 adjustable free floating with adjustments from 1/4" to 5/8".
  8. Bull Nose Corner Bead: No.10X for rounded corner reinforcement.
  9. Miscellaneous accessories as detailed and as required: Conform to requirements of the CLPCA Reference Specification.

- F. Fasteners for (Steel Stud Application) Nails or Screws: ASTM C646, per building code approval 1-1/4 to 1-5/8 inch long S-12 pancake head / wafer head tech screw, of galvanized steel, furring type, length as required by CBC Table 25-C, for at least 1/2" penetration into studs. Clips and other attachment items for positioning and securing lath and accessories shall be standard with the manufacturer. PrimeSource 'Pro-Twist Construction Fasteners', ER-5454, USG, ITW or equal.
- G. Fasteners for (Concrete / CMU Application): Screws 1-1/4 inch long S-12 pancake head, USG, ITW or equal, of galvanized steel, furring type, length as required by CBC Table 25-C, for at least 1/2" penetration into the block substrate. Clips and other attachment items for positioning and securing lath and accessories shall be standard with the manufacturer.
- H. Head Flashing: Provide 26-gage galvanized widow and door head flashing sheet metal and other stucco component flashing.

### 3.00 EXECUTION

#### 3.01 INSPECTION

Examine substrate and adjoining surfaces where lathing work will be performed. Report conditions detrimental to timely and proper completion to the Contractor. Do not proceed until unsatisfactory conditions are corrected. Executing work is deemed acceptance of surfaces received.

#### 3.02 APPLICATION OF BUILDING PAPER / SHEATHING PAPER

- A. Weather Resistive Barrier Underlayment at Sheathed / Unsheathed Walls: Provide two layers of '60 Minute / Grade D' building paper over all sheathing (Provide one layer of '60 Minute / Grade D' building paper over un-sheathed exposed framed walls) prior to installation of selected lath and waterproofing membrane, where applicable. Install in accordance with Section 1402.1 of the UBC, Section 1404.2 of the IBC or Section R703.2 of the IRC, as applicable. Apply from the roll with the long dimension running horizontally, overlapping the upper courses over the lower layer by a minimum of 2 inches and lapping vertical end joints a minimum of 6 inches. Lap end joints over supports. Secure paper sheathing at intervals not exceeding 12"oc, 3" from each edge. Flash all windows and doors to provide a waterproof seal between window flashing paper and building paper.
- B. Underlayment at Wall Caps, Sills, Parapets, or Other Horizontal Projections / Surfaces: Use building paper under the subsequently applied peel n-stick waterproof membrane flashing as specified in Section 07113 – Sheet Membrane Waterproofing. Double wrap building paper tightly over horizontal surfaces being flashed using as few fasteners as possible on the horizontal surface to minimize possible water penetration.
- C. Penetration Sealing: Seal all penetrations through building paper using non-staining sealant, in conformance with selected manufacturers written recommendations, or as specified in Section 07900–Caulking and Sealants.

#### 3.03 INSTALLATION OF LATHING ACCESSORIES

- A. Isolation: Where lathing and metal support system abuts the building structure horizontally or vertically, isolate the work from movement and vibration. Install expansion joints to absorb deflections but maintain lateral support. Refer to expansion joint requirements listed hereinbefore. Frame both sides of expansion joints separately and do not bridge joints with furring or lathing.
- B. Install lath accessories prior to lath application. Set accessories plumb, level and true to line, in such a manner to permit framing of lath application between accessories and plaster application to the required thickness required. Shim where necessary. All corners shall be mitered. Accurately and tightly fit exposed joints. Install sections in as long a length as practical. Fasten at 12" on center, maximum.
1. Corner Beads: Install for full length of outside corners.
  2. Corner Reinforcements: Install at all inside corners. , except where approved by the Architect, for welded wire lath to be carried around corners.
  3. Cornerites: Secure at 6" intervals at edges only, not in corner.
  4. Casing Beads: Install for all free edges, wherever plaster abuts another finish material and elsewhere as required. Install casing beads around frames of all doors, windows, and louvers that do not provide integral plaster stops. Install casing beads at top and sides of plaster wall panels that abut concrete floors or underside of slab above. Hold casing beads back 3/8-inch minimum and 1/2-inch maximum from abutting frames and other elements to provide suitable joint for sealant.
  5. Plaster Stops: Apply at all plaster edge terminations. Apply at junctions of plaster and concrete surfaces, and where indicated on drawings.
  6. Base / Weep Screeds: Install at base of wainscot and elsewhere required. Provide weep screeds also where plaster finish terminates at floors or decks. Provide wherever transition occurs between stud construction and concrete construction. Apply before installation of building paper. Carry paper down over flange of screed.
  7. Reinforce corners of all openings diagonally with 9" x 24" strips of galvanized expanded metal lath.
  8. Expansion Screeds: Spacing shall be minimum required by industry standards, unless indicated otherwise on the drawings.
  9. Install expansion and control joints where indicated on the contract drawings, and additionally those proposed by the Contractor and as approved by the Architect in the required Contractor generated shop drawings. Provide at 10'-0"oc each way, unless indicated otherwise. Lath is to be framed into and not run behind control joints. Wire tie control joints to lath. Do not screw nail to substrate. Double layer water resistant vapor barrier / building paper shall continue behind joints and lap onto screed flanges.

### 3.04 APPLICATION OF METAL LATH

All lathing and accessory installation shall conform to the requirements of ASTM C1063 and to Codes and Regulations referenced herein and as governing the project. The most stringent requirements between the referenced publications and this specification shall govern the work. Discrepancies shall be brought to the Architects attention. Conform to the requirements of CLPCA specifications.

3.06 APPLICATION OF LATH / SHEET

- A. Expanded Metal Lath over Exterior (Gypsum) Sheathing:
1. Screw metal lath sheets through the building paper and sheathing into framing support members.
  2. Install lath sheets with the long dimension at right angles to the framing supports (horizontally) with sides and ends butt jointed. Stagger the ends of the lath to avoid continuous vertical joint on the same framing support.
  3. Butt lath sheets into and between lath accessories so accessories picture frame the application into trimmed sections. Lath at internal and external corners shall be butt jointed into reinforcement trim angles.
  4. Install lath between lathing accessories so that finished installation provides surfaces that are true, even and without sags or buckles.

END OF SECTION





1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to the work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
1. Conventional Plaster Finish - Vertical and Horizontal Surfaces: Portland cement plaster / stucco: Modified conventional 7/8 inch thick three coat stucco / plaster (scratch/brown/finish) system (consisting of a site mixed or premixed, fiber reinforced modified scratch and brown base coats concentrate,
    - Light Sand Finish: Polymer modified 20/30 cement / sand float plaster system finish that is a 'gray only' finish to be colored / sealed with a painted finish coat under the work of Section 09900, system over metal stud framing.
    - Smooth Finish: Ready-to-use cementitious smooth stucco color coat stucco [with liquid Acrylic admixture] for application over [crack-resistant mesh-reinforced polymer-modified Portland cement base coat], [with EVA bonder over] portland cement brown coat and a portland cement scratch coat [
    - Specified system shall be applied over a 3.4lb expanded metal lath and two layers of a Grade 'D' black paper as indicated under the work of Section 09205.
  2. Plaster Base for Application of Prefabricated EPS Architectural Panel: Portland cement plaster / stucco: Modified conventional 1/2 inch thick one coat stucco / plaster (modified base) system (consisting of a premixed, fiber reinforced polymer modified base coat concentrate,
    - Specified system shall be applied over a 2.5 lb expanded metal lath and two layers of a Grade 'D' black paper as indicated under the work of Section 09205.
  3. Plaster Base for Application of Exposed Aggregate  
White Portland cement plaster / stucco: Modified conventional 1/2 inch thick one coat stucco / plaster (modified base) system (consisting of a batched site mixed or a premixed, fiber reinforced polymer modified base coat concentrate. Once plaster is applied, stone aggregate is to be seeded / applied
    - Elevator Shaft - Specified system shall be applied over a 2.5 lb expanded metal lath anchored to the cast in-place concrete as indicated under the work of Section 09205.
    - Police Station Wall Panels / Entrance Fin - Specified system shall be applied over a conventional 3/8" scratch coat over a 3.4 lb expanded metal lath and two layers of a Grade 'D' black paper as indicated under the work of Section 09205.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 05400: Light Gage Steel Framing
- B. Section 09205: Metal Lath
- C. Section 09235: Exterior Sheathing
- D. Section 09900: Painting

1.03 REFERENCED STANDARDS

- A. American Society for Testing and Materials (ASTM).
  - ASTM C150 Standard Specification for Portland Cement
  - ASTM C206 Standard Specification for Finishing Hydrated Lime.
  - ASTM C897 Standard Specification for Aggregates for Job-Mixed Portland Cement Based Plasters.
  - ASTM C926 Standard Specification for the Application of Portland Cement Based Plaster.
  - ASTM C1063 Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Portland Cement-Based Plaster.
- B. Federal Specifications
  - FS UU-B-790A Building Paper, Vegetable Fiber: (Kraft, Waterproofed, Water Repellent, and Fire Resistant.
- C. PCA - Portland Cement Plaster (Stucco) Manual.
- D. Plastering Industries Technical Research Committee - Reference Specification for Machine Applied Plaster.
- E. California Lathing and Plastering Contractor's Association (CLPCA) Lathing and Plastering Reference Specification, edition as set forth in Plaster, Metal Framing System, Lath Manual.
- F. California Building Code CBC – Chapter 25 A
  - Chapter 7 Fire-Resistant Materials and Construction
  - Chapter 25 A Gypsum Board and Plaster

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Product Data: Submit for review, complete list of all materials to be used including latest manufacturer's technical data, literature and specifications for physical characteristics of each item and application instructions for the fiber modified base coat stucco system and finish material (s) indicated.
- C. Sand Certification: Sand compliance certificates meeting the ASTM C897 must be presented with each load of sand. Failure to provide may result in Architect / District requesting, the Contractor at his sole expense to provide certificates of sand testing from an independent third party testing laboratory.
- D. Shop Drawings: Contractor shall provide drawings (elevations / details) indicating the type and locations of all proposed control joints and / or reveals indicated. Material submittals will not be approved without issuing these shop drawings.

Coordinate with lath work. All additionally proposed locations are subject to the Architects review.

- E. Sample Panel: Submit 1'-0" x 1'-0" samples of selected system base coat(s) and specified system finish. Provide samples with the specified finishes for review of the textures selected by the Architect and any reveals for review. Coordinate with contract documents for lath and reveals installed under related work. Provide samples with required lath and reveals. Reviewed samples shall become the standard of comparison for production work and examples for mock-up production.
- F. Applicator Qualification Data: Submit contractor / applicators resume with list of minimum three successful projects, installing the same materials / systems specified herein, and having similar scope of work, identified by name, location, date installed and phone number of reference contact person.
- H. Warranty: Submit a labor/material (joint/several) warranty for the specified products or proposed alternates with project specific language, assigned to this section of work for review by the Architect. Proposed revisions are to be re-reviewed by the contractor / applicator/ manufacturer for content and reissued in its revised format along with the product submittals for review. Non-conformance to this requirement will be grounds for the Architect to reject acceptance of the system materials, whether specified or submitted as a proposed alternate.

#### 1.05 QUALITY ASSURANCE

- A. Perform work in accordance with ASTM C926, ASTM C1063 and the PCA Portland Cement Plaster / Stucco Manual.
- B. Conform to ASTM E119 and CBC for fire rated assemblies
- C. Contractor Qualifications: The stucco / plaster system shall be installed by an applicator having a minimum of three (3) years successful experience and minimum of three projects in applications similar to those required for this Project.
- D. Contractor shall review architectural drawings for detailed locations of control / expansion joints. Drawings may not indicate the full extent of joints required. Contractor shall be responsible for indicating additional proposed locations in conformance with best industry standards and experienced performance for this building type. Contractor shall repair all cracking that is determined would have been eliminated by placement of additional control joints above and beyond those indicated or those that comply only with minimum industry standards.
- E. Mock-ups:
  - 1. Construct a minimum of one 4'-0" square mock-up panel for each different aesthetic condition / finish / color and workmanship to be encountered on this project. Incorporate each different substrate required for this project inclusive of reveal(s), specified finish, textures and of the exposed aggregate required. Refer to 3.03G. Incorporate proposed control / expansion joints (elevator shaft) and the typical plaster accessories installed under Section 09205.

2. Coordinate fabrication of the mock-up(s) in conjunction with the mock-up requirements of adjoining work of other sections to fabricate a representative section(s) of the building as indicated by the Architect.
  3. Locate mockups on-site in the location and of the size indicated or, if not indicated as directed by Architect.
  4. Obtain Architect's approval of mock-up(s) before start of plaster work. Revise mock-up(s) as necessary to secure Architects / District's approval. Mock-ups may be incorporated into the finished work when approved by the Architect
  5. Protect mock-up(s) during construction to use as a quality standard for comparison of the completed work of this section.
  6. Mock-up panels not permitted as part of the finished work shall be completely demolished and removed from the site upon completion and acceptance of the work.
- F. Conform to the requirements specified herein for inspection and gauging of specified mix design.

#### 1.06 PRE-INSTALLATION CONFERENCE

- A. Conduct a pre-installation meeting a minimum of one week prior to construction of the required mock-up(s) at the project site. Job-site meeting shall be attended by the Architect, District, Contractor, plaster system sub-contractor, adjoining material sub-contractors, manufacturer's representatives and finish consultant as applicable.
1. Review and coordinate related requirements and procedures to be followed in performing the work of this Section. Discuss the sequencing, layout and installation procedures to determine and anticipate conditions prior to start of work.
  2. Contractor shall review architectural drawings for detailed locations of control / expansion joints. Drawings may not indicate the full extent of joints required. Contractor shall be responsible for indicating additional proposed locations in conformance with best industry standards and experienced performance for this building type. Discuss locations of all control and expansion joints to be installed whether or not indicated on the drawings.
  3. Discuss plaster system / composition to be installed, inclusive of all admixtures specified. Where a smooth finish is specified discuss the procedures of application for the crack-resistant mesh-reinforced polymer-modified Portland cement base coat, and cementitious smooth stucco color coat stucco with liquid acrylic admixture applied over the EVA bonder over the conventional Portland cement brown coat and Portland cement scratch coat.
- B. Coatings consultant shall be supplied by the local distributor and must be contacted / present to inspect the means and methods on all samples, mock-ups and during the actual project system application.

#### 1.07 SYSTEM REQUIREMENTS

Plaster system shall meet the conditions of acceptance of the California Building Code, CBC Standard No. 25-I when plaster system is applied to walls having a fire-resistive

rating. Systems not complying with that requirement shall be specifically approved for use by the authorities having jurisdiction.

#### 1.08 JOB CONDITIONS

- A. Do not apply stucco / plaster systems when the ambient temperature is below 40 degrees F. or when conditions indicate that the ambient temperature may fall below 40 degrees F. during plaster drying / curing time. Do not apply stucco / plaster systems during rainy, damp or foggy weather, or if forecast within 24 hours . Supplemental protection from precipitation must be provided as needed. Protect applied materials from uneven and/or excessive evaporation during hot, dry weather.
- B. Protect adjacent surfaces not indicated to receive stucco with drop cloths, waterproof paper or other means to protect against staining, splashes, over-spray, water or debris.
- C. Allow new cementitious surfaces, including mortars to cure minimum 28 days prior to plaster application.

#### 1.09 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver manufactured materials in the original, unopened containers or packages bearing the manufacturers name, brand name, date of manufacturer and other identifying information conforming to the requirements of this section.
- B. Keep materials dry, stored off ground, under cover and away from damp surfaces until used. Store bulk sand in a well drained area on a solid surface to prevent mixing with foreign matter. Remove wet or deteriorated materials from site.

#### 1.10 WARRANTY

Provide a one (1) year labor / material (joint/several) warranty agreeing to a 'No Cost to District' repair of the installed base coats and stucco system finish that develops cracking or spalls due to improper curing, bond failure at masonry substrates, excessive material shrinkage, improper accessory attachment or failure due to accessory corrosion, transference of sheathing joints or cracking attributed to inadequate number of control joints, whether or not indicated on the contract documents or proposed by the contractor on the required / reviewed shop drawings.

#### 2.00 PRODUCTS

##### 2.01 MATERIALS

- A. Plastic Portland Cement for Hand Application: Conform to ASTM C150, Type I or Type II, except that plasticizing agents may be added in manufacturing process not to exceed 12% of the total volume. Gun Plastic Portland Cement for Machine Application shall conform to the requirements above for Plastic Portland cement with the addition of slippage additives.
- B. Sand: Provide clean, hard, durable, sharp, washed, uncoated particles, free from deleterious amounts of silt, loam, clay, soluble salts and other organic matter,

well-graded in sizes from fine to coarse. Comply with ASTM C897 for sampling, testing and sieve gradation.

- C. Lime: Typical type 'S' lime may be added to the mix design at a 2:1 ratio or use of a pumping agent Gibco may be used as an alternate to lime.
- D. Water: Potable, clean and suitable for domestic consumption, free of harmful soluble salts, acids, alkalis and other deleterious matter which would contaminate the mix.
- E. Bonding Agents over Masonry: Conform to ASTM C631. Provide "Weld-crete" by Larsen Products, "Thorobond" by Thoro Systems, LaHabra Acrylic Bonder & Admix, Merlex Superhold, or equal.
- F. Fiber Additive: Provide reinforcement using 1/2" long alkaline resistant, chopped glass fiber shorts, "Dur-O-Fibar" by Dur-O-Wal, Inc., "Hi-Fibre P-1510, by Hill Bros. Chemical Co. or 1/2" long fibrillated polypropylene fibers, "Harbourite" by Fibermesh, Inc., or equal.
- G. Fiber Reinforced Portland Cement Base Coat System: Provide Parex Fiber-47 Armourwall 300 WaterMaster concentrate or equal pre-mixed stucco consisting of Portland cement, alkali resistant fiberglass, acrylic fibers and other proprietary ingredients. Base coat system is pre-bagged complete except for the job site addition of the specified sand, admixture and required water.
- H. Two-Coat polymer base / fiber modified (PB) Base Coat: Stucco system base coat shall be a factory premixed, (PB) polymer-based/fiber reinforced Portland cement concentrate. Type F as manufactured by En-Rock, LaHabra Fastwall 100, or equal. Base coat is pre-bagged complete except for the job site addition of the specified polymer admix, sand and required water.
- I. Cement Plaster 20/30 Finish Coat: Provide standard product 'gray' (to be painted) alkali resistant mix design as manufactured by La Habra Stucco, California Stucco or equal.
- J. Cementitious Stucco Finish Admixture: Acrylic polymer modifier. Use 1 gallon of Parex - Adacryl, Thoro-Acryl 60 or equal per bag to improve workability, bond and strength. No other additives of any kind such as Portland cement, lime, rapid binders, accelerators, etc. shall be added under any circumstances. Coordinate usage with the manufacturer.
- K. Exposed Aggregate: Coordinate with the Architect / District for the type, size and color of aggregate to be used in seeding the panels. Aggregate is to match the gray, brown and light brown rock used on adjacent building panels.
- L. Reinforced Smooth Finish Coat - Finish Coat Underlayment: Provide the following components as manufactured by Merlex Stucco, Inc. or approved equal:
  - Physical Properties:

Tensile Strength	ASTM C307	50lb/linear inch
Dimensional Movement Withstood	ASTM C307	0.04 inches
  - 1. Crack-resistant, mesh reinforced polymer-modified portland cement base coat - 'Basex'

2. Liquid acrylic admixture – 'Acrylex'
3. EVA bonder – 'Superhold' – Application over brown coat
4. Reinforcing Mesh: Alkali resistant, open weave, polypropylene mesh 4 oz/sqyd minimum weight
5. Color Coat: Ready-to-use cementitious smooth finish stucco – Santa Barbara. Completed finish coat is to be subsequently painted
6. Acrylic Admixture: 1/3 gallon per sack of 'Santa Barbara' finish added to mixer

## 2.02 PROPORTIONS AND MIXING

- A. General:
  1. Accurately proportion materials for each stucco batch with measuring devices of known volume.
  2. Size batches for complete use within one hour after mixing. Mix only as much material as can be used prior to initial set; discard material after stiffening begins.
  3. Use approved moist, loose sand in proportions recommended by base coat concentrate manufacturer.
  4. Withhold 10% of mixing water until mixing is nearly complete. Add remaining water as needed to produce desired workability / consistency.
  
- C. Mechanical Mixing:
  1. Clean mixer of set or hardened materials before loading new batch.
  2. Maintain mixer in continuous operation while adding materials.
  3. Conform to mixing sequence, cycle of operations and time recommended by the manufacturer of the base coat admix materials.
  
- D. Hand Mixing:
  1. Do not hand mix base coat materials (scratch or brown) unless small quantities are required using less than one sack of Portland cement and approved by the Architect.
  2. Use waterproof mixing boxes and water barrels when mixing within the building.
  3. Small amounts of water (up to 8oz.) can be added to the acrylic finish coat to improve workability; no other admixtures are allowed.
  
- E. Thoroughly mix materials with batch type mechanical mixer for a minimum of two minutes using minimum amount of water to produce proper consistency for application. Proportion materials so that all batches are identical.
  
- F. Use only clean tools and equipment, free from hardened or partially hardened materials. Do not retemper or use material that has partially set, caked or lumpy.
  
- G. Mix Proportions for Conventional Scratch and Brown Coats: Comply with ASTM C926; mix design by plaster subcontractor with minimum 3000psi 28-day compressive strength. Use Plastic Portland cement if machine applied or regular Plastic Portland cement if hand applied.
  1. Scratch Coat: Provide a typical 2-bag cement, 1-bag lime, 6 to 7 cubic feet sand with one pound of fiber reinforcement per 94# sack of cement. (One 94lb bag of Portland cement with 250lb. of sand)

2. Brown Coat: 2- bag cement, 1-bag lime, 6 to 7 cubic feet sand with one pound of fiber reinforcement per 94# sack of cement. (One 94lb bag of Portland cement with 300lb. of sand)
3. Finish Coat: (Factory prepared) Natural gray colored Portland cement, sand (pre-mix, as determined by manufacturer) polymer modified (Addition of slippage additives may be added for workability.)

Note: Add fiber to base coat mixes after ingredients have mixed at least 2 minutes. Comply with fiber manufacturer's written instructions but do not exceed 1#/cu. ft. for glass fibers and ¼ #/cu.ft. for polyethylene fibers to each sack of cement material. Reduce aggregate quantities accordingly to maintain workability.

- H. Thoroughly mix Portland cement plaster for base coats in the proportions specified with only sufficient water to attain proper consistency for application. Proper consistency for machine applied Portland cement plaster may be determined by slump test. Take material for slump test from nozzle of plastering machine hose. Maximum allowable slump shall be 2-1/2" using a 2" x 4" x 6" slump cone.
- I. Cement Finish Coat: Thoroughly mix 1 part Portland cement, 3 parts fine sand or, if preferred factory sacked plaster at job site with 1/3 gallon of polymer and additional water as needed to the proper consistency to achieve proper hydration and workability for the approved finish texture.
- J. Reinforced Smooth Finish Coat
  1. Third Base Coat: Conform to manufacturer's instructions for batching the mesh-reinforced polymer-modified Portland cement base coat. Mix with water in accordance with manufacturer's instructions using a mechanical mixer.
  2. Color Coat: Prepare the ready-to-use cementitious smooth stucco color coat mixing with water and acrylic admixture in accordance with manufacturer's instructions using a mechanical mixer.

### 3.00 EXECUTION

#### 3.01 EXAMINATION

- A. Examine substrates and adjacent surfaces where work of this section will be performed. Report conditions detrimental to timely and proper completion to the Contractor. Examine each successive layer upon which the waterproofing finish will be applied
  1. Consult manufacturer's representative if conditions exist that are not covered by, or cause conflict with manufacturer's installation instructions.
  2. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.
  3. Do not proceed until unsatisfactory conditions are corrected.
  4. Executing work is deemed acceptance of surfaces received.
- B. Verify that the required two layers of weather barrier/building paper are installed and flashed in accordance with building code and best industry standards to form



a water-shedding substrate surface. Verify that the application of specified peel-n-stick membranes have been completed in areas indicated.

- C. Examine substrates, grounds and accessories to insure that finished stucco will be true to line, plane, level and plumb, without requiring additional thickness of plaster.
  - 1. Verify that substrate is firmly positioned and not prone to settling or movement.
  - 2. Verify that wire mesh lath has been firmly affixed to substrate with proper weep screed attachment at base of walls. Follow ASTM C1063 as closely as possible
- D. Verify that concrete, or other surfaces to receive direct bond applications of base and finish coats of plaster are structurally sound, rough, clean, free of dust, dirt, loose particles, paint products, oil, release agents, water repellents, efflorescence, and other foreign contamination which would adversely affect the bond or proper hydration. Verify that surface cracks, holes or voids in excess of 1/16 inch have been repaired.

### 3.02 SURFACE PREPARATION

- A. Concrete or masonry surfaces indicated for direct plaster application that are not sufficiently rough for proper bonding of plaster shall be roughened by mechanical abrasion/sandblasting or chemically etched, where either a dash coat, bonding agent or additive is not required to be used.
  - 1. Chemical Etching: Scrub moist surfaces with acid-etching solution and rinse thoroughly with clean water. Repeat application as necessary to obtain adequate suction/bond of plaster.
  - 2. Dash Coat: Apply on concrete / CMU surfaces and moist-cure for minimum 24 hours prior to plastering.
- B. Uniformly dampen absorptive bases by use of a fine fog spray of clean water. Immediately before plastering, dampen concrete and concrete unit masonry surfaces, except where a bonding agent has been applied. Determine degree of saturation that will result in optimum suction for plastering and minimize moisture evaporation from the direct plaster application.
- C. Apply a bonding agent to approved/clean concrete and masonry surfaces prior to application of plaster. Apply in accordance with the manufacturer's printed instructions.
- D. Install temporary grounds and screeds to ensure accurate rodding of plaster to true surfaces.

### 3.03 APPLICATION OF PLASTER

- A. Plastering work and curing practices shall conform to requirements of ASTM C926 and to codes, regulations and referenced standards. Verify that provisions of referenced publications and industry standards do not conflict with the requirements of this specification.

- B. Interrupt or delay application only at junctions of planes, at openings or at control / expansion joints.
- C. Plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground unless otherwise indicated.
- D. Corners: Finish internal corners and angles square; external corners square and true with exterior plaster faces.
- E. Number of Coats Required: Apply plaster system of composition indicated to the following requirements:
1. Three coat system over metal lath. Nominal plaster thickness  
Scratch Coat: 3/8-inch minimum measured from face of lath.  
Brown Coat: 3/8-inch.  
Finish Coat: 1/8-inch minimum. Apply finish coat to comply with approved sample texture and approved mock-up(s).  
Total Thickness: 7/8-inch minimum over lath.  
Smooth Plaster - EVA bonder – 'Superhold' Crack-resistant, mesh reinforced, polymer-modified Portland cement base coat: 1/8 inch  
Finish Coat: Ready-to-use cementitious smooth stucco color coat – 1 coat application – 1/8 inch  
Total Thickness: 1-inch minimum over lath.
  2. Two coat system over the sheathing / concrete / masonry bases. Nominal plaster thickness  
Modified Scratch / Brown Coat: 3/8-inch minimum measured from face of solid substrate.  
Finish Coat: 1/8-inch minimum. Apply finish coat to comply with approved sample texture and approved mock-up(s).  
Total Thickness: 1/2-inch minimum over concrete / masonry.
- F. Application of Scratch Coat - (First Coat):
1. Apply scratch coat in a full 3/8" coat with sufficient trowel pressure and material to key stucco into metal lath or to create bond to substrate. Embed and fill all spaces/openings of lath. Prior to initial set, scratch horizontally to provide key for bond of brown coat. Moisture cure with water fog spray to compensate for evaporation and minimize rapid dry shrinkage cracking. Keep moist for a minimum of 48 hours before second coat is applied.
  2. After application of the scratch coat and immediately before application of the brown coat, place self-adhering glass mesh butterflies four inches wide and six inches long at corners of all doors and windows to minimize / restrain cracking prior to application of the brown coat.
- G. Application of Brown Coat - (Second Coat):
1. Apply brown coat over a dampened scratch coat to a minimum thickness of 3/8" or as required to bring scratch and brown coats to 3/4". Apply brown coat over the concrete / CMU in a full 3/8" coat. Brown coat shall be applied using sufficient pressure to key brown coat into scratch coat. Rod, float and straighten to a true, level surface. Leave sufficiently rough to assure adequate bond for finish coat without blemishes or defects that would effect finish texture. Tool to provide a "V'-joint intersection of stucco

with frames or other items that act as stucco grounds. Moisture cure brown coat using water fog spray as often as required by weather conditions. Do not apply water with a direct stream from the hose. Keep moist for a minimum of 48 hours and then let dry.

2. Brown coat may be applied as soon as the scratch coat has attained sufficient rigidity to prevent damage from application pressures of the brown coat application.
3. On vertical surfaces, cold joints in the brown coat shall not occur over cold joints in the scratch coat. Surface shall be free from imperfections that would reflect or telegraph to the finish coat.
4. Apply brown coat to concrete / masonry surfaces after required <preparation> bonding agent has been applied to obtain good bond.

**NOTE:**

5. It is anticipate that the exposed aggregate would be seeded / embedded into this modified layer of plaster. Once the plaster layer is applied and gauged, embed the aggregate to the point of refusal in order to completely cover the entire surface and to match the adjoining building panel and the approved mock-up. Tamp the surface to fully embed edges and to level surface protrusions. Aggregate shall be fully mixed in order to provide a variegated aesthetic of the different colors of rock.

H. Smooth Plaster - Application of Third Base Coat: Mesh-reinforced, polymer-modified portland cement base coat

1. Follow manufacturer's instructions for first coat application of thickness dictated by aggregate.
2. Apply required bonding agent to brown coat to obtain good bond of subsequent base coat.
3. Embed reinforcing mesh in base coat while still wet, troweling from center to edge, then skim over with additional base coat to fully cover mesh.

I. Finish Coat Application - (Third Coat): Cement Plaster Finish

1. Apply finish coat no sooner than seven (7) days after application of brown coat, or 28 days of concrete curing. Dampen surface of brown coat (or concrete) (base coat) to obtain uniform suction immediately before applying finish coat.
- (1.) Smooth Plaster - Mesh Reinforced: Apply finish coat no sooner than 1 day / 24 hours after application of the mesh reinforced base coat. Dampen surface of base coat to obtain uniform suction immediately before applying finish coat.
2. Apply finish coat as directed by the manufacturer to a thickness of 1/8". Apply by hand (hawk and trowel method) to provide the Sand Float texture as shown on the drawings, and to obtain uniformity. Finish texture shall match the reviewed sample.
3. Lay out work to permit completion of an entire area or carry work to a natural breaking point, without juncture marks in the finish coat where work of one day adjoins another. Where work is halted at a point not at a control joint location the succeeding coat shall not be halted at the same point.
4. Apply sealant at all splices, intersections and termination points of control joints or wherever stucco terminates at adjacent dissimilar materials.

- I. Machine-Applied Plaster: When plaster is machine applied, requirements of industry standards for slump testing shall be follows. Maximum slump of plaster taken at the nozzle shall not exceed 2-1/2 inches. Contractor shall maintain a supply of 2" x 4" x 6" cones at the job site for use by the Owners Inspector and others to determine that slump of plaster is within the specified range.
- J. EPS - Foam Shape Installation: Refer to Section 09230
  - 1. Adhesively attach the prefabricated panel(s) at location noted on the drawings with selected manufacturers standard base coat and adhesive (Parex Base Coat & Adhesive 21). Allow to fully cure.
  - 2. Apply base coat and adhesive mixture material over the polystyrene and onto cement based brown coat to a minimum of 2-1/2" overlap.
  - 3. Completely embed standard 4-oz. fiberglass mesh reinforcement and smooth to flush with brown coat, while base coat is still wet.

### 3.04 QUALITY CONTROL

Flat Surface Tolerances of Scratch and Brown Coats: Do not deviate more than plus or minus ¼ inch in 10 feet from a true plane in finished plaster surfaces, as measured by a 10 foot straightedge placed at any location on surface.

### 3.05 CURING

- A. Moist-cure plaster base and finish coats to comply with ASTM C926, including written instructions for time between coats and curing. Moist cure surface with a fine fog spray with clean potable water for minimum 48-72 hours following initial application and initial set. Avoid soaking and saturating plaster. Hot and sunny days may require frequent fog spraying.
- B. Allow brown coat to air cure an additional 7 days before application of the finish coat.
- (B.) Third Base Coat / Smooth Finish Coat:
  - 1. Damp curing may be necessary during hot, windy weather, consult with manufacturer recommendations.
  - 2. Allow a minimum of 1 day after fiber-reinforced polymer-modified base coat before applying the ready-to-use cementitious smooth stucco color coat
  - 3. In cool weather, allow extra time for color coat stucco to cure for finish troweling, as base-and-mesh coat allows for more gradual curing.
- C. Curing Protection: Protect each coat of plaster from curing too rapidly or too slowly. Protect plaster with tarpaulins hung over the outside of building when environmental conditions are detrimental. Protect plaster applied during cold weather against freezing for at least two days after application.
- D. After curing, plaster and trim shall be painted as specified in Section 09900- Painting. Allow 28 days for curing of plaster system prior to painting.

### 3.06 PATCHING

- A. Prior to painting operations, repairing, pointing and patching of defective plaster work shall be performed after all adjacent work is in place. Cut out cracks, indented and damaged plaster to straight lines with clean, sharp edges. Cut out cracks to width of not less than 1". Point around items / trim abutting or extending through plaster to achieve a clean sharp appearance at all such locations where finish coat terminates or meets dissimilar materials.
- B. Fill patched areas with identical base mix material. Apply a finish coat of the same material as the adjoining finish plaster. Match adjoining finish and texture; joining flush and smooth so joints between existing and new plaster finishes will not be invisible.
- C. Repair or replace work to eliminate blisters, buckles, check cracking, dry outs, efflorescence, excessive pinholes and similar defects as required to comply with approved finishes.

### 3.07 CLEANING AND PROTECTION

- A. During the course of installation, promptly clean spills, splatters and droppings immediately before material is allowed to dry. Clean completed work areas free of debris and plaster after each coat has been applied. Leave all work areas in a broom clean condition.
- B. Clean or repair all adjacent surfaces that are marred, stained or otherwise damaged by the work of this section. Remove protective materials and excess plaster from exposed beads, screeds, base, trim, reveal or adjacent surfaces removing stains. Remove tape and other inserts as applicable.
- C. When plastering work is completed, remove unused materials, containers, equipment and plaster debris. Remove surplus materials, waste, debris, temporary coverings from site.
- D. Maintain project conditions to ensure that completed plaster is without damage or deterioration at the time of Substantial Completion. Protect all completed plastered surfaces from damage due to subsequent construction operations.

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. EPS (Expanded Polystyrene) foam trim, adhesive basecoat, reinforcing mesh and double coat of smooth polymer-modified cement finish coat, ready for paint

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 09220: Portland Cement Plaster
- B. Section 09900: Painting

1.03 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340
- B. Product Data: Provide manufacturers product data sheets for the following:
  - 1. EPS architectural foam trim shapes
  - 2. Reinforced mesh
  - 3. Polymer modified cement adhesive and base coat(s)
  - 5. Adhesive / coating manufacturer's installation instructions
- C. Shop Drawings:
  - 1. Show complete details, cross sections and dimensions of foam panel and its relationship to adjoining plaster base substrate.
  - 2. Field-verify dimensions and layout prior to submitting the shop drawings to the Architect. Fully detail and dimension the sizes and layout of the panel(s) sections.
  - 3. Elements on long runs are to be made of equal / standard size. Layout conditions shall be approved prior to execution.
  - 5. Shapes are to be manufactured / installed in the manufacturer's largest sections possible for fabrication and erection.
- D. Samples: Provide one panel section in 2'-0" x 2'-0" piece with the specified finish / texture manufactured the same as delivered product.

1.04 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Panel / Adhesive / Coating Manufacturer Qualifications: Submit a letter from the manufacturer with proof of a minimum of five (5) years of successful product production in which has been supplied to various

- projects in similar scope and scale and have been in service for a minimum of three (3) years.
2. Installer Qualifications: The prefabricated architectural finished panel shall be installed by an applicator experienced in applications similar to those required for this Project and be approved by the product manufacturer and able to demonstrate a minimum of three (3) years of similar scope and scale as this project
  3. Conform to the requirements specified herein for inspection and gauging of specified finish material mix design / application.

#### 1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver manufactured materials in the original, unopened containers or properly packaged bundles or pallets to preclude damage to finish surfaces, bearing the manufacturers name, brand name, date of manufacturer and other identifying information conforming to the requirements of this section.
- B. Keep off-loaded materials dry, stored off ground, under cover and away from damp surfaces until used. Remove wet or deteriorated materials / products from the site.

#### 1.06 PROJECT / SITE CONDITIONS

Environmental Requirements - Coated Foam: Do not apply adhesive or coatings if ambient temperature is above 110 degrees F or will fall below 40 degrees F within 48 hours of application

#### 2.00 PRODUCTS

##### 2.01 MANUFACTURER

Products shall be manufactured by Vefo, Inc. (909) 598-3856; or approved equal

##### 2.02 MATERIALS

- A. Coated Foam:
  1. EPS - Foam Trim / Shapes: Minimum 1 pound density expanded polystyrene; Federal Specifications HH-1-524 C, Type I, ASTM C578. Flame spread shall not exceed 25 and a smoke developed less than 450. with the following properties:
    - a. ASTM D1623 Tensile Strength 15psi minimum
    - b. ASTM C273 Shear Modulus 400psi minimum
    - c. ASTM E84 Flame Spread 25 maximum
    - d. ASTM E84 Smoke Development 450 maximum
  2. Adhesive: Dry Bond by Omega Products, or equal
  3. Base Coat: Omega Products
  4. Reinforcing Mesh: Resin coated, open weave, glass fiber mesh; weight 4.0 oz/sq.yd.
  5. Finish Coat: Omega Products – Dry Bond, unless indicated otherwise
  6. Water: Potable



### 3.00 EXECUTION

#### 3.01 EXAMINATION

- A. Examine substrates upon which work will be installed in the presence of the Contractor / Architect. Verify that surfaces are structurally sound, clean, free of dust, dirt, efflorescence, or other forms of contamination that could impair bond strength.
- B. Coordinate that corrective work on unsatisfactory substrates shall be resolved prior to executing the work of this section.
- C. Commencement of the work of this section by the installer is acceptance of substrate conditions.

#### 3.02 PREPARATION

Protect adjacent finished surfaces from contact with adhesives and coating materials

#### 3.03 MIXING

Mix adhesive, bond coat materials with cool water and appropriate system mix design and appropriate admixtures in accordance with manufacturer's instructions.

#### 3.04 INSTALLATION

- A. Review manufacturer's instructions for appropriate substrate preparation.
  - 1. Remove and inspect all components from manufacturers packaging. Do not install any damaged or incorrect parts without approval of manufacturer and Architect
  - 2. Adhesive Application: Provide 'Dry Bond' for cement plaster substrates.
  - 3. Install architectural element in conformance with contract documents / architectural plans
- B. Installation of Finished Panel:
  - 1. Using a 3/8" notched trowel, butter-back the architectural panel piece and notch trowel apply adhesive to the substrate at the point of installation.
  - 2. Firmly apply pressure to the panel to set adhesive and form a suction bond anchorage between the two contact surfaces.
  - 3. Apply enough adhesive and pressure to allow extra adhesive to escape from perimeter seams. Wipe to form a neat and consistent cant of adhesive along the contacting surfaces.
  - 4. Provide non-destructive fastening, clamping, bracing, shoring or falsework as needed to guarantee that the panel maintains a cohesive bond in full contact to the anchoring substrate.
  - 5. Verify that application is plumb, true and perfectly aligned with adjoining surfaces and architectural elements.
  - 6. Provide a minimum adhesive cure time of 48 hours.
  - 7. After adhesives have set, remove temporary bracing and fasteners.
  - 8. Patch substrate above or below panel as needed, prior to providing the specified plaster finish coat, color / texture.

9. Protect the installed work from damage / stains as required from the subsequent installation / application of the plaster finish coat materials.
10. Install sealant / grout as required to fill and close the joint between adjoining finish materials. Verify that sealants used will not stain, discolor or disfigure the finish material and/or the EPS foam substrate.

C. Patching of Finished Panel

1. Mix and apply base coat, mesh, bond coat and finish coat materials in compliance with manufacturer requirements.
2. Wait 24 to 48 hours after applying the finish coat to scrape the surface or sand in order to eliminate any rough edges, or laitance and create the smooth texture.
3. Use a gauge to obtain the same thickness as the adjacent surfaces. Approximately 1/8" in thickness will be eliminated during the scraping process.
4. Carving and cutting must be executed within a 2 week period.
5. Finish texture is to match the pre-manufactured trim sections
6. Refer to the manufacturers instructions for tools related to finish surface

3.05 CLEANING

- A. Clean spills and splatters before materials are allowed to dry
- B. Remove protective coverings from adjacent surfaces
- C. Keep premises free of accumulations of waste and debris. Upon completion, remove surplus materials, waste and debris from site.

END OF SECTION

1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to the work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Exterior fiberglass covered gypsum sheathing boards attached to steel stud joist framing members in exterior walls, soffits and ceiling applications as backing / behind the exterior curtain wall finish system, as shown on the drawings.

1.02 RELATED WORK IN OTHER SECTION

- A. Section 05400: Light Gage Steel Framing
- B. Section 07113: Sheet Membrane Waterproofing Underlayment
- C. Section 09205: Metal Lath
- D. Section 09250: Gypsum Wallboard

1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
  - ASTM C79 Standard Specification for Gypsum Sheathing Board
  - ASTM C442 Standard Specification for Gypsum Backing Board and Core Board
  - ASTM C473 Standard Test Methods for Physical Testing of Gypsum Board Products
  - ASTM C475 Specification for Joint Compound/Tape for Finishing Gypsum Board
  - ASTM C630 Specification for Water-Resistant Gypsum Backing Board
  - ASTM C931 Specification for Exterior Gypsum Soffit Board
  - ASTM C1002 Standard Specification for Steel Drill Screws for Application of Gypsum Board or Metal Plaster Bases.
  - ASTM E84 Test Methods for Surface Burning Characteristics of Building Materials
  - ASTM E96 Test Methods for Water Vapor Transmission of Materials
  - ASTM E119 Test Methods for Fire Tests of Building Construction and Materials
- B. Gypsum Association - GA 253 and 505.

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Provide a complete list of materials that are being submitted and all manufacturer product data sheets for each item / product to be used. Data sheets shall

describe the material, and as applicable give thickness, sizes and fire resistance data required.

- C. Shop Drawings: Indicate fastener and adhesive patterns for FM wind uplift resistance specified for roof sheathing.
- D. Manufacturer's written certification that products submitted meet the specified project requirements and required building and fire resistant code requirements for the application they are intended.
- E. Warranty: Provide the requested warranty(s) shall be for both labor and materials without exclusions for review and approval as a condition of acceptance of the specified materials. Coverage shall include installation, repair or replacement of any rejected or failed work.

#### 1.05 QUALITY ASSURANCE

- A. Application shall comply with California Building Code (CBC) Chapter 25.
- B. Install the gypsum sheathing in accordance with the manufacturer's recommendations and in conformance with reference standards and in conformance with the fire-rating requirements indicated on the Drawings or as required by code.
- C. Gypsum sheathing materials / products proposed must be in compliance with ASTM E84, E96, and E119 for surface burning and water transmission characteristics for building construction and have a maximum flame spread classification of 25.
- D. Use only where building paper is included in the overall scope of work of this section. Contractor shall review project specific detailing to determine whether the addition of flexible flashing membrane under the specified building paper/vapor barrier is recommended with best industry practices, at a specific location that may not be indicated on the drawings. Coordinate and obtain Architects approval of the added membrane scope of work, prior to application of the subsequent building code required building paper to form a water-shedding surface. Stucco is not to be considered a weather barrier.

#### 1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver sheathing to the site in the manufacturer's original unopened containers or bundles bearing the manufacturer's name and brand designation. Fire resistant type shall bear the Underwriter's Laboratories, Inc., (UL) label or label of another organization acceptable to ICC.
- B. Store gypsum sheathing board so that it is protected from damp/wet surfaces, weather, direct sunlight, surface contamination, corrosion or construction traffic. Stack flat and level, off the floor. Do not stack long lengths over shorter lengths.
- C. Handle sheathing board to prevent damaged edges, ends, backs or faces. Replace damaged or defective materials.

## 1.07 WARRANTY

- A. Provide sheathing manufacturers standard warranty covering sheathing materials for five (5) years commencing on date of purchase.
- B. Provide a one (1) year material and labor warranty covering the performance of the installed sheathing substrate attachment / fastenings from "popping" which contributes to cracking in finished surfaces.

## 2.00 PRODUCTS

### 2.01 MANUFACTURE

- A. Specialty product(s) as manufactured by Georgia-Pacific "DensGlass Gold" or Certaineed "GlasRoc", or equal, shall only be considered alternates to each other or that specified, as approved by the Architect, and must be equal in performance results, fire rating and warranty requirements.
- B. Exterior sheathing products shall be a manufactured by Certaineed, Domtar, Georgia-Pacific, Gold Bond, United States Gypsum (USG) Sheathing, or equal. Only American / United States produced products are acceptable.

### 2.02 MATERIALS

- A. Exterior Gypsum Sheathing: Conform to C79, C931 and C1177, with minimum 1/2" horizontal - 5/8" vertical thick non-combustible gypsum core treated with a water-resistant additive,
  - 1. Certaineed GlasRoc – specially formulated water resistant core with reinforced glass mats fully embedded beneath a polymer-modified layer of gypsum with an acrylic coating bonded to a polymer-modified gypsum surface.
  - 2. Georgia-Pacific DensGlass Gold - encased in a specially formulated water-repellant, alkali-resistant inorganic glass mat surface coating
  - 3. Typical long edges of standard v-shaped tongue and groove long edges (2' x 8') or square edges (4' x 8') sheet size.

**Note:**

If product is to remain exposed on the outside of the building for more than 6 weeks or subjected to inclement weather, provide a gypsum sheathing that is rated for 12 months of exposure.

- B. Provide the specified sheathing board based on selected performance characteristics that are 5/8" thick with a Type 'X' gypsum core panel with additives to enhance the fire resistance of the core. Sheathing as manufactured under the Certaineed "GlasRoc Type X, Georgia-Pacific "DensGlass, Gold Bond Gold Fireguard", "Sheathing Fire-Shield", USG "Sheetrock", may be used upon Architect's concurrence. Materials are to be non-combustible when tested in accordance with ASTM E136, Flame-spread 0, Smoke-development 0 when tested in accordance with E84.
- C. Joint Tape: Tape specifically designed and manufactured to seal joints against water and air infiltration formulated with an adhesive that permanently bonds to sheathing substrates, and as indicated below:

1. Polypropylene sheathing tape, 0.0027 inch thick, 2-1/2" wide, composed of oriented polypropylene 10 by 10 glass mesh coated with permanent acrylic adhesive formulated to adhere to gypsum sheathing surface, No. 8086 Contractor Sheathing Tape by 3M Building Products, or equal.
  2. Polyethylene tape, 0.025 inch thick, 3 inches wide, composed of polyethylene backing coated with synthetic-rubber based adhesive. Polyken '612 Seam-Seal Tape' manufactured by Polyken Technologies, or equal.
- D. Joint Compound: Setting-compound, Georgia Pacific Corporation "ToughRock", "Speed Set", or equal.
- E. Fasteners / Screws - Metal Framing: Self-tapping, corrosion resistant Type S-12 drill or Hi-Lo bugle / wafer head, fine thread, or (Type S sharp point for light gage framing and furring), minimum 1 in. long complying with ASTM C1002 attaching sheathing to steel framing less than 0.03 inch thick, or ASTM C954 for framing 12 to 22 gage (0.033 to 0.112 inch thick). PrimeSource "Pro-Twist Construction Fasteners", ER5454, or equal.

### 3.00 EXECUTION

#### 3.01 INSPECTION

Examine sub-framing to verify that corners and framing are plumb, true, solid and that framing members are properly spaced. Plane of faces of adjacent members shall not vary more than 1/4". Report conditions detrimental to timely and proper completion to the Contractor. Do not proceed until unsatisfactory conditions are corrected. Executing work is deemed acceptance of surfaces received.

#### 3.02 INSTALLATION OF GYPSUM SHEATHING

- A. Provide sheathing where indicated on Drawings. Install in accordance with GA 253 and in accordance with ASTM C840 and the manufacturer's recommendations.
1. Use maximum lengths possible to minimize number of joints. Locate edge joints parallel to and with vertical orientations on framing. Stagger intermediate end joints of adjacent lengths. Block sheathing at joint less than full height of wall. Stop sheathing at horizontal or vertical control joints.
  2. Cut boards at penetrations, edges and other obstructions of the work. Fit tightly against abutting construction, except provide a 3/8" sealant joint where non-load bearing construction abuts structural elements.
  3. Coordinate sheathing installation with flashing and joint sealant installation so that these combined materials are installed in the sequence and manner that prevents exterior moisture from passing through completed exterior wall assembly.
  4. Do not bridge building expansion joints with sheathing. Cut and space edges to match spacing of structural support elements.
  5. Sheathing may be initially tacked in place with screws if overlying metal lath is screw attached through building paper and sheathing into studs immediately after installing sheathing.
  6. Attach to metal framing with screws spaced 8"oc at perimeter and 8"oc in field. Drive fasteners to bear tight and flush with surface of sheathing

without cutting into paper face; do not countersink. Locate fasteners minimum 3/8" from edges and ends of sheathing panels.

7. Support, construct and finish work straight, plumb and level, clean with no unfinished parts, damaged edges or corners. All edges and ends of wallboard shall have solid bearing
  
- B. Horizontal Installation: Install 2 foot wide gypsum sheathing boards horizontally with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent boards without forcing. Abut ends of boards over centers of stud flanges and stagger end joints of adjacent boards not less than one stud spacing; two where possible. Screw-attach boards along perimeter edges and at ends to each steel stud as described above.
  
- C. Vertical Installation: Install 4-foot wide gypsum sheathing boards vertically with vertical edges centered over flanges of steel studs. Abut ends and edges of each board with those of adjoining boards. Screw-attach boards along perimeter edges and at ends to each steel stud as described above.
  
- D. Fastening / Metal Framing: Attach sheathing with screws spaced 8"oc at perimeter where there are framing supports and 8"oc along intermediate framing in the field.
  
- E. Sheathing Tape Application: Apply joint tape over joints and embed in setting type joint compound specified. Overlap tape not less than the tape width at joint intersections. Apply the specified primer recommended by the tape manufacturer for polyethylene tape installation.
  
- F. Joint Compound: Where required, provide in accordance with manufacturer's instructions and requirements of local governing authorities and in conformance with drawing details. Skim coat surface for a smooth finish.

### 3.03 CLEAN-UP

Upon completion of the work, remove tools, equipment, unused material and cuttings leaving the work site in a clean, orderly manner.

END OF SECTION





1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to the work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Gypsum board finish for walls and ceilings.
  - 2. Provide abuse resistant gypsum panels to protect against vandalism in the Police Station Lobby / Hallway
  - 3. Metal drywall accessories.
  - 4. Taping, spackling and sanding.
  - 5. Acoustical sealant
  - 6. Installation of access panels in gypsum board walls

1.02 RELATED WORK IN OTHER SECTION

- A. Section 08100: Hollow Metal Door and Frames.
- B. Section 09110: Metal Framing and Furring

1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
  - ASTM C36 Standard Specification for Gypsum Wallboard
  - ASTM C442 Standard Specification for Gypsum Backing Board and Coreboard
  - ASTM C475 Standard Specification for Joint Treatment Materials for Gypsum Wallboard Construction
  - ASTM C630 Standard Specification for Water Resistant Gypsum Backing Board
  - ASTM C840 Standard Specification for Application and Finishing of Gypsum Board
  - ASTM C919 Standard Specification for Practice for Use of Sealants in Acoustical Applications.
  - ASTM C954 Standard Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases to Steel Studs.
  - ASTM C1002 Standard Specification for Steel Drill Screws for the Application of Gypsum Board or Metal Plaster Bases.
  - ASTM C1047 Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
- B. Gypsum Association - GA 216
- C. Federal Specifications - 216 - Application and Finishing of Gypsum Board

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.

- B. Provide a list of materials accompanied by product data for all items proposed.
- C. Submit manufacturer's certification that products meet or exceed specification requirements.

#### 1.05 QUALITY ASSURANCE

- A. Application shall comply with California Building Code (CBC) Chapter 25 A, and American Standard Association's Specifications for Gypsum Wallboard.
- B. Install gypsum wallboard system in accordance with GA 216 standards, manufacturer's recommendations and in conformance with the required fire-rating requirements. Taping and finishing must meet ASTM C840 and GA-216 standards.
- C. Gypsum wallboard proposed must be in compliance with ASTM E84, E96 and E119 for surface burning, water transmission of materials and building construction and have a maximum flame spread classification of 25.

#### 1.06 PROJECT CONDITIONS

Maintain temperature range between 55 degrees F. and 70 degrees F. for a period extending from 24 hours before installation until the permanent heating system is in operation. Provide ventilation during and following adhesive and joint treatment application. Use temporary air circulators in enclosed areas lacking natural ventilation.

#### 1.07 SCHEDULING

Do not apply gypsum wallboard until insulation, pipes, conduits, ducts, vents, supports and other items that will be concealed by the wallboard have been inspected, approved and unsatisfactory conditions corrected.

#### 1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver wallboard and accessories to the site in the manufacturer's original unopened containers, bundles or rolls bearing the manufacturer's name and brand designation. Fire resistant wallboard shall bear the Underwriter's Laboratories, Inc., (UL) label or label of another organization acceptable to ICBO. Moisture resistant wallboard shall be prominently labeled by the manufacturer.
- B. Store wallboard inside the building or in other dry weather tight enclosure. Stack wallboard flat and off the floor. Do not stack long lengths over shorter lengths.
- C. Store flammable adhesives away from fire, sparks or smoking areas.

### 2.00 PRODUCTS

#### 2.01 MATERIALS

- A. Gypsum wallboard shall conform to the standards specified below:
  - 1. Regular Wallboard: ASTM C36, and Federal Specifications SS-L-30 Type III, Class I, Style 3 with tapered edges 1/2" thick for ceilings and 5/8" thick for walls unless otherwise indicated.

2. Fire Retardant Wallboard: ASTM C36, Type X with tapered edges 5/8" thick unless otherwise indicated, at rated partitions.
  3. Moisture Resistant Wallboard: ASTM C630 with tapered edges 1/2" thick for ceilings and 5/8" thick for walls unless otherwise indicated, typical at restroom, Staff Shower and Custodial Room.
  4. Abuse-Resistant Gypsum Wallboard Panels at Police Station Lobby / Hallway: Provide 5/8" panels that comply with ASTM C1278 Type 'X' manufactured from a gypsum / cellulose fiber core and a minimum 95% recycled content USG Fiberock, or equal.
- B. Screws for attaching gypsum wallboard to 25 gage metal framing and furring shall conform to ASTM C646. Screws for attaching wallboard to 20 gage and heavier metal framing shall be manufacturer's Type "S-12" bugle head screws.
- C. Metal trim for gypsum drywall construction shall be electro-galvanized steel conforming to ASTM C1047 with edge trim and corner beads with either knurled and perforated or expanded flanges for nailing or stapling and beaded for concealment of flanges in joint compound. Use metal corner bead for external corners and angles and unequal leg channel-type metal edge trim at junctions of gypsum wallboard and walls of other materials.
- D. Taping and Finishing Materials shall conform to ASTM C475.
1. Joint Tape: Paper or fiberglass reinforcing tape.
  2. Joint Compound: Two standard grades, one specifically for bedding tapes and filling depressions and one for topping and sanding.

### 3.00 EXECUTION

#### 3.01 INSPECTION

Before applying gypsum wallboard, verify that framing corners are plumb, true and that framing members are properly spaced. Edges and ends of wallboard shall have solid bearing.

#### 3.02 INSTALLATION OF WALLBOARD

- A. Use moisture resistant wallboard within restrooms, shower / locker rooms and elsewhere as indicated. Use fire retardant wallboard where indicated or required to achieve fire rated partitions and ceilings. Use regular wallboard in all locations not otherwise indicated or specified.
- B. Use wallboard of maximum practicable lengths to minimize end joints. Stagger end joints when they occur. Locate end joints as far as possible from the center of walls and ceilings. Install wallboards in moderate contact without forcing them in place. Do not place square ends against tapered edges. Except for face layer of double layer construction, support ends and edges of wallboard panels on framing or furring members. Joints on opposite sides of the same partition shall not occur on the same stud.
- C. Fastening: Locate fasteners not less than 3/8" nor more than 1/2" from edges and ends of wallboard. Drive fasteners perpendicular to the wallboard surface with heads set slightly below the wallboard surface for finish layers and even with the

surface for base layers. Attach wallboard starting from the center of each panel and proceeding toward the outer edges.

- D. Non-Rated Single Layer Construction: Apply wallboard with the long dimension at right angles to ceiling framing and parallel to wall framing. Attach wallboard with screws spaced 12" on centers for ceilings and 16" on centers for walls. Use 1" long screws for metal framing and furring.
- E. Rated Fire Resistive Partitions: Installation of wallboard shall be in accordance with Table 7-B of the California Building Code.
- F. Install metal edge trim at junctions of gypsum wallboard and walls of other materials where there are exposed edges and at vertical and horizontal external corners and angles. Attach corner and edge trim with screws spaced not more than 9" on centers.
- G. Cut edges, utility holes and joints of water resistant wallboard shall be treated with the wallboard manufacturer's recommended waterproof sealant prior to installation.
- H. Gypsum wallboard surfaces shall be true, plumb and have a maximum variation of 1/8" in 10'-0". Lay a straight edge on the surface in any direction and have no measurable variation in any 2'-0" direction.

### 3.03 TAPING AND FINISHING

- A. Joints, corners, and screw heads and imperfections shall be taped and finished in accordance with the manufacturer's specifications and as herein specified.
- B. Joints, wall and ceiling angles, and inside vertical corners shall be reinforced with tape embedded in joint compound and finished with not less than two applications of joint compound allowing each application to dry thoroughly and sanding between coats as required.
- C. Dimples at screw heads and other imperfections shall be treated with three coats of joint compound.
- D. External corners, edges and ends with metal beads and edge trim shall have flanges treated with three coats of joint compound feathered out between 8" and 10" from the nose.
- E. The final application of compound and sanding shall leave all gypsum wallboard surfaces uniformly smooth to receive specified finish.
- F. Water-resistant wallboard surfaces shall be taped and finished as specified above for finished wall surfaces.
- G. Hold top of gypsum board partitions against concrete slabs 3/8" short. Caulk between partition and bottom of slab. Refer to Section 07900.

### 3.04 REPAIR

Repair screw head pops by driving a new screw approximately 1/2" from the "pop" and reset the popped screw. When face paper is punctured, drive a new screw approximately 1/2" from the defective fastener. Fill damaged surfaces with compound.

3.05 CLEAN-UP

Upon completion of the work, remove from adjacent surfaces, over spray, splatter and daubs of taping and finishing compound. Remove tools, equipment, unused material and cuttings leaving a clean orderly work area.

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Condition, Special Conditions and Division I apply to the work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Ceramic mosaic floor tile.
  - 2. Ceramic wall tile and base.
  - 3. Tile floor pavers and base
  - 4. Membrane waterproofing.
  - 5. Marble threshold
  - 6. Setting of granite slab countertops

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 03300: Concrete and Concrete Finishes
- B. Section 09220: Portland Cement Plaster
- C. Section 09250: Gypsum Wallboard

1.03 CONDITIONS – DSA Requirements

Ceramic Tile Flooring demonstrating a coefficient of friction of at least 0.6 per ASTM C1028 will be accepted as meeting the intent of slip resistance. CBC 1124B.1 / ADA Standards 4.5.1.

1.04 REFERENCED STANDARDS

- A. American National Standards Institute, Inc., (ANSI)
  - ANSI A108.1 Glazed Wall Tile, Ceramic Mosaic Tile, Quarry Tile and Paver Tile Installed with Portland Cement Mortar.
  - ANSI A108.10 Installation of Grout in Tile work
  - ANSI A118.3 Chemical Resistant, Water Cleanable Tile-Setting and Grouting Epoxy and Epoxy Adhesives
  - ANSI A118.6 Ceramic Tile Grouts
  - ANSI A137.1 Ceramic Tile
- B. American Society for Testing and Materials (ASTM)
  - ASTM C144 Standard Specification for Aggregate for Masonry Mortar
  - ASTM C150 Standard Specification for Portland Cement
  - ASTM C206 Standard Specification for Finishing Hydrated Lime
  - ASTM C207 Standard Specification for Hydrated Lime for Masonry Purposes
  - ASTM C1028 Test Method for Evaluating the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces
  - ASTM D2047 Test Method for Static Coefficient of Friction of Polish

## Coated Floor Surfaces.

- C. Tile Council of America (TCA) - TCA Handbook for Ceramic Tile Installation
- D. National Tile Contractors Association - NTCA
- E. Marble Institute of America, Inc.'s Standard Specifications

### 1.05 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Shop Drawings: Show dimensioned layouts for all wall and floor tile surfaces. Show locations of joints and cuts.
- C. Product Data: Submit manufacturer's printed data for latex mortar, additives, grouts and other manufactured products, including manufacturer's instructions for mixing and application.
- D. Samples: Where colors and patterns are not specified, submit samples of each type of tile and stone specified and grout colors showing the manufacturer's full range of standard colors and patterns for final selection. Submit samples of each of the following:
  - 1. Each type and proposed shape, size and trim
  - 2. Submit sample of each stone slab showing splash and selected edge detailing
  - 3. Joint grout color for wall and floor tile surfaces.
  - 4. Cured sealant colors for expansion joints in the surface.

### 1.06 QUALITY ASSURANCE

- A. Tile cartons shall be grade sealed by the manufacturer in accordance with ANSI A137.1.
- B. Labels for dry set and latex mortars shall include hallmarks certifying compliance with ANSI A118.1 and A118.4.
- C. Conform to the Tile Council of America (TCA) handbook 2003-2004 edition, with installation in conformance with the following:
  - Interior Walls – Wet Areas:
    - Cement backerboard (CBU) over metal studs: TCA W244-03
    - Cement mortar bed over metal studs: TCA W231-03 or W241-03
  - Interior Walls – Dry Areas:
    - Gypsum board over metal studs: TCA W243-03
  - Shower Receptor Walls
    - Cement backerboard (CBU) over metal studs: TCA B415-03
    - Cement mortar bed over metal studs: TCA B414-03

### 1.07 REQUIREMENTS

- A. Furnish District with unopened containers of each type, size, and color of material installed for future use. Quantity to be provided shall be a minimum of 1% of area



installed, but not less than one full standard size box of each.

- B. Floor tile shall have a minimum friction coefficient of 0.60% per ASTM C1028.

## 1.08 PROJECT CONDITIONS

Set and grout tile when the temperature is at least 50 degrees F and rising, with temperature of the substrate not exceeding 100 degrees F.

## 1.09 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver tile, fabricated slab counter tops, cement, lime, mortar and grout to the site in unopened containers, labeled with the manufacturer's name and brand designation.
- B. Store tile and cementitious materials in dry weather-tight enclosures off ground. Sand shall be stored on solid surfaces to prevent mixing with foreign matter and in a well-drained area.

## 2.00 PRODUCTS

### 2.01 MATERIALS

- A. Ceramic Tile: "Standard" grade units conforming to the requirements of ANSI A137. Tile shall be delivered in sealed cartons, identified with a Master Grade Certificate, on standard form of the Tile Council of America, certifying grades, type and qualities of tile furnished.
1. Ceramic Wall Tile: As indicated on the drawings
  2. Ceramic Mosaic Floor Tile: As indicated on the drawings
  3. Tile Pavers: As indicated on the drawings
  4. Provide base, stops, returns, coves, and other trim shape as required to complete the work as intended.
- B. Stone (Granite / Travertine) Slab Countertop: Highly polished, uniform thickness, accurately cut to sizes as required. Slab to be selected by the Owner and Architect
1. Blue Pearl or Blue Butterfly Granite / Cornerstone Prefab Granite, as selected by the Owner
  2. Royal Salmon Light / Travertine
- C. Cement: Standard Type I or II Portland cement, conforming to ASTM C150, low alkali.
- D. Lime: Hydrated conforming to ASTM C207, Type S.
- E. Sand: Clean natural and graded to pass a No. 8 sieve with not more than 5% passing a No. 100 mesh screen, conforming to ASTM C144.
- F. Water: Fresh, clean and potable, and free from such amounts of mineral and organic substances as would adversely affect the hardening of cement mortar.
- G. Mortars: Mortar Beds

1. Portland Cement Mortar: Conform to ANSI A108.1A,B & C
  2. Dry Set Mortar: Conform to ANSI A108.5 & A118.1.
  3. Latex Portland Cement Mortar: Conform to ANSI A108.5 & A118.4.
  4. Organic Adhesive: Conform to ANSI A108.4 & A136.1
- Laticrete: White 317 Thin-Set powder mix with Laticrete 333 add-mix  
Mapei: White Kerabond premium dry-set mortar mixed with Keralastic add-mix  
Flextile: White 52 versatile floor mortar (no admixture)
- H. Ceramic Tile Grout: Conform to ANSI A108.10 & A118.6. Provide alkali and lime proof grout, with pure ground mineral oxide non-fading coloring pigment. Product shall also contain finely graded silica sand for sanded applications. Color, type and mix of grout shall be as selected by the Architect. Custom Building Products – Sanded Grout.
- I. Waterproof Membrane: Laticrete 9235 waterproof membrane or equal.
- J. Waterproof Membrane Reinforcing Fabric: Laticrete or equal, rot-proof, non-woven thick tensile cloth specifically treated for use with specific waterproof materials.
- K. Cleavage Membrane: Provide building paper conforming to ANSI A109.2 or A109.3, 15 pound asphalt-saturated felt conforming to Federal Spec UU-P-264, or minimum 10mil polyolefin sheet.
- L. Wire Mesh Reinforcing: 2" x 2" x 16/16 gauge welded wire mesh, unless otherwise indicated on the Drawings, conforming to ANSI 50.3.
- M. Waterproofing Admixture: Laticrete 3701, or equal latex or acrylic waterproofing mortar and grout additive. Mix proportions shall be in accordance with manufacturer's instructions for type and application of mortar and grout used.
- N. Bond Coat: Laticrete 4237 Bond Coat, or equal.
- O. Joint Sealant: Provide as specified in Section 07900.
- P. Marble Thresholds: Conform to "Class A" Marble Institute of America (MIA) standards, smooth honed finish, shaped to provide smooth transition between tile and adjacent floor finishes. Color as selected by the Architect.

## 2.02 MIXES

- A. Setting Materials: Conform to ANSI standards and manufacturers instructions.
1. Portland Cement Mortar: A mixture of Portland cement and sand, roughly in proportion of 1:5 on floors and of Portland cement, sand and lime in proportions of 1:5:1/2 to 1:7:1 for walls.
  2. Dry-Set Mortar: A mixture of Portland cement with sand and additives imparting water retentivity which is used as a bond coat for setting tile.
  3. Latex-Portland Cement Mortar: A mixture of Portland cement, sand and special latex additives which are used as a bond coat for setting tile.
- B. Grout Materials: Conform to ANSI standards and manufacturers instructions. Waterproof Portland cement grout or an approved manufactured dry grout with

latex admixture, color as selected by Architect, manufactured specifically for grouting joints of ceramic tile walls. Provide non-sanded grouts for joints 1/8" or less.

- C. Grout Cement for Floors: Grout cement shall be Portland cement and sand tinted to produce colors as selected by Architect, mix per manufacturers recommendations.

### 3.00 EXECUTION

#### 3.01 INSPECTION

- A. Examine floor substrates to receive tile, setting beds and accessories before tile installation begins to assure that substrates are level or uniformly sloped to drain with 1/4" in 10'-0" for Portland cement mortar method and 1/8" in 10'-0" for dry set or latex Portland cement mortar methods.
- B. Examine wall substrates to receive tile, setting beds and accessories before tile installation begins to assure that substrates are plumb and in a true plane within 1/8" in 10'-0" for dry set or latex Portland cement mortar methods.
- C. Examine countertop substrates to receive stone slabs to assure that substrates are plumb and in a true plane within 1/8" in 10'-0" for adhesive setting.
- D. Make sure grounds, anchors, plugs, hangers, bucks and floor drains to be built into the tile have been installed.
- E. Check to assure that waterproof membranes and rough-ins for plumbing, mechanical and electrical work behind / under the tile have been installed and tested.
- F. Do not proceed with installation of tile work until such deficiencies have been corrected.

#### 3.02 PREPARATION

- A. Clean or sandblast substrates of dust, dirt, oil, grease, and deleterious substances to obtain good bond. Conform to applicable reference standards/requirements including TCA and to recommendations of manufacturers of materials used.
- B. Concrete Slabs to Receive Mortar Setting Beds: Keep concrete damp for at least 8 hours and scrub with a neat Portland cement slurry just before placing setting bed mortar, or use Laticrete Bonding Coat.
- C. Screeds: Accurately set temporary screeds to control the finish plane of mortar bed and remove as installation progresses. Fill void spaces from screeds with same mortar.

#### 3.03 INSTALLATION OF TILE

- A. Lay out tile work so that, as far as possible, no tile less than half full size occurs.

Lay floors out from center lines of rooms so that all major adjustments are made at walls. Lay out tiles on walls so that fields and patterns center on floor tile. Run in a true, straight line from wall to wall perpendicular and at right angle to walls. Each tile needs to be clean of dirt or other materials prior to setting.

- B. Cut and drill using high quality wet saw or diamond or carbide blades / bits, without marring or chipping the tile finish. Rub cuts smooth with a fine abrasive stone. Set no cut edge against fixtures, or other tile without a joint at least 1/16" wide. Whenever possible, turn cut edges away from the adjoining wall. Fit tile around electric outlets, plumbing pipes, drains, fixtures and fittings close enough to permit standard plates and collars to overlap the tile.
- C. Floor Tile and Tile Pavers:
1. Install tile by the Portland cement mortar bed method (mud set) for installations on grade slabs in accordance with TCA Handbook Detail F112 and ANSI A108.1, for mortar bed installations above grade conform to TCA F111, ANSI A108.1, using a cleavage membrane and reinforcing. At Architect's option, installation may be by dry-set mortar or latex Portland cement mortar (thin-set) method over slabs on grade in accordance with ANSI A108.5 and TCA F113 or ANSI A108.5.
  2. Apply bond coat, if required, and mortar leveling bed as specified. Refer to drawing details and project requirements. Submit alternates for stated requirements for approval prior to execution.
  3. Apply cleavage membrane over sub-floors above grade, lapping sides and ends a minimum of 4 inches.
  4. Install mortar bed reinforcing for installations above grade, lapping sides and ends a minimum of one full mesh, support to locate in center of mortar bed.
  5. Mortar Setting Bed: Upon application of bond coat, place freshly mixed setting bed mortar, tamp, and screed to required planes; place no more mortar than can be covered with tile before initial set. Do not use re-tempered mortar. Just before placing tile, cover setting bed mortar with damp pure Portland cement bond coat 1/32" to 1/16" thick. Set tile into fresh bond coat and beat to true planes or proper slopes to align with cove base, with total bearing and flush joints.
- Option: Subject to approval of a sample panel prepared expressly for this option, mortar setting beds may be spread, tamped, screed and wood floated to required planes, cured for at least 7 days with polyethylene sheeting, and then air dried until all plastic and drying shrinkage has occurred. Tile may then be installed by the dry set or the latex mortar thin-set method according to requirements specified herein. Provide expansion joints as specified above.
6. Thin Set: Apply coat of selected/approved setting mortar over floor slab. Comb with notched trowel to leave uniform ridges, leaving enough mortar to bed tile completely. Apply tile while mortar surface is wet and tacky. Align, apply even pressure and beat to embed, assure true plane and eliminate any voids.
  7. Curing: Remove excess setting material from tile edges. Keep newly finished mortar bed set tile damp for a minimum of three days; do not saturate with water. Protect from rain or flooding during curing period.
- D. Wall Tile:

1. Install tile by the cement mortar bonded method, with mortar minimum 3/8" thick. Where mortar bed exceeds 3/4" or where surface is irregular install scratch coat.
2. Install tile by the Portland cement mortar bed method (mud set).  
Option: Subject to acceptance by Architect mortar setting bed shall be spread, screed and wood floated to required planes and cured until all plastic and drying shrinkage has occurred.
3. Apply bond coat, if required, and mortar leveling bed as specified. Refer to project requirements.
4. Install mortar bed reinforcing for installations lapping sides and ends a minimum of one full mesh, support to locate in center of mortar bed.
5. Mortar Setting Bed: Upon application of bond coat, place freshly mixed setting bed mortar, tamp, and screed to required planes; place no more mortar than can be covered with tile before initial set. Do not use re-tempered mortar. Just before placing tile, cover setting bed mortar with damp pure Portland cement bond coat 1/32" to 1/16" thick. Set tile into fresh bond coat and beat to true planes or proper slopes to align with cove base, with total bearing and flush joints.
6. Option: Subject to approval of the Architect expressly for this option, mortar setting beds may be spread, tamped, screed and wood floated to required planes, cured for at least 7 days with polyethylene sheeting, and then air dried until all plastic and drying shrinkage has occurred. Tile may then be installed by the dry set or the latex mortar thin-set method according to requirements specified herein. Provide expansion joints as specified above.
7. Thin Set: Apply coat of selected/approved setting mortar over wall. Comb with 1/4" x 1/4" notched trowel to leave uniform ridges, leaving enough mortar to bed tile completely. Apply tile while mortar surface is wet and tacky, and only enough that can be covered in 15 minutes. Using the flat side of the trowel, "Butter Back" each tile with thin-set mortar prior to placing the tile into the setting grout. Align, apply even pressure and beat to embed, assure true plane and eliminate any voids.
9. Curing: Keep newly finished mortar bed set tile damp for a minimum of three days; do not saturate with water. Protect from rain or flooding during curing period.

E. Expansion Joints:

1. Expansion joints shall follow the instructions of TCA EJ 171-02. Joints will vary on substrate, climate and size of installation. Verify with the Architect for the number, size and location of joints proposed.
2. Provide expansion joints where such joints abut rigid structures (at boundary edges), and where indicated or directed, width matching the substrate joints or as indicated and extending for full depth of the mortar setting bed.
3. Clean and fill expansion joints with backer rod, bond breaker, and sealant according to Section 07900, sealant color and tooling to match tile grout joints.
4. If expansion joint locations are not shown, provide expansion joints at the boundary and in the tile field at equal intervals maximum, 10-foot spacing both ways, located as directed.

F. Stone Slab Countertops: Install slabs by the latex Portland cement mortar /

adhesive methods in accordance with ANSI / TCA Handbook Details.

- G. Grout shall be mixed using a latex additive and applied in accordance with the TCA specifications and standards. Force a maximum of grout into all joints. Grouted joints shall be full and integral with setting bed. Before grout sets, strike or tool the joints of cushion-edge tile to depth of cushion, filling gaps and with square-edged tile, fill joints flush with their surface.
- H. Marble Threshold (Staff Shower): Provide bedding of the threshold in a complete butter-backing of thin set material applied to the back of the marble threshold and to the floor slab with a minimum 3/8" notched trowel, applied to both surfaces and pressed firmly and tapped into place. Wipe excess materials exposed to view.

### 3.03 CLEANING AND CURING

- A. Initially clean off excess grout with clean burlap bag or cheese cloth, or other non-staining soft wood excelsior or sawdust. Smoothing of grout shall be performed with a damp/wet sponge.
- B. Do not attempt to clean new installations for a minimum of 48 hours after completing the grouting operations. Apply non-staining laminated and reinforced kraft paper having a bituminous or latex binder over floor tile as soon as pointing, grouting and initial cleaning operations have been completed.
- C. Lap sheets at seams at least 4" and seal against the escape of moisture. Leave curing paper in place until job is ready for final cleaning, at least two (2) full days. Keep traffic off floors during the curing period.
- D. Remove curing paper and wash tiles and grout joints thoroughly using a nylon scrub brush or pad. Rinse with clean, warm water and allow too dry. A second rinsing may be needed to completely clean the surface. Polish with clean, dry cloths. Use no acids or abrasive soaps on tile, except as approved by tile manufacturer.
- E. Ceramic tile having stains or discolorations that are not removable with soap and clean water shall be replaced.
- F. Apply a grout sealer, being careful not to apply any to the surface of the tile since it may cause a smeared look when it dries. Buff sealer off the tile using a clean dry towel before it dries.

END OF SECTION

1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to the work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Acoustical ceiling panels and materials
  - 2. Ceiling suspension system, including hanger wires, etc.
  - 3. Coordination with work of mechanical, electrical and all other trades
  - 4. Acoustical wall / ceiling panels in the Police Station Interview Room

1.02 RELATED WORK IN OTHER SECTIONS

- A. Division 15: Mechanical work
- B. Division 16: Electrical work

1.03 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
- B. Ceiling and Interior Systems Contractors Association (CISCA)
- C. Underwriters Laboratories Inc., Fire Resistance Directory

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Manufacturer's Data: Submit technical data for all materials, material properties, system configurations, accessories, hardware, available colors and finishes.
- C. Shop Drawings: Submit shop drawings showing manufacturer's standard details and specific conditions of suspension system, in coordination with related work. Provide reflected ceiling layouts and setting diagrams covering the pattern and arrangement of the suspension system, acoustical units, lighting fixtures, diffusers and other related items which are to be carried by the suspension system. Indicate the location of all openings in the acoustical ceilings to accommodate the work of other trades. Show all information necessary for fabrication and installation of the work.
  - 1. Coordination drawings shall include:
    - a. Adjoining gypsum board construction.
    - b. Ceiling suspension members, including wall moldings.
    - c. Method of attaching hangers to the building structure.
    - d. Ceiling mounted items including light fixtures, air outlets and inlets, speakers, sprinkler heads and special moldings at walls, column penetrations, and other junctures with adjoining construction.
    - e. Acoustical wall panel, selection and installation detailing

- D. Samples:
1. Ceiling: Minimum 6 inch by 6 inch of each type and pattern of acoustical tile and 6" long of each item used in the suspension system shall be submitted. All items shall have the finish specified for the completed work.
  2. Walls: Provide a 6" x 6" sample of the acoustical wall panel of the required thickness / specified NRC rating with the selected covering material, to demonstrate finish and color. Include a sample of the proposed mounting / anchorage hardware or adhesive.
- E. Manufacturer's certificate that products meet or exceed specified requirements.

#### 1.05 EXTRA STOCK

Deliver to District at project site, 1 unopened carton of acoustical ceiling tile units as attic stock .

#### 1.06 QUALITY ASSURANCE

- A. Installer's Qualifications: Experienced in the installation of acoustical ceiling systems similar to the requirements of this Project and acceptable to, or licensed by the manufacturer.
- B. Comply with all reference standard guidelines for anchorage and installation of suspended acoustical ceiling assemblies.
- C. Refer to Fire Resistance Directory for specified UL design number and related assembly construction data.
- D. Comply with applicable codes for requirements governing ratings, assembly, components and installation.

#### 1.07 JOB CONDITION

Environmental Conditions: Do not install acoustical units until ambient temperature and humidity conditions approximate occupied conditions. Refer to manufacturers printed recommendations.

#### 1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery: Deliver materials in manufacturer's unopened cartons and containers bearing manufacturer's name, brand, type, style, size, color, texture, and other identifying information. Handle in manner to avoid damage.
- B. Storage: Store materials in dry location and in manner to prevent damage, deterioration and intrusion of foreign material. Replace material damaged or unfit for use.

### 2.00 PRODUCTS

#### 2.01 ACOUSTICAL CEILING PANELS



Armstrong World Industries Travertone #536A Fissured, 24" x 24" x 3/4" (as detailed), regular lay-in Fire Guard (UL label) or approved equal.

## 2.02 SUSPENSION SYSTEM

- A. Chicago Metallic Corporation, Fire-Front 850 System or equal, with exposed 24" x 24" grid. Equivalent systems by Donn Corporation or other reputable manufacturers may be acceptable upon review by Architect.
- B. Provide Type W30N Vibration Isolator Hangers as manufactured by Mason Industries, Inc. or approved equal.
- C. All systems shall support the ceiling assemblies shown on the Drawings, or specified herein with a maximum deflection of 1/360 of the span. Use #12 gage galvanized steel hanger wires for all wires for all systems. No.12 wire shall be suspended from structure above at intervals of 4'-0"oc along main runners with main runners at 2'-0"oc for all areas. Provide sufficient hanger wires to support lighting fixtures, etc.
- D. Suspension shall be intermediate duty formed from commercial quality cold-rolled steel, electro-zinc coated. Exposed finish shall be pre-painted low sheen satin white. Use the following components:
  - 1. Main tee with double web design and with a rectangular bulb; with 15/16" exposed flange with a rolled cap; with cross tee holes at 6"oc; with hanger wire holds at 2"oc; with integral reversible spline, spaced at 2'-0"oc.
  - 2. Cross tee with double web design and with a rectangular bulb; with web extending to form a positive interlock between cross tee webs; with the lower flange extended and offset, spaced at 2'-0"oc.
  - 3. Provide access, concealed and flat splines, as required for access.
- E. Provide metal moldings to match suspension system. Moldings shall be a minimum of .024 gauge electro-galvanized pre-painted steel to match exposed system.
- F. Hanger wire shall be minimum 12 gage galvanized carbon steel wire, ASTM A641 soft temper, pre-stretched, Class 1 coating, sized so that stress at three times hanger design load (ASTM C635 Table 1, Direct Hung) will not be less than the yield stress of the wire.
- G. Angle Hangers: ASTM A446 steel with G90 coating.
- H. Hanger Rods: Zinc coated steel.
- I. Acoustical Panels: Provide 1" thick manufactured chemically hardened edge, prefinished factory assembled panels with beveled, radius or square edge detail and rounded or square corner details, to conform to project specifics. Panel to have a NRC Rating of .75 – 1.00 for Type 'A' mounting. Mounting device to be adhesive, hook and loop, magnets or Z-clips. As manufactured by APS 800-277-7978, or equal.

## 3.00 EXECUTION

### 3.01 INSTALLATION

- A. Install acoustical units and suspension system per applicable manufacturer's recommendations and in accordance with accepted shop and layout drawings.
- B. The entire ceiling system shall be rigidly supported against lateral movement, and the completed work shall be in a true level plan within a tolerance of 1/8" in 12'-0" in any direction. Conform to ASTM C636 and CISCA recommendations.

### 3.02 SUSPENSION SYSTEM

- A. Hanger wires shall be 12-gage, 4'-0" x 2'-0" spacing for all main runners and cross runners within 8" of ceiling perimeters.
- B. Hanger wires that are more than one in six out of plumb shall have counterbraced wires.
- C. Ceiling grid may be attached to two adjacent walls; the ceiling must be at least 1/2" free of other walls.
- D. Cross runners 12" long and all main runners not connected to walls must be interconnected near the free end with 16-gage tie wire or a metal strut securely attached to prevent spreading.
- E. A set of four splay wires shall be provided for each 96sf unless other specially designed and detailed bracing is provided. First set of splay wires shall be 4'-0" from any wall. Wires shall be taut without causing ceiling to lift.
- F. Hanger wires must be fastened with not less than three tight turns. Splay wires must have four tight turns for 12-gage wire.
- G. All ceiling wires and un-braced ducts, pipes, etc. must be separated by at least 6".
- H. All light fixtures shall be attached to the ceiling grid to resist a horizontal force equal to the weight of the fixtures.
- I. Flush or recessed light fixtures and air terminals or services weighing more than 56 pounds and all fixtures and air terminals or services in intermediate duty grid shall be independently supported by not less than four taut 12-gage wires capable of supporting four times the load.
- J. Install suspension system seismic restraint to ASTM E580 CISCA recommendations and governing codes.

### 3.03 ACOUSTICAL UNITS

Lay out units in square pattern about center lines of each major room or space as indicated. Run texture of units in one direction as indicated or directed. Where possible, adjust pattern so edge units are not less than 1/2 unit width. Provide cut-outs and openings for mechanical and electrical penetrations. Neatly scribe units at abutting surfaces and at all penetrations or projections when moldings are not acceptable or provided.

### 3.04 ACOUSTICAL WALL / CEILING PANELS

- A. Coordinate with manufacturer recommendations for type, number and spacing of fasteners required based on the size and thickness of the acoustical panel to be used. Panel selection and fastening is to be based on the NRC rating desired.
- B. Locate adhesive or fasteners (hook and loop, magnets or Z-clips) at the required distance from edges and ends of panels. Attach panels starting from the center of each panel and proceeding toward the outer edges, making sure that the panels are properly aligned, true and plumb to corners, door jambs, floor, ceiling and walls, as required.

### 3.05 CLEAN-UP

- A. Leave all acoustical work free of dirt, marks, or faulty material. Clean exposed adjacent surfaces soiled by the work, with mild cleaning solutions as recommended by the manufacturer. Repair damage caused by the work at no extra cost to the Owner and to the satisfaction of the Architect. Remove equipment, surplus materials and debris of the work from the jobsite and leave the installation ready for use.
- B. Acoustical Units: Leave clean and free from defects. Replace damaged, discolored and improperly installed units.
- C. Baked Enamel Finishes: Refinish or touch-up damaged and scratched surfaces in acceptable manner.

END OF SECTION



1.00 GENERAL1.01 RELATED DOCUMENTS

- A. Drawings and general sections for specifications and supplementary conditions.

1.02 DESCRIPTION

- B. Furnishing and installing Detectable/Tactile Warning Surfaces. Not recommended for asphalt applications.

1.03 SUBMITTALS

- A. Manufacturer's literature describing products, installation and maintenance.
- B. Submit samples of the tile type proposed for use.
- C. Shop drawings are required for products showing fabrication details, tile placement, installation materials and procedure.
- D. Material test reports from qualified independent testing laboratory, current within a 24 month period, indicating that materials proposed for use are in compliance with requirements and meet the properties indicated.
- E. Maintenance instructions for each type of tile and accessory as required.

1.04 QUALITY ASSURANCE

- A. Provide Detectable/Tactile Warning Surfaces and accessories as produced by a single manufacturer with a minimum of three (3) years' experience manufacturing detectable/tactile warning surfaces.
- B. Engage an experienced Installer certified in writing by manufacturer as qualified for installation.
- C. Detectable/Tactile Warning Surfaces must comply with the Americans with Disabilities Act.
- D. Detectable/Tactile Warning Surfaces must comply with the California Code of Regulations (CCR) Title 24, Part 2.
- E. Vitrified Polymer Composite (VPC) Detectable/Tactile Warning Surfaces shall be an epoxy polymer composition employing aluminum oxide particles in the truncated domes. "Armor-Tile" product as manufactured by Engineered Plastics Inc., Tel: 800-682-2525, or approved equal.
  - 1. Dimensions: Detectable/Tactile Warning Surfaces shall be held within the following dimensions and tolerances:
    - a. Length and Width: As indicated on the Improvement Plans
    - b. Nominal Face Thickness: 0.1875 +/-5% max.
    - c. Warp of Edge: 0.5% max.

2. Water Absorption - ASTM D 570-98 less than 0.05%.
3. Slip Resistance - ASTM C 1028-96 greater than 0.80.
4. Compressive Strength - ASTM D 695-02a greater than 28,000 psi.
5. Tensile Strength - ASTM D 638-03 greater than 19,000 psi.
6. Flexural Strength - ASTM D 790-03 greater than 25,000 psi.
7. Chemical Stain Resistance - ASTM D 543-95 no discoloration or staining.
8. Abrasive Wear - ASTM D 2486-00 less than 0.060 after 1000 cycles.
9. Wear Resistance - ASTM C 501-84 greater than 500.
10. Fire Resistance - ASTM E 84-05 flame spread less than 15.
11. Impact Resistance - ASTM D 5420-04 greater than 550 in. lbf/in.
12. Accelerated Weathering - ASTM G 155-05a for 3000 hrs.  $\Delta E < 4.5$  tile color 33538, no fading or chalking.
13. Freeze Thaw - ASTM D 1037-99 no cracking, delamination, or other defects.
14. Salt Spray - ASTM B 117-03 for 200 hours no deterioration.
15. AASHTO HB-17 single wheel HS20-44 loading no failure @10,400lbs.

#### 1.05 DELIVERY, STORAGE AND HANDLING

- A. Detectable/Tactile Warning Surfaces shall be suitably packaged or crated to prevent damage in shipment or handling.
- B. Detectable/Tactile Warning Surfaces shall be delivered to location at building site for storage prior to installation.

#### 1.06 SITE CONDITIONS

- A. Environmental Conditions and Protection: Maintain minimum temperature of 40°F in spaces to receive Detectable/Tactile Warning Surfaces for at least 24 hours prior to installation, during installation, and for not less than 24 hours after installation.
- B. The use of water for cleaning and dust control shall be contained, not to come into contact with the general public.

#### 1.07 GUARANTEE

- A. Detectable/Tactile Warning Surfaces shall be guaranteed in writing for a period of five years from date of final completion. The guarantee includes defective work, breakage, deformation, and loosening of tiles.

#### 2.00 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
  1. The Vitrified Polymer Composite (VPC) Detectable/Tactile Warning Surface Tile specified is based on "Armor-Tile" product manufactured by Engineered Plastics Inc. (800-682-2525).
  2. Color: Color shall be homogeneous throughout the tile. Federal Color Numbers are: Yellow - 33538, Light Grey No. 26280, Dark Grey No.

36118), Onyx Black No. 17038, Pearl White No. 37875, Brick Red No. 22144, Ocean Blue No. 15187, Ocre Yellow No. 23594, Colonial Red No. 20109.

## 2.02 MATERIALS

- A. Color matched, flat head drive anchors 1/4" diameter x 1-1/2" long. Armor-Drive™ anchors as supplied by Engineered Plastics Inc.
- B. Armor-Bond™ Adhesive as supplied by Engineered Plastics Inc.
- C. Armor-Seal™ Perimeter Sealant as supplied by Engineered Plastics Inc.

## 3.00 EXECUTION

### 3.01 INSTALLATION

- A. Cast In Place: Pour and float concrete, set tile by tamping down into concrete until all air voids are removed, edge around the perimeter, cut off protective plastic sheet.
- B. Surface Applied Installation: Grind substrate, remove dust on tile and substrate, apply adhesive to back of tile, drill into concrete, install fasteners, clean tile surface, apply perimeter sealant.
- C. Modular Paver: Box out or saw cut concrete, lay a gravel or mortar bed, tamp paver onto substrate, place 3/8" diameter foam rope at bottom of all joints, apply joint sealant.
- D. Directional Tile: Grind substrate 3/16" deep, 6" wide, saw cut two 3/4" deep grooves, remove dust on tile and substrate, apply adhesive to back of tile, drill into concrete, install fasteners, clean tile surface, apply perimeter sealant.
- E. Guidance Tile: Pour and float concrete, set tile by tamping down into concrete until all air voids are removed, edge around the perimeter.

### 3.02 CLEANING AND PROTECTING

- A. Protect tiles against damage during construction period to comply with manufacturer's specification.
- B. Protect tiles against damage from rolling loads following installation by covering with plywood or hardwood.
- C. Clean tiles by method specified by manufacturer not more than four days prior to date scheduled for inspection.

END OF SECTION





## 1.00 GENERAL

### 1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to the work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Vinyl composition floor tile
  - 2. Sheet vinyl flooring
  - 3. Cleaning, polishing and protections.
  - 4. Metal edge reducing strips.
  - 5. Top-set base.

### 1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 03300: Concrete and Concrete Finishes
- B. Section 14240: Hydraulic Passenger Elevators

### 1.03 CONDITIONS – DSA Requirements

Resilient Flooring demonstrating a coefficient of friction of at least 0.6 per ASTM C2047 will be accepted as meeting the intent of slip resistance. CBC 1124B.1 / ADA Standards 4.5.1.

### 1.04 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)  
ASTM D2047 Test Method for Static Coefficient of Friction of Polish Coated Floor Surfaces.

### 1.05 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Submit shop drawings, manufacturer's technical data and material specifications, as applicable for all products specified for review prior to start of work.
- C. Samples: Submit samples of each flooring material, 3" square, 2" width sample of base material, and 3" sample of each type of reducing strip used.

### 1.06 REQUIREMENTS

- A. Resilient flooring shall have a coefficient of friction of at least 0.6 per ASTM D2047.
- B. Provide District with unopened containers of each type, size, and color of material installed for future use. Quantity to be provided shall be a minimum of 2% of area installed, but not less than one (1) standard size container.

### 1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

Use all means necessary to store, handle and protect the materials of this Section before, during and after installation.

## 1.08 WARRANTY

Provide manufacturers standard limited five (5) year commercial warranty covering against inherent defect of material failure, including shrinkage, fade, crack and excessive wear.

## 2.00 PRODUCTS

### 2.01 GENERAL

- A. All materials shall be of new stock of the highest grade available, free from defects and imperfections, of recent manufacture and unused. Materials shall be of the same manufacture and same lot number. Where model numbers are indicated, if the specified models are discontinued, the Contractor shall furnish the manufacturers' updated model at no additional cost to the Owner.
- B. All flooring shall be delivered in sealed cartons, plainly labeled or marked to indicate color, pattern, gage, lot number, and sequence of manufacture within the lot. All flooring shall have been manufactured within the 6-month period previous to installation.

### 2.02 MATERIALS

- A. Vinyl Composition Tile: Provide moisture impermeable, non-slip retardant, non-static dissipative, vinyl composition tile with a minimum 85% natural limestone and post industrial recycled vinyl with a static load limit of 75psi. Material shall be 12" x 12" x .125" thick with square and true edges. Conform to ASTM E648 0.45 watts / CM2 or more, ASTM E662 450 or less and Fed. Spec. SS-T-312, Type IV, Grade B. Refer to drawings for Architect selected styles / patterns and colors, from the Mannington commercial product line. Alternate products manufactured by Armstrong World Industries, Azrock Floor Products, GAF Corp, or equal, as approved by the Architect.
- B. Elevator Cab Flooring: Provide 12" x 12" x 3/16" thick terrazzo/marble chip tile, Marble Mosaic Classic Series 600 by Fritz Chemical Co., or equal. Selected colors to be field tile #CL697, Dapple Gray with a 4" x 12" accent border tile #CL621, Raven Black at cab perimeter. Conform to detailed layout as directed by the Architect. Product as distributed by
- C. Sheet Vinyl: Provide moisture impermeable, slip retardant, non-static dissipative, homogeneous resilient vinyl material with an overall thickness of .08" / wear layer thickness .08" and a static load limit of 250psi. Conform to ASTM E 648 0.45 watts / CM2 or more, ASTM E662 450 or less and Fed. Spec.L-F-475. Installation shall provide for radius molding (cove) and metal trim top molding for self cove base flooring. Owner has selected Armstrong – Possibilities Petit Point #88210 – Charcoal Gray.
- D. Adhesive shall be as recommended by manufacturer to meet material compatibility and warranty requirements.

- E. Top-set base shall be 4" high, 1/8" thick rolled rubber with preformed corners, Fed. Spec. SS-W-40a, Type I. Burke, Mercer Industries Inc., Johnson Rubber Co., R.C. Musson Rubber Co., or approved equal. At carpeted areas provide carpet base (no cove).
- F. Floor leveling cement shall be Ardex K-15, Floorstone, or equal.
- G. Metal Edge Strips: Anodized extruded aluminum, Royal #A243, Celotrym, Greenbaum or equal.

### 3.00 EXECUTION

#### 3.01 EXAMINATION

- A. Examine floor substrates to assure that tolerances are level within 1/8" in 10'-0".
- B. Check to assure that rough-ins for plumbing, mechanical and electrical work have been installed and tested, in areas that could affect resilient flooring work.
- C. Do not proceed with installation of resilient flooring until such deficiencies have been corrected.

#### 3.02 INSTALLATION

- A. Fill all cracks and low spots with a floor leveling cement. Remove all dirt, mortar, and plaster droppings and any other matter that would prevent adhesion or cause bumps, depressions, or other defects in the appearance or durability of this finish floor covering, and make surface smooth, level and uniform.
- B. Maintain a temperature of not less than 70deg. F. in the locations (at floor level) for not less than 48 hours before installation and for ten (10) days after installation. Allow flooring to condition in the locations for at least 24 hours before installation.
- C. Do not lay flooring until other work (painting) has been substantially completed. Cement and lay flooring in a manner that will result in a complete and first-class installation. Install flooring on all covers for telephone and electrical ducts or other items which occur within the limits of the floor. Reference markers, holes, or openings, either existing or required for other trades that are in place or plainly established shall be replaced in the covered floor, as necessary.
- D. Layout of Floor Tile:
  - 1. Lay tile with center of tile or joints of tile on the center lines of the room, or area, with borders equal in size. Locate transition between rooms with different colors at center of door when door is in a closed position. Match tile for color and pattern by using tile from cartons in the same sequence as manufactured.
  - 2. Tile shall be laid with grain pattern running the long way of room and in only one direction
  - 3. At elevator cabs lay rubber tiles so that the integrally raised circular dots are true and plumb to line (parallel and perpendicular) with relation to elevator cab walls.

- E. Allow no open cracks or voids, and no raising or puckering at joints. Roll floor covering to assure a tight bond and eliminate any trapped air.
- F. Provide metal reducing edge strips at all exposed unprotected edges of floor covering and with a smooth, even seam. Flooring shall abut or pass under thresholds.
- G. Installation of Top-set Base:
  - 1. Apply cove base after flooring has been installed. Form inside and outside corners with manufacturer's standard preformed corners. Provide one-piece top-set base (no splices or joints will be permitted), except where wall length exceeds manufactured lengths. Do not splice or join more than two pieces of base with each piece less than half of manufactured length.
  - 2. Apply base adhesive to the back of the base with a notched trowel, leaving approximately 1/4 inch bare-space along the top edge of the base. Immediately press the base firmly against the wall and move gently into place, making sure that the base is in contact with the floor and the wall. Roll the entire vertical surface of the base with a hand roller and press toe of cove base. Allow no open cracks or voids, and no raising or puckering at joints.
  - 3. At elevator cabs, base material is to be cut from floor tiles. Make all cuts straight and true to dimension at both ends. Align base to hold true the dot pattern established.

### 3.03 EDGE STRIPS

Cut metal edging to length for symmetrical screw spacing at 6" on center and with screws as near as possible to each end of strip. Drill strips and countersink to receive stainless steel flat or oval head screws. Edging strip must be hidden by door when in closed position. Install edging strips at resilient flooring transitions where differences in finished levels occur. (Finished level is top of resilient flooring or top of finished concrete).

### 3.04 PROTECTION

During installation operation, the entire areas shall be closed to traffic and work of other trades. Where traffic is unavoidable, floors shall be protected with building paper and also boards or plywood, where trucking is being done over the installed area.

### 3.05 CLEANING

After completion, all resilient floor covering shall be protected from the work of other trades by covering with non-asphalt building paper. After the work of all other trades has been completed, the temporary protections shall be removed, the surfaces washed with a neutral cleaner and all heel and scuff marks removed so that the resilient floor covering is ready to be waxed. One coat of wax shall be applied and polished with a polishing machine.

END OF SECTION

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## 1.00 GENERAL

### 1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Carpet tile with closed cell polymer high performance backing for glue down installation.
  - 2. Accessory items as required for a complete installation.

### 1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 03300: Concrete and Concrete Finishes.
- B. Section 09650: Resilient Flooring.

### 1.03 CONDITIONS – DSA Requirements

- A. Carpeting:
  - 1. Provide glue-down or firm cushion installation that complies with CBC Section 1124B.3
  - 2. Carpet shall have a level loop, textured loop, level-cut, or level-cut / uncut pile texture and maximum pile height of ½" per CBC Section 1124B.3 / ADA Standard 4.5.3.
  - 3. Carpet edges shall comply with CBC Section 1124B.3

### 1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Product Data: Manufacturer's product literature and installation instructions for each type of carpet and accessory required. Include manufacturer's data to prove compliance with the specified requirements on physical characteristics, durability, resistance to fading and flame resistance characteristics. Submit a complete list of items proposed to be provided under this Section.
- C. Shop Drawings: Submit floor plan of room and proposed carpet tile layout and seaming diagrams for review, showing seam locations, pattern direction of carpet, size and location of fill strips and location of trim at exposed carpet edges. Indicate all columns, doorways, enclosing walls or partitions, built-in cabinets, and locations of cutouts. Include installation details at special conditions.
- D. Samples: Provide 18" x 18" or 24" x 24" samples of each carpet tile and 12-inch long samples of each type of exposed edge stripping. Demonstrate from selected color and pattern from stock proposed to be installed. Include all exposed accessories and trim.

- E. Certificate of Compliance:
  - 1. Submit letter of compliance from manufacturer, or independent laboratory, that material tests were performed in conformance with Federal Specification CCC-T-191lb, and that density and flame spread determined by ASTM E84 (Tunnel Test). Each roll of goods delivered to job shall bear Underwriters Laboratories Class "A" labels attesting to maximum ratings.
  - 2. Upon completion, furnish certificate or letter to Architect stating that installation is in compliance with specification.
- F. Maintenance Materials: Furnish written cleaning and maintenance instructions.

#### 1.05 QUALITY ASSURANCE

- A. Comply with Flooring Radiant Panel Test, American Society for Testing and Materials, ASTM E 648, Class I (exceeds .45 watts/cm<sup>2</sup> Critical Radiant Flux) Direct Glue Down and NBS Smoke Density Test, ASTM E 661, 450 or less.
  - 1. Carpet Surface Burning Characteristics: Provide carpet identical to that tested for the following fire performance characteristics, per test method specified below, by UL or other testing and inspecting organizations acceptable to authorities having jurisdiction. Identify carpet tiles with appropriate markings of applicable testing and inspecting organization.
    - a. Test Method: DOC FF 1-70.
      - 1) Rating: Pass.
    - b. Test Method: ASTM E84.
      - 1) Flame Spread: 25 or less.
      - 2) Smoke Developed: 450 or less.
- B. Installer's Qualifications: Minimum two (2) years experience in installation of commercial carpeting / carpet tiles of type, quantity and installation methods similar to work of this Section.
- C. Stock sufficient materials on site to prevent interrupting progress of work and to insure a consistent dye lot.

#### 1.06 COORDINATION

- A. Prior to construction of each type of new substrate which is to support carpet flooring finish, furnish information on substrate texture and condition required for each type of adhesive and carpet tile to be installed.
- B. Painting work in areas to be carpeted shall be completed prior to installation of carpet tiles.

#### 1.07 PROJECT CONDITIONS

- A. Substrate Conditions: No condensation within 48-hours on underside of 4-foot x 4-foot polyethylene sheet, fully taped at perimeter to substrate.
- B. Substrate Conditions: pH of 9 or less when substrate wetted with potable water and pHDrion paper applied.
- C. Carpet tile materials shall be unpackaged, inspected, and allowed to relax and

ventilate in a well protected area on-site for a minimum of 24-hours prior to installation.

- D. Use adhesives in strict accordance with manufacturer's recommendations and ventilate area with maximum outside air for a period of not less than 48-hours after completion.

#### 1.08 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle materials of this Section, before, during and after installation per manufacturer's recommendations to protect from stain or damage from construction operations until acceptance of project.
- B. Deliver carpet tile and adhesive materials in original factory protective wrapping / containers, labeled with identification of manufacturer, brand name, quality or grade, fire hazard classification and lot number.
- C. Store inside in well ventilated area, protected from weather, moisture, soiling, extreme temperatures and humidity.

#### 1.09 WARRANTY

- A. Warrant the carpet tile surface pile against abrasive wear of more than 10-percent within 10-years for carpet tiles properly installed and maintained. Misuse, damage or improper cleaning methods shall not apply.
- B. Warrant installation against stretching, wrinkling, opening of joints / seems and other areas of poor materials and workmanship for a period of 2-years after final acceptance of Project. Provide materials and labor necessary for repair or replacement without additional cost to District.
- C. This warranty shall be in addition to and not a limitation of other rights the District may have against the Contractor under the Contract Documents.

#### 1.10 MAINTENANCE

Maintenance Instructions: Furnish manufacturer's printed instructions for maintenance of installed carpet tiles, including methods and frequency recommended for maintaining.

#### 1.11 EXTRA STOCK

Deliver to the District at the completion of installation, a minimum of 1 unopened carton of extra carpet tiles of the same size, weight, dye lot etc as those installed by work of this contract.

#### 2.00 PRODUCTS

##### 2.01 MANUFACTURE

Carpet Tile: Recycled content modular carpet tiles; as manufactured by Interface Inc. color and pattern TBD; 18" x 18" or 24" x 24"

##### 2.02 ACCESSORY MATERIALS

- A. Adhesive and Sealers: Pressure sensitive adhesive, as standard for the manufacturer. Verify applicability from the enclosed.
  - 1. Floor Adhesive: Henry #356, Robert #41-0504, BACO Top-Coat #7055, Mannington MT-790, acrylic based permanent, non-flammable and solvent free, vinyl compatible adhesive, or equal.
  - 2. Double-Faced Plastic Carpet Tape: Industrial – grade, as manufactured by Carpet Tile, 3320 Gilmore Industrial Blvd, Louisville, KY 40213
  - 3. Concrete Seal: Henry #162, or Roberts #41-006.
  - 4. Seam Cleaner: Mannington MT-900, or equal.
- B. Metal Carpet Edges / Nosings: Anodized extruded aluminum section as manufactured by Royal Molding, Celotrym, Greenbaum or equal.

### 3.00 EXECUTION

#### 3.01 SURFACE CONDITIONS

Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

#### 3.02 SURFACE PREPARATION

- A. Make substrate level and free of irregularities. Fill cracks and holes with latex patching compound. Assure one constant floor height after carpet tiles are installed, filling low spots and grinding high spots as required.
- B. Clean floor of dust, oil, grease or other foreign. Clear away debris and scrape up cementitious deposits from concrete surfaces to receive carpet tiles; apply sealer to prevent dusting.
- C. Wet mop with warm water and sweep with broom.
- D. Sealers and Adhesives: Apply sealer, not more than one (1) day ahead of adhesive application, unless indicated otherwise by the selected manufacturer.

#### 3.03 GENERAL REQUIREMENTS

- A. Comply with manufacturer's recommendations for installation technique, seaming, orientation of carpet tile patterns; maintain uniformity of carpet direction and lay of pile, unless indicated otherwise.
- B. Scribe carpet tiles accurately to vertical surfaces.
- C. Align the lines of carpet tiles as woven using no fill strips less than 6" wide, laying all carpet tiles in the same direction unless specifically directed otherwise by the Architect. Carpet tiles must be tightly jointed and accurately aligned.
- D. Where carpeting is used on the walls as a base, install as directed by the manufacturer. Trim the top edge and at exposed vertical edges as acceptable to the Architect.



- E. Seams:
  - 1. Locate tile seam patterns only where shown on the reviewed shop drawings or where otherwise permitted by the Architect.
  - 2. Fabricate seams by the compression method using a butt joint.
  - 3. Make seams as inconspicuous as possible, flat, un-puckered and completely free from glue on the exposed surfaces.
  - 4. Do not stretch seams.
- F. Extend carpet under removable flanges of furnishings and into alcoves and closets of each space.
- G. Provide cutouts where required, and bind cut edges where not concealed by protective edge guards or overlapping flanges.
- H. Install carpet edge guard where edge of carpet is exposed; anchor guards to substrate.

### 3.04 INSTALLATION

- A. Measuring: Determine the number of tiles needed by measuring the length (L) and width (W) of the room to be carpeted. Multiply the width times the length to get the square footage of the room.
- B. Preparation:
  - 1. Remove any old floor coverings, debris, and adhesives from the floor substrate surface
  - 2. Sweep / vacuum clean the entire floor surface of any dust, drywall mud, etc.
  - 3. Once the floor has been cleaned of dust and debris, lightly mop with clean water and allow it to dry completely.
  - 4. Unpack the carpet tiles and allow to become acclimated to room temperature for minimum 24 hours, prior to installation.
- C. Layout:
  - 1. Determine the center of the room by snapping chalk lines between the midpoints of the room's opposing walls. Measure from the center point (the point at which the 2 chalk lines converge) up 3 feet and make a mark. Now measure from the center point to the left 4 feet and make another mark. If the distance between the two marks you've made is 5 feet, then you have perfectly square reference lines to start laying your tiles by.
  - 2. A Special Pressure Sensitive Adhesive may be applied very thinly using a short napped paint roller on to the sub floor. This adhesive will stay tacky and will allow the tiles to be removed and replaced at a later date with ease. However; Caution must be used, not to apply excessive adhesive to the floor, as it could possibly ooze up between the tiles. Apply adhesive uniformly to substrate in accordance with manufacturer's instructions.
  - 3. Double-Sided Tape accomplishes the same task and will not gum up the sub floor. The tape will work well on most any clean dry surface such as cement floors.
  - 4. Begin starting with one quadrant. Install a row of full tiles along both reference lines. First apply the adhesive using a paint roller. Next, place the tiles along the reference lines applying firm pressure with the palm of your hand to ensure good contact with the adhesive. Tiles should be

placed snug against adjacent tiles and their edges accurately aligned with one another. Butt carpet tile edges tightly together to form seams without gaps. Roll lightly to eliminate air pockets and ensure uniform bond.

5. Continue placing tiles row by row or by using the stair-step method always starting from the center and moving towards the wall.

- D. **Cutting and Fitting Tiles:** After placing all of the full tiles, the perimeter tiles must be accurately marked and cut to fit snug against the wall. Place the tile to be cut directly on top of the last tile in a row. Next, position another tile against the wall and on top of the tile to be cut. Make a mark on each side where the outer corners of the top tile overlap the tile to be cut. Remove the tiles and using a sharp utility knife and a straight edge, cut through the back of the perimeter tile between the two marks. Use this same procedure to cut and fit the rest of the perimeter tiles.

### 3.05 EDGES AND THRESHOLDS

- A. Cut metal edging to length for symmetrical screw spacing at 6" on center and with screws as near as possible to each end of strip. Drill strips and countersink to receive stainless steel flat or oval head screws. Edging strip must be hidden by door when in closed position. Install edging strips at carpet transitions where differences in finished levels occur. (Finished level is top of installed carpet, top of resilient flooring or top of finished concrete).
- B. **Thresholds:** Loosen thresholds, place carpet tiles underneath edge and tighten threshold.

### 3.06 CLEAN UP

- A. Clean and remove spillage of adhesive from carpet tile face or seams with adhesive remover as recommended by the manufacturer.
- B. Clean up dirt and debris and clean carpet of spots with soap and water or proper spot remover. Remove spots or replace carpet tiles where spots cannot be removed.
- C. Remove waste, excess materials, tools and equipment.
- D. Remove loose thread or protruding yarn with sharp scissors and broom or vacuum clean.

### 3.07 PROTECTION

Provide a heavy non-staining paper or plastic walkway as required over carpeting in direction of traffic, maintaining intact during remainder of the project construction period, until carpeted space is accepted by the District and time of Substantial Completion.

### 3.08 MAINTENANCE

Thirty (30) days after completion of work, make adjustments, relay tiles found necessary.

### 3.09 SURPLUS MATERIAL

1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to this Section.
- B. Furnish all labor, materials, services, equipments and appliances required to perform all work to complete the Contract, including, but not limited to these major items:
- C. Interior / Exterior Coating:
  - 1. Pipe guards/ bollards
  - 2. Barrier Beams
  - 3. Clearance barriers
  - 4. H.M. doors and frames
- D. Carefully examine other sections of these specifications to ascertain scope of coating work which is required.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 05500: Miscellaneous Metal
- B. Section 08100: Hollow Metal Doors and Frames
- C. Section 09900: Painting

1.03 SURFACES NOT TO BE PAINTED

- A. Stainless steel, anodized aluminum, plated metals.
- B. All paint finished items, refer to Section 09900.
- C. All factory pre-finished items.
- D. Galvanized items, unless specified otherwise.
- E. Do not paint over required labels or equipment identification, performance rating, name, or nomenclature plates.

1.04 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
  - ASTM B117 Salt Spray
  - ASTM D520 Zinc Dust, Type II
  - ASTM D870 Immersion
  - ASTM D1653 Water Vapor Transmission
  - ASTM D2247 Humidity
  - ASTM D2794 Impact
  - ASTM D3363 Hardness
  - ASTM D4060 Abrasion
  - ASTM D4541 Adhesion

1.05 DEFINITIONS

Coating, as used herein, means manufacturer's coating system materials which may include surface preparation, zinc rich primers, shop coat primer touch-up, acrylic aliphatic polyurethane enamels or siloxane-epoxy, and other applied materials whether used as prime, intermediate or finish coats, as required to provide selected manufacturers complete system.

#### 1.06 QUALITY ASSURANCE

- A. **Applicator Qualifications:** Applicator shall have a minimum of five (5) years of experience with successfully completed applications similar in material and scope to that indicated for this Project.
- B. **Single-Source Responsibility:** Provide all primers, undercoating and finish coating materials produced by the same manufacturer that are compatible with one another and substrates indicated under conditions of service and application, and of the same production dates as noted on the sealed containers.
- C. **Coating Coordination**
  - 1. Provide finish coats that are compatible with the prime coats actually used and base substrate material finish as provided.
  - 2. Review other sections of these specifications as required, verifying prime coats used, and assuring compatibility of the total coating system for the various substrata.
- D. **Acceptance of Work**
  - 1. Inspect surfaces to which materials of this section are to be applied. Correct any defects or other unsatisfactory conditions prior to coating application.
  - 2. Application of any material of this section shall be deemed acceptance of substrate surfaces. Failure of coating work will be construed as improper application.
- E. **Requirements of Regulatory Agencies:** Comply with state and local regulations governing the use of coating materials.

#### 1.07 SUBMITTALS

- A. **Provisions:** Comply with Section 01300 / 01340.
- B. **Product Data:**
  - 1. Materials list of items proposed to be provided under this section. Identify each material by manufacturers catalog number and general classification. Written approval of this list must be obtained from Architect before any coating is used or work started.
  - 2. Manufacturer's specifications and product data needed to prove compliance with the specified requirements. Technical information shall include certification that the proposed products meet the reference standards. Data shall include chemical composition, weight / percent of each solid per gallon, pounds of zinc per gallon, etc. Pot life extenders shall be submitted for acceptance prior to usage.
  - 3. Certification by manufacturer that products supplied comply with

requirements indicated that limit amount of VOC in coating products.

- C. Samples:
1. Following the selection of colors and glosses by the Architect, as described under "Color Schedules: in Part 2 of this section, submit samples for the Architect's review.
    - a. Provide three samples of each color and each gloss of the finish coating.
    - b. Except as otherwise directed by the Architect, make samples approximately 8" x 10" in size.
    - c. If so directed by the Architect, submit samples during progress of the work in the form of actual application of the approved coating materials on actual surfaces to be painted, and over actual prime coat used.
  2. Revise and resubmit each sample as requested until the required gloss and color is achieved. Such samples, when approved, will become standards of color and finish for accepting or rejecting the work of this Section.
  3. Do not commence finish coating until approved samples are on file at the job site.
- D. Qualification Data: For firms and persons specified in "Quality Assurance" to demonstrate their capabilities and experience. Include lists of completed projects with names and addresses of the projects, Architect and Owner.

#### 1.08 PROTECTION

- A. Provide dust-stops required for protection of adjacent surfaces. Do no coating in dusty rooms or in areas where other work is being performed that might raise dust or cause other disturbances that would damage coated surfaces. Isolate section of the building as necessary to prevent dust circulation.
- B. Protect finished work during progress of coating work and repair any damage done to work. Cover and protect finished work of other trades.
- C. Do not store or mix coating materials on or adjacent to finished floors and walls, unless surfaces are protected from splatters. Handling and application of materials shall be at entire risk of Contractor. Replace or repair any damaged portions of work at Contractor's expense.
- D. Provide adequate barriers, "Wet Paint" signs or other devices necessary to protect coating work during application and until acceptance of entire job.

#### 1.09 JOB CONDITIONS

- A. Do not apply coating system when the temperature of surfaces to be painted and the surrounding air temperatures are below 45deg. F. or above 100deg. F unless otherwise permitted by the manufacturers' printed instructions and as acceptable to the Architect.
- B. Weather Conditions:
  1. Do not apply coating in snow, rain, fog, or mist; or when the relative

humidity exceeds 80%; or to damp or wet surfaces unless otherwise permitted by the manufacturers' printed instructions and as acceptable to the Architect.

2. Applications may be continued during inclement weather only within the temperature, weather and time limits specified by the coating manufacturer as being suitable for use during application and drying periods.
- C. Apply coating only after unsatisfactory conditions have been corrected and surfaces to receive coatings are thoroughly dry. Start of application is construed as applicators acceptance of surfaces within that particular area.
- D. Coordination of Work: Review other sections in which primers or other coatings are provided to ensure compatibility of total systems for various substrates.
  1. Work of this contract is to be coordinated with the work of other sections, in order to get the correct surface preparation and correct primer.
  2. If potential incompatibility of surface preparation and/or primers applied by others exists, obtain confirmation of the primers suitability for expected service conditions and primers ability to be top coated with the material specified.
  3. Notify the Architect about anticipated problems before using coatings specified over substrates primed with non-specified materials.

#### 1.10 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Materials shall be delivered to jobsite in original cans, sealed, and bearing names of manufacturer, product name, system number, kind of coating, date of production, thinning instructions, handling instructions and precautions. Coating shall be mixed per manufacturer's printed instructions.
- B. Store materials not in use in tightly covered containers in a well ventilated area at a minimum ambient temperature of 45 deg F. Maintain containers used in storage in a clean condition, free of foreign materials and residue.
- C. Take precautions to prevent fire, as required by codes, rules, and as directed. Remove rags and waste, soiled with volatiles, from premises at end of each day's work. Store used rags in metal containers with metal covers. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing and applying the coatings.
- D. A "NO SMOKING" sign shall be placed over the door and inside of each coating storage or mixing room and maintained there at all times. Keep open cans of volatiles away from coating storage area. Supply good ventilation.

#### 1.11 GUARANTEE

Furnish a written guarantee to the effect that coated surfaces shall, under normal usage and conditions, not fade, chip, crack, rust, blister, chalk or spall for a period of one (1) year after final acceptance of work by the Owner, and that any defects discovered during this period, whether due to faulty workmanship or to incorrectly applied materials, shall be replaced without additional cost to Owner.

#### 2.00 PRODUCTS

## 2.01 MATERIALS

- A. Materials necessary to complete the coating system as herein specified and listed by material number and names are standards for kinds, quality and function, and are taken from the stock list of coatings complying with printed specifications of Tnemec Company, Inc., Compton, California as distributed by TPC Consultants, Inc. (310) 643-5191, PPG distributed by Frazee Paint Company, Carboline distributed by Vista Paint Corporation, Fullerton, CA (323) 397-9000; to establish types and quality. Except as otherwise specified, all materials shall be by one manufacturer.
- B. Materials for primers, intermediate and finish coats of paint shall be ready-mixed and shall not be changed, except for field mixing of parts "A" and "B" components, and thinning (when required), any of which shall be in strict accord with the printed instructions of the manufacturer. Coatings of different manufacturers shall not be mixed.

## 2.02 APPLICATION EQUIPMENT

- A. For application of the approved coating, use only such equipment as recommended by the manufacturer and as acceptable to the Architect.
- B. Prior to use of application equipment, verify that equipment is compatible with the material to be applied.

## 2.03 OTHER MATERIALS

Provide other materials not specifically described but required for a complete and proper coating system, as recommended by the manufacturer and as accepted by the Architect.

## 3.00 EXECUTION

### 3.01 SCAFFOLDING

Furnish and maintain scaffolding, masking, warning signage necessary for execution of work. Scaffolding and execution of work of this section is not to interfere with work of other sections.

### 3.02 QUALITY OF WORK

Apply materials by skilled mechanics experienced in this type of work. Apply materials with even spread and smooth flow of materials without runs, sagging, brush marks, skips, undercoats showing through or other defects.

### 3.03 PREPARATION FOR COATING

- A. Areas in which coating is to be applied shall be swept clean. Schedule cleaning operations so that dust, dirt and other contaminants does not fall on wet, newly coated surfaces.
- B. Remove plates and similar items already in place that are not to be coated. If removal is impractical, provide surface applied protection before surface

preparation and coating.

- C. Do not apply coating systems over dust, dirt, oil, grease, rust, scale, moisture, scuffed surfaces, or other detrimental conditions.
- D. Architect shall accept barrier coats over incompatible primers. Where required remove primers and re-prime substrate with specified material.
- E. Surface Preparation:
  - 1. Shop Preparation of Bare Metal: Commercial blast cleaning per (Steel Structure Painting Council SSPC - SP6) all surfaces where shop primed in conformance with Steel Coating section. Coordinate this work with related sections.
  - 2. Use solvent and hand tool cleaning (SSPC-SP1) on surfaces previously galvanized to remove all soluble contamination and zinc oxides, prior to coating work.
  - 3. Power tool clean (SSPC-SP-11) to bare metal all welds and damaged organic urethane zinc primer, prior to field touch-up

### 3.04 MIXING / THINNING

- A. Stir materials before applying to produce mixture of uniform density and consistency. Stir additionally as required during application. Do not stir surface film into material. Remove film and if necessary, strain coating material before using.
- B. Thin only as directed by printed instructions of manufacturer, using materials that do not affect color, sheen, adhesion and performance. Pot life extenders must be of type recommended by manufacturer.

### 3.05 COATING APPLICATION

- A. After commercial blast cleaning, follow selected manufacturer's recommendations for application of specified two component zinc-rich primer to 3.0 - 3.5 dry mils thickness to all surfaces not shop primed in accordance with Section 05500 unless specified otherwise.
- B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of finish coat but provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. After spot touch-up of shop applied prime coat and field application of the epoxy intermediate coat. Where required, finely sand down and apply specified top-coat of two component acrylic polyurethane enamel coating to a min. dry film thickness of 2.5 mils or siloxane-epoxy to a minimum dry film thickness of 5 mils.
- D. Sand between coats to remove defects visible to the unaided eye from a distance of five feet.
- E. The system coats specified are the minimum number required.
  - 1. Insure even, uniform color, complete opacity, free from cloudy or mottled



- appearance, with finish sheen without streaks, laps, runs, sags or missed areas.
2. Upon completion of work, coating that does not show uniform thickness, color and finish will be deemed incorrectly applied and Contractor shall apply additional coats at no cost to Owner until uniform results are obtained.
  3. Give special attention to edges, corners, crevices, welds, exposed fasteners, and similar surfaces to ensure that they receive dry film thickness equivalent to that of flat surfaces.
  4. The number of coats and film thickness required is the same regardless of the application method. Test for holidays using a non-destructive holiday tester.
- F. Allow sufficient drying time between successive coats. Do not recoat until the coating has dried so it feels firm and does not deform or feel sticky under moderate thumb pressure and where applying another coat does not cause the undercoat to lift or loose adhesion.
- G. Application Procedures: Apply coatings by brush, roller or spray according to manufacturers written instructions.
1. Brush application: Use brushes best suited for material applied and of appropriate size for surface or item being coated. Work brush coats into surface in even film without streaks.
  2. Rollers: Use rollers of carpet, velvet, or high pile sheep wool for material and texture required.
  3. Spray equipment: Use spray equipment with orifice size and application pressure recommended by the manufacturer. Apply each coat to provide equivalent hiding of brush or roller applied marks. Do not double back with spray equipment build up film thickness of 2 coats in 1 pass.

### 3.06 COATING SCHEDULE

- A. Omit primer on metal surfaces that have been shop primed and touchup painted.
- B. Finish surfaces in compliance with the following systems for the substrate indicated.

#### EXTERIOR – INTERIOR - 1<sup>ST</sup> Line Quality (1)(2)(3)

1. Galvanized Metal
  - a. First Coat: Not Applicable. Etch by chemical preparation
  - b. Second Coat: Intermediate – High-Build Epoxy or High Build Polyurethane. Dry film thickness of 2.0-4.0 mils
    - (1) Carboline: Carboguard 890 VOC
    - (2) PPG: Amerlock 2 VOC
    - (3) Tnemec: Series L69 Epoxoline (166 Epoxoline – Non-VOC)
  - c. Third Coat: Finish – Aliphatic Polyurethane Enamel (Semi-Gloss). Dry film thickness of 3.0 – 4.0 mils
    - (1) Carboline: 133 MC Carbothane
    - (2) PPG : Amershield VOC Gloss
    - (3) Tnemec: 1080 WB EnduraShield (740 or 1075 Endurashield)

- 2 Shop Primed Metal
- a. First Coat: Zinc rich epoxy or urethane. Dry film thickness of 3.0–4.0 mils
    - (1) Carboline: 11 VOC Carbozinc / 859 VOC Carbozinc (touchup)
    - (2) PPG : 68 HS VOC Amercoat
    - (3) Tnemec: 94-H2O Hydro-Zinc (90-97 Tnemec-Zinc)
  - b. Second Coat: Intermediate – High-Build Epoxy or High Build Polyurethane. Dry film thickness of 4.0–8.0 mils
    - (1) Carboline: 890 VOC Carboguard
    - (2) PPG: not required
    - (3) Tnemec: Series L69 Epoxoline (166 Epoxoline – Non-VOC)
  - c. Third Coat: Finish – Aliphatic Polyurethane Enamel (Semi-Gloss). Dry film thickness of 3.0–4.0 mils
    - (1) Carboline: 133 MC Carbothane
    - (2) PPG: 450 HS Amercoat Gloss
    - (3) Tnemec: 1080 WB EnduraShield (740 or 1075 Endurashield)

- 3 Ferrous Metal
- a. First Coat: Zinc rich epoxy or urethane. Dry film thickness DFT of 2.5–3.5 mils
    - (1) Carboline: 11 WB Carbozinc / 859 VOC Carbozinc (touchup)
    - (2) PPG: 68 HS VOC Amercoat
    - (3) Tnemec: 94-H2O Hydro-Zinc (90-97 Tnemec-Zinc)
  - b. Second Coat: Intermediate – High-Build Epoxy or High Build Polyurethane. Dry film thickness of 4.0–6.0 mils
    - (1) Carboline: 890 VOC Carboguard
    - (2) PPG: not required
    - (3) Tnemec: Series L69 Epoxoline (166 Epoxoline – Non-VOC)
  - c. Third Coat: Finish – Aliphatic Polyurethane Enamel (Semi-Gloss). Dry film thickness of 3.0–4.0 mils
    - (1) Carboline: 133 MC Carbothane
    - (2) PPG: Amershield VOC Gloss
    - (3) Tnemec: 1080 WB EnduraShield (740 or 1075 Endurashield)

### 3.07 RIGHT OF REJECTION

Do not do coating work under conditions that would jeopardize appearance of work in any way. No work will be accepted which shows laps, stains, brush marks or flat spots or imperfections in coating. Unsatisfactory work will be rejected and shall be replaced at no additional cost to Owner.

### 3.08 PROTECTION

Protect work of other trades whether being coated or not and adjacent facilities against damage from coating operation.

### 3.09 REFINISHING

Should finish coating be applied before other trades have completed their work repair any damage to the final coating. Work under this section that has become marred or that has developed imperfections shall be refinished at no extra expense to the Owner.

### 3.10 CLEANING

- A. At the end of each workday remove rubbish, empty cans, rags and other

discarded materials. Remove surplus materials and debris from the site.

- B. After completing coating application clean spattered surfaces. Remove spattered coatings by washing, scraping or other non-defacing methods. Do not damage adjacent finished surfaces.

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
1. Exterior Painting:
    - a. Concrete columns including returns.
    - b. Concrete spandrels and parapet from top interior surface to drip at bottom.
    - c. All concrete walls, including returns
    - d. Plaster surfaces
    - e. Stairway markings / stair striping for the visually impaired
  2. Interior Painting:
    - a. All beams and slab soffits.
    - b. Ramp walls
    - c. Foundation, retaining light well walls
    - d. All columns (color coding as noted Section 10410).
    - e. Exterior surfaces of electrical cart storage, mechanical, storage, elevator machine, storage, communications and storage rooms masonry walls.
    - f. Plaster surfaces.
    - g. Gypsum board walls
    - h. Hollow metal doors and frames
    - i. Wood doors
    - j. Stairway markings / stair striping for the visually impaired
    - k. Elevator interior shaft walls, framing members, backsides of lobby entrance doors., separation screen, pit ladders, etc.
    - l. Elevator lobby walls
  3. Carefully examine other sections of these specifications and drawings to ascertain scope and extent of painting that is required.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 09870: Steel Coating System

1.03 CONDITIONS - DSA Requirements

Treads and Nosings: Provide 2" contrasting color (70% recommended) warning stripe of material at least as slip resistant as the treads of the stairs, 1" max. from edge of nosing and top landing. At interior stairs, provide warning stripe at top landing and bottom tread nosing only. At exterior stairs, provide warning stripe at top landing and all tread nosings. CBC Section 1133B.4.4.

1.04 SURFACES NOT TO BE PAINTED

Painter's finishes are not required on the following:

- A. Stainless steel, anodized aluminum, plated metals.
- B. Integral colored split-face concrete block, except sealer at exterior.
- C. All factory pre-finished items.
- D. Items as finished under Steel Coating System Section.
- E. Finish hardware, except prime coated hardware.
- F. Galvanized fabrications, unless indicated otherwise
- G. Do not paint moving parts of operating units; mechanical or electrical parts such as valve operators; linkages; sensing devices; and motor shafts, unless otherwise indicated.
- H. Do not paint over required labels or equipment identification, performance rating, name, or nomenclature plates.
- I. Sealants and caulking.

#### 1.05 DEFINITIONS

"Paint" as used herein, means coating systems materials including primers, emulsions, epoxy, enamels, sealers, fillers and other applied materials whether used as prime, intermediate or finish coats.

#### 1.06 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Schedule and Data
  - 1. Materials list of products, materials and items proposed to be provided under this section. Written approval of this list must be obtained from Architect before any work is started.
  - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
  - 3. List of all substrates / surfaces interior and exterior, in which the proposed products / materials are to be applied in conformance with the Scope of Work listed above and inclusive of any/all other surfaces intended to be painted but not necessarily indicated as required for a complete project unless indicated otherwise.
- C. Samples
  - 1. Following the selection of colors and glosses by the Architect, as described under "Color Schedules" in Part 2 of this section, submit samples for the Architect's review.
    - a. Provide three samples of each color and each gloss for each material on which the finish is specified to be applied.
    - b. Unless otherwise directed by the Architect make samples approximately 8" x 10" in size.
    - c. If so directed by the Architect, submit samples during progress of the work in the form of actual application of the approved materials on actual surfaces to be painted.
  - 2. Do not commence finish painting until approved samples are on file at the job site.

#### 1.07 QUALITY ASSURANCE

- A. Manufacturers - Conventional Paint Systems: Catalog names and system numbers of paint types listed herein are based on products of Dunn-Edwards, Glidden Professional, Frazee/COMEX, Sherwin Williams and Vista, and is the standard of quality against which the Architect will judge equivalency of the submittal. Provide one of these systems listed color matched to the Benjamin Moore colors / numbers listed / selected by the Architect on the drawings. The quality of titanium dioxide, the use of clays, aluminum silicate, talc and the purity of acrylic materials are a few of the criteria which will be used by the Architect in determining equivalency of proposed submitted materials that differ from those listed.
- B. Paint Coordination
1. Provide finish coats compatible with the prime coats actually used.
  2. Review other sections of these specifications as required, verifying the prime coats to be used and assuring compatibility of the total painting system for the various substrata.
  3. Upon request furnish information on the characteristics of the specific finish materials to assure that compatible prime coats are used.
  4. Provide barrier coats over non-compatible primers or remove the primer and re-prime as required.
  5. Notify the Architect in writing of anticipated problems in using the specified painting systems over primers supplied under other sections.
  6. Coordinate with Architect for color scheme of exterior painting. Verify whether reveals are to be field color or if painted a contrasting color.
- C. Acceptance of Work of Others
1. Inspect surface substrate materials to ascertain that they are suitable for painting. Report or correct any defects or other unsatisfactory conditions prior to painting.
  2. Applications of any materials of this section over respective surfaces shall be construed as acceptance of surface conditions. Excuses for failure of painting work due to improper sub-surfaces will not be acceptable.
- D. Comply with state and local agencies governing the use of paint materials and control of volatile organic compound regulations.

#### 1.08 PROTECTION

- A. Provide dust-stops required for protection. Do no painting in dusty rooms or in rooms where other work is being performed that might raise dust or cause other disturbances that would damage painted surfaces. Isolate sections of the building as necessary to prevent dust circulation.
- B. Protect or mask finished work during progress of painting and make good any damage done to adjacent work or surfaces. Cover and protect finished work of other trades and clean items of paint splattering.
- C. Do not store or mix paint materials on or adjacent to finished floors and walls, unless surfaces are protected from splatter. Handling and application of materials of this trade shall be at sole risk of Contractor. Replace or make suitable repair of any damaged portions of work at Contractor's expense.

- D. Provide adequate barriers, "Fresh Paint" signs or other devices including temporary barriers for temporary heating during paint application if it becomes necessary to protect paint work during its application and to conform to manufacturers recommended paint application instructions until acceptance of entire job. Repair or replace damaged work at no additional cost to Owner.
- E. Hardware that is not primed for painting and electric switch plates and similar items that are not to be painted shall be removed, after applicable surface has been painted, reinstalled. If hardware service cover-plates and screws are required to be painted, match adjacent surfaces. Repairs and replacement required due to damage shall be at Contractor's sole expense.

#### 1.09 JOB CONDITIONS

- A. Do not apply paints when the temperature of surfaces to be painted and the surrounding air temperatures are below 50 deg. F., unless otherwise permitted by the manufacturers' printed instructions and as acceptable to the Architect.
- B. Weather Conditions
  - 1. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85%; or to damp or wet surfaces unless otherwise permitted by the manufacturers' printed instructions and as acceptable to the Architect.
  - 2. Applications may be continued during inclement weather only within the temperature & weather limits specified by the paint manufacturer as being suitable for use during application and drying periods.

#### 1.10 REQUIREMENTS

Elevator shaft framing shall include all surfaces whether or not exposed to view through the glazed window wall. Shaft interior shall be considered all concrete shaft and pit walls, divider, separator and hoist way beams, miscellaneous metal supports and angles, back sides of elevator doors at each level, flashings, etc.

#### 1.11 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Materials shall be delivered to jobsite in original cans or packages, sealed and bearing name of manufacturer, product number and kind of paint. Paint shall be mixed at the factory with primers, undercoat and enamels in separate containers. Bulk paste shall not be used.
- B. Take precautions to prevent fire as required by codes, rules and as directed. Remove rags and waste soiled with volatile paint from premises at end of each day's work. Store used rags in metal containers with metal covers.
- C. A "NO SMOKING" sign shall be placed over the door and inside of each paint storage or mixing room and maintained there at all times. Keep open cans of volatiles away from paint storage area. Supply good ventilation.

#### 1.12 GUARANTEE

- A. Furnish a manufacturer's written labor and material guarantee to the effect that painted surfaces shall under normal usage and conditions, not fade beyond



allowable tolerances, chip, crack, rust or blister for a period of not less than two (2) years from final acceptance of work by the District. Any defects discovered during this period whether due to faulty materials or workmanship that would be interpreted to mean incorrectly applied materials is to be replaced (labor and materials) without additional cost to District.

1. Installed materials that are considered to be failed or faulty must exhibit one or more of the visual defects listed above. Claim of defect due to fade shall be substantiated by an independent testing lab that specializes in the testing of coatings to report their findings that installed materials have weathered in conformance or in excess of the manufacturers reported / published performance test data for that same material attribute. Losing party shall pay the cost of the testing labs fee.
2. Contractor shall furnish a two (2) year labor warranty for the work of this contract and the manufacturer supplying materials shall carry the burden of providing replacement materials and the labor required at their discretion to execute repair of the proven failed area.

## 2.00 PRODUCTS

### 2.01 MATERIALS

- A. Materials necessary to complete the painting as herein specified and listed by manufacturer and material number are standards for kinds, quality and function, to establish types and quality, and are taken from the stock list of architectural finishes of the Dunn-Edwards, Frazee/COMEX, Glidden Professional, Sherwin-Williams Company and Vista Paint Companies. Provide listed or approved alternate manufacturer (Benjamin Moore) systems that comply with required criteria.
- B. Materials for undercoats and finish coats of paint shall be ready-mixed except field catalyzed coatings, and shall not be changed except thinning of undercoats (when required) or coloring, any of which shall be in strict accord with the recommendations of the manufacturer. Paints of different manufacturers shall not be mixed. Pigments shall be fully ground maintaining soft paste consistency capable of being readily and uniformly dispersed to complete homogeneous mixture. Paints shall have good flowing and brushing properties and be capable of drying or curing free of streaks and sags.

### 2.02 COLOR SCHEDULES

- A. Colors shall be selected from color chip samples provided by one of the approved manufacturers. Match approved samples for color and coverage. The Architect will prepare a color schedule with samples for guidance in painting from the selected manufacturer's color key systems.
- B. Requirements of the Steel Coating Section 09870, with regards to colors selected are in addition to that specified herein for work of this section and therefore adds to the total number of possible colors available for Architect's selection and usage

### 2.03 APPLICATION EQUIPMENT

- A. For application of the approved paint use only such equipment as is recommended by the manufacturer and as acceptable to the Architect.
- B. Prior to use of application equipment, verify that the proposed equipment is actually compatible with the material to be applied and that integrity of the finish will not be jeopardized by use of the proposed equipment.

#### 2.04 OTHER MATERIALS

Provide other materials not specifically described but required for a complete and proper application as selected by the Contractor subject to the acceptance by the Architect.

### 3.00 EXECUTION

#### 3.01 SCAFFOLDING

Furnish and maintain scaffolding and similar temporary work necessary for execution of work. Scaffolding shall not to interfere with work of other sections. Shift between coats if necessary to allow installation of other work; remove when no longer needed.

#### 3.02 QUALITY OF WORK

Apply materials by skilled workers. Do not assign workers to any work requiring special finishing if they have not had previous experience in that type of work. Evenly spread and smoothly flow on materials without runs, sagging, brush marks, skips, undercoats showing through or other defects.

#### 3.03 SPECIAL SUPERINTENDENCE

Finish painting must be first-class in every respect. Repaint and refinish work that Architect indicates is not to highest standards of trade at no additional cost to Owner. Improper work or materials shall be removed, replaced and refinished.

#### 3.04 PREPARATION FOR PAINTING

- A. General
  - 1. Surfaces shall be clean and dry when paint is applied. Rooms in which painting is to be started shall be swept clean, dusted and then all surfaces wiped with a damp cloth to remove dust and dirt.
  - 2. No painting is permitted until surfaces are dry and fully cured. New masonry or concrete shall have aged at least 30 days under good drying conditions prior to painting. Use moisture meter to ascertain moisture content recommended by applicable paint manufacturer.
  - 3. Mask adjoining surfaces and protect adjacent areas not to be painted.
- B. Metal Surfaces: Comply for items not finished under the Steel Coating System Section.
  - 1. Wash metal surfaces with mineral spirits to remove any dirt or grease, before applying paint materials. Before painting clean rust or scale using wire brushes or sandpaper. Clean shop coats of paint that have become marred. Touch-up abraded parts with primer.
  - 2. Work includes touching up shop prime coats, as required.

3. Etch exposed galvanized metal with Jasco Prep N Prime, Dunn-Edwards – Galva-Etch ME01, Sherwin-Williams DTM Wash Primer B71Y1, or equal, before priming and painting.
- C. Concrete/Masonry/Plaster
1. Surface shall be dry before any sealer or paint is applied. Use moisture meter to ascertain moisture content of surfaces to be painted.
  2. Clean surfaces of dirt, laitance, encrustations and foreign matter. Ensure concrete surfaces that are to be painted are free of oil or other form release agents that are non-compatible with the paint. Fill cracks, holes, pits, and other imperfections in paint surfaces flush and smooth. Chemically treat surfaces as required to counteract lime and alkali burns, "hot spots" and other inherent unacceptable properties.
  3. Treat stains and spots where surface is touched up to prevent stains from coming through paint. Completed finish shall be free from alkali burns and dull spots and shall be uniform in color and sheen.
- D. Wood Surfaces
1. Do necessary puttying of nails, holes, cracks, and other defects after first coat with putty of color to match that of finish. Bring putty flush with adjoining surface and sand smooth.
  2. Sand smooth interior trim to be finished in paint, stain or enamel; clean surface before proceeding with first coat application. Sand painted surfaces between coats with fine sandpaper to produce an even, smooth finish.
- E. Drywall: Surfaces shall be cleaned of dust and grease. Correct defects in taping and finish of joints prior to application of paint.

### 3.05 PRIMING AND BACKPAINTING

- A. Carefully prime finish lumber and millwork with applicable primer and back paint as specified. Back paint immediately upon delivery of millwork to jobsite.
- B. Apply first coat of paint or other finish immediately after woodwork has been fitted, erected, sanded and approved. Touch up shop coats of paint prior to application of required priming.

### 3.06 THINNING

Thin only as directed by printed instructions of manufacturer of applicable paint. Paint thinners to be exact type recommended by manufacturer of paint brand used and shall bear same brand name.

### 3.07 PAINT APPLICATION

- A. General
  1. Touch-up shop applied prime coats that have been damaged. Touch-up bare areas and "spot" touch-up undercoats as necessary prior to start of finish application. After spot touch-up of shop applied prime coat finely sand down and apply a field primer coat as specified over shop prime coat before proceeding with finish coating.

2. Slightly vary the color of succeeding coats.
  - a. Do not apply additional coats until the completed coat has been inspected and accepted by Architect.
  - b. Only the inspected and accepted coats of paint will be considered in determining the number of coats applied.
3. Sand and dust between coats to remove defects visible to the unaided eye from a distance of five feet.
4. On removable panels and hinged panels, paint the backsides to match the exposed sides.

B. Number of Coats: Number of coats specified is the minimum requirement. Insure acceptable paint finishes of even, uniform color, completely opaque, free from cloudy or mottled appearance and uniform thickness. Upon completion of work, painting that does not show uniform color, texture and thickness will be deemed incorrectly thinned or applied. Contractor shall apply additional coats at no cost to Owner until uniform results are obtained.

3.08 PAINT SCHEDULE Numbers indicated identify the paint system in white. Provide the same material indicated in the color selected by the Architect.

A. EXTERIOR

<u>Substrate</u>	<u>Dunn-Edwards</u>	<u>Glidden Professional</u>	<u>Frazer COMEX</u>	<u>Sherwin-Williams</u>	<u>Vista</u>
1. Concrete and Plaster					
1st Coat - Epoxy	ESPR00	6001	266	B42WW49	4600
2nd Coat-Flat	EVSH10	6201	203	K33	2000
2. Concrete Block Masonry					
5 mil DFT - Acrylic					
1st Coat	SBPR00	4000	262	B25W25	040
2nd Coat-Flat	EVSH10	6201	203	K33	2000
3. Metal - Ferrous - Alkyd					
1st Coat	BRPR00	205		B50NZ	9600
2nd Coat-Semi-Gloss	EVSH50	6407		B55Z-600	9800
3rd Coat-Semi-Gloss	EVSH50	6407		B55Z-600	9800
3. Metal - Ferrous - Acrylic:					
1st Coat	WBPR10	4020	561	B66W1	4800
2nd Coat-Semi-Gloss	EVSH50	6407	124	B42	8400
3rd Coat-Semi-Gloss	EVSH50	6407	124	B42	8400
4. Metal -Non-Ferrous - Alkyd					
1st Coat	BRPR00	205		B50WZ30	9600
2nd Coat-Semi-Gloss	EVSH50	6407		B55Z-600	9800
3rd Coat-Semi-Gloss	EVSH50	6407		B55Z-600	9800
4. Metal-Non-Ferrous - Acrylic					

1st Coat	UGPR00	4020	561	B66W1	4800
2nd Coat–Semi-Gloss	EVSH50	2406	124	B42	8400
3rd Coat–Semi-Gloss	EVSH50	2406	124	B42	8400
5. Metal – Galvanize - Alkyd					
Pretreatment	SC-ME01-1	Jasco	Jasco	B71Y1	Jasco
1st Coat	GAPR00	Dev-Flex?		B50WZ30	9600
2nd Coat–Semi-Gloss	EVSH50	4160		B55Z-600	8400
3rd Coat–Semi-Gloss	EVSH50	AT6300H		B55Z-600	8400
		AT6300H			
5. Metal – Galvanize - Acrylic					
Pretreatment	SC-ME01-1	Jasco	Jasco	B71Y1	Jasco
1st Coat	UGPR00	4020	561	B66W1	9600
2nd Coat–Semi-Gloss	EVSH50	2406	124	B42	8400
3rd Coat–Semi-Gloss	EVSH50	2406	124	B42	8400
6. Metal – Aluminum - Acrylic					
1st Coat	42-44	4020	561	B66W1	4800
2nd Coat-Semi-Gloss	EVSH50	2406	124	B42	8400
3rd Coat-Semi-Gloss	EVSH50	2406	124	B42	8400

Stairway Markings: Each flight of each exterior stair tread shall be marked by a strip of clearly contrasting color (traffic yellow) at least 2" wide (3" to cover the tooled tactile strip nosings) placed parallel to and not more than 1" from the nose of the step or landing. Use template to produce neat, clean cut and uniform strip. Two coats minimum.

- B. INTERIOR - Concrete Surfaces: Surfaces include four sides interior columns and interior face of exterior columns including integral columns at shear walls. Color-coded band (at locations as hereinbefore mentioned) around columns to designated floor level and at floor splits (color change occurs at columns as directed by Architect). Each floor will have a different color. Refer to graphics schedule, related specification sections and drawing details for requirements. Interior surfaces include all slab soffits, sides and bottoms of beams.

<u>Substrate</u>	<u>Dunn-Edwards</u>	<u>ICI / Dulux</u>	<u>Frazee</u>	<u>Sherwin-Williams</u>	<u>Vista</u>
1. Concrete and Plaster					
1st Coat - Epoxy	ESPR00	36	266	B42WW49	4600
2nd Coat – Flat	SPMA10	1201	010	A96	8100
2. Conc. Block Masonry					
5 mil DFT - Acrylic					
1st Coat	SBPR00	3010	262	B25W25	040
2nd Coat – Flat	SPMA10	1201	010	A96	8100
3. Metal–Ferrous-Alkyd					
1st Coat	BRPR00	Dev-Flex 4160		B50NZ	9600
2nd Coat – Eggshell	71 Series	MG13-11		B33WZ2000	9700
2nd Coat – Semi-Gloss	72 Series	SG45		A40W15	9800

2nd Coat - Gloss	73 Series	GX22		B54Z	9900
3. Metal-Ferrous-Acrylic					
1st Coat	W520	4020	561	B66W1	4800
2 <sup>nd</sup> Coat – Eggshell	SPMA30	1402	022	B20W200	8300
2nd Coat – Semi-Gloss	SPMA50	1406	131	B31W200	8400
2nd Coat – Gloss	EVSH60	3028	143	A85	8500
4. Metal Non-Ferrous-Alkyd					
1st Coat	GAPR00	4160		B50WZ30	9600
2nd Coat – Eggshell	71 Series	MG13-11		B33WZ2000	NA
2nd Coat – Semi-Gloss	72 Series	SG45		A40W15	9800
2nd Coat - Gloss	73 Series	GX22		B54Z	9900
4. Metal-Non-Ferrous - Acrylic					
1st Coat	UGPR00	4020	561	B66W1	4800
2 <sup>nd</sup> Coat – Eggshell	SPMA30	1402	022	B20W200	8300
2nd Coat – Semi-Gloss	SPMA50	1406	131	B31W200	8400
2nd Coat – Gloss	EVSH60	3028	143	A85	8500
5. Metal-Galvanize - Alkyd					
Pretreatment	SC-ME01-1	Dev-Flex	Jasco	B71Y1	Jasco
1st Coat	GAPR00	Jasco		B50WZ30	9600
2nd Coat – Eggshell	71 Series	4160		B33WZ2000	NA
2nd Coat - Semi-Gloss	72 Series	MG13-11		A40W15	9800
2nd Coat - Gloss	73 Series	SG45		B54Z	9900
		GX22			
5. Metal-Galvanize - Acrylic					
Pretreatment	SC-ME01-1	Jasco	Jasco	B71Y1	Jasco
1st Coat	UGPR00	4020	561	A96	4800
2 <sup>nd</sup> Coat – Eggshell	SPMA30	1402	022	B20W200	8300
2nd Coat – Semi-Gloss	SPMA50	1406	131	B31W200	8400
2nd Coat – Gloss	EVSH60	3028	143	A85	8500
6. Gypsum Wallboard Acrylic					
1st Coat	VNPR00	1030	061	B28W400	1100
2nd Coat – Flat	SPMA10	1201	010	A96	8100
2 <sup>nd</sup> Coat - Velvet	SPMA20	1402	022	B20W200	NA
2 <sup>nd</sup> Coat – Eggshell	SPMA30	1406	131	B31W200	8300
2nd Coat – Low Sheen	SPMA40	3028	143	A85	NA
2nd Coat – Semi-Gloss	SPMA50				8400
2nd Coat- Gloss	EVSH60				8500

7. Wood – Paint Finish

Acrylic

1st Coat	IKPR00	3210	168	B28W101	4200
2nd Coat – Flat	SPMA10	1201	010	A96	8100
2 <sup>nd</sup> Coat - Velvet	SPMA20	1402	022	B20W200	1700
2 <sup>nd</sup> Coat – Eggshell	SPMA30	1406	131	B31W200	7000
2nd Coat – Low Sheen	SPMA40	3028	143	A85	8500
2nd Coat – Semi-Gloss	SPMA50				
2nd Coat - Gloss	EVSH60				

8. Piping and Conduit: Paint finish exposed piping, storm drain piping, Fire Department risers and controls, ductwork, conduit and other features not specifically designated to match adjacent surfaces or as directed by Architect. Paint per Item 3 or 4 above as applicable.

9. Stairway Markings: The upper approach and the lower tread of each flight of each interior stair shall be marked by a strip of clearly contrasting color (traffic yellow) at least 2" wide (3" to cover the tooled tactile strip nosings) placed parallel to and not more than 1" from the nose of the step or landing. Use template to produce neat, clean cut and uniform strip, two coats minimum.

END OF SECTION





1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this section.
- B. Furnish all labor, materials, services, equipment and appliances to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Layout work and field measuring
  - 2. Painting parking stall lines
  - 3. Painting arrows, markings, signs and letters on pavement

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 02510: Asphaltic Concrete Paving
- B. Section 02520: Site Concrete Work
- C. Section 03300: Concrete and Concrete Finishes
- D. Section 09985: Parking Bumper Wheel Stops
- E. Section 09990: Parking Signage

1.03 REFERENCE STANDARDS

- A. Standard Specification for Public Works Construction, Reference Specification (RS):
  - 1. Section 210 Paint and Protective Coatings
  - 2. Section 310 Painting Traffic Striping Pavement Marking and Curb Markings (except 310-5.6.10)
- B. Federal Specifications (FS):
  - TT-P-115F Solvent Based Traffic Paint
  - TT-P-1952B Water Based Traffic Paint
  - TT-P-1952D Water Based - Fast or Rapid Dry
- C. Standard Specifications for Public Works Construction (SSPWC), latest edition.
- D. State of California Standard Specification for Construction of Local Streets and Roads (SSS), latest edition.
- E. State of California Standard Plans for Construction of Local Streets and Roads (SSP), latest edition.

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01340.
- B. Complete lists of materials proposed for use giving the manufacturer's name, catalog number, catalog cut and MSDS sheets for each item.

- C. Detailed shop drawings indicating sizes and layout of lines, markings and arrows and the dimensioned location of placement on site.
- D. Manufacturer's standard color palette for review and acceptance.
- E. Manufacturer's current technical data, specifications, installation instructions, including relevant limitations, safety and environmental cautions, application rates and equipment to be used for each product specified
- F. Test reports and certifications per Reference Standard Specification Subsection 210.1.7.

#### 1.05 QUALITY ASSURANCE

- A. Applicator Qualifications: Perform work by skilled personnel regularly engaged and specializing in providing parking lot striping service for a minimum of two (2) years. The Contractor shall employ and use adequate numbers of skilled workers who are thoroughly trained, experienced and who are completely familiar with the specified requirements and the means and methods needed for timely and proper performance of the completion of the work, so that no delays on any portion of the project shall occur.
- B. All paint shall comply with governing Air Quality Management District AQMD rules and regulations and in accordance with the California Air Resources Board (CARB) effect at the time of application, over airborne emissions and industrial waste disposal. Materials shall be in compliance with less than 150 (VOC) g/l.
- C. Striping paint shall be either water based vinyl or acrylics or alkyd resin type traffic paints. Paints shall be compatible with new asphalt concrete paving and/or bituminous seal coating materials (as applicable). Coordinate work requirements with civil drawings and/or District, to determine whether the work scheduling allows for the asphalt concrete paving is to receive bituminous slurry seal coating. If the parking lot surface is to be sealed, and a full 30-day full cure time is required prior to application of the striping. Do not use products if it is deemed that usage will impact construction scheduling and negatively impact the lot release to the District.
- D. Dry film thickness for striping and stenciled areas shall be gauged at 15 wet mils so that the end result is **10 dry mils minimum**. Dry film thickness may require being increased based on the amplitude / conditions of the surface to be coated and the resulting painted surface provided. The resulting painted surface is to be completely opaque with visible build. If required, Contractor shall make a second pass / application to deliver the required results, without additional cost to the Owner.

#### 1.06 GENERAL REQUIREMENTS

- A. All striping and pavement signs, markings and letters shall be located per plans. All lettering shall be typograph letters /Helvetica medium, size as shown on Drawings, unless indicated otherwise on signage & graphic schedule. Alternative letterforms are not acceptable. Letter spacing shall be "normal".
- B. All construction shall conform to the SSPWC.

- C. Protection
  - 1. Contractor shall schedule and perform his work under this contract so no disturbance will be caused to District's normal operations located on the premises and shall protect existing improvements from damage due to operations at all times.
  - 2. Exercise all precautions necessary to protect other construction on property. Contractor shall be responsible for, and shall pay for any damage to such adjacent construction or personal property (i.e. automobiles, etc.), on account of operations under this Contract.
  
- D. Disposal of Debris
  - 1. Remove all trash and debris generated by operations from the site and legally dispose, at the Contractor's expense at an authorized dumping area.
  - 2. Dispose of all material spills, waste and containers in accordance with state, federal and local regulations with regards to waste and hazardous waste disposal. Contractor / District to approve disposal site, sign and get copies of all manifest.
  - 3. Submit upon request, receipts showing payment of dumping fees or other written evidence of approval for dumping prepared by authorities having jurisdiction over the dumping area to show proper and approved disposition of the waste material.

#### 1.07 INSPECTION

- A. After the Contractor has laid out pavement markings, and prior to application of paint materials, the surfaces to be painted shall be inspected. Deficiencies in layout and surface preparation shall be corrected by the Contractor. The inspection shall not relieve the Contractor of the responsibility for accurate and acceptable work.
- B. Obtain Architect's approval of chalk layout prior to commencement of striping. Notify Architect 72 hours in advance of layout.
- C. Owner reserves the right to modify striping layout prior to layout by Contractor.

#### 1.08 REGULATORY REQUIREMENTS

Comply with all requirements for handicap accessibility in accordance with California Building Code with Title 24 CCR Amendments, applicable section of Chapter 31A, Chapter 11B, and current ADA regulations. Refer also to "The California Access Compliance Source Accessibility Standards Interpretive Manual", CalACS. Blue paint for the symbol of accessibility shall be in conformance with Federal Standard, (FS 595 A) and CCR, Title 24, CBC.

#### 1.09 PROJECT CONDITIONS

- A. Take precautions necessary to avoid and mitigate the effects of wind drift in the application of liquid materials.

- B. Do not apply marking paint when weather is foggy, rainy or ambient temperatures are below 50 degrees F, nor when such conditions are anticipated during eight hours after application.

#### 1.10 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery: Manufacturer's original unopened containers with labels and MSDS sheets in legible condition. The Architect reserves the right to inspect the containers prior to their opening to review the accompanying bills of lading and to reject materials in opened containers.
- B. Storage: Store all materials off-ground under cover as required. Protect materials from adulteration by infiltration. Conform to the manufacturer's environmental requirements relative to storage and handling of materials in compliance with OSHA.

### 2.00 PRODUCTS

#### 2.01 MATERIALS

- A. Traffic Surface Paint: Provide water-based or low V.O.C., acrylics or alkyd resin type traffic, semi-gloss paints per Federal Specifications (FS) as listed hereinbefore. All paint and related materials shall conform to Section 210.1 of the SSPWC.
  1. Dunn-Edwards Stripe, W-801 Vinyl-Stripe.
  2. Frazee, 506 Traffic Line Paint
  3. Sherwin-Williams, TM Series Setfast Traffic Marking Paint
  4. Vista Paint 6800, 6801 (1952B) 6900, 6901 (1952D)
  5. Ennis Traffic Safety Solutions, 'Standard Dry'  
Fast Dry, High Build, Wolverine, Durasheen, Solvent Borne
  6. Pervo 3080 Series (Also owned by Ennis)  
White color for stalls and for directional markings (surface lots)  
Yellow (black interior) for directional markings  
Red for fire lanes  
Blue and white for accessible parking symbols.
    - Handicapped Symbol of Accessibility and Lettering: Blue traffic paint. Color shall match No. 15090 in Federal Standard 595A (similar to royal blue), in conformance with CCR Title 24, Section 2-1720 and Cal ACS Section 3107A(c) Handicap Regulations. California Building Code Section 1129 B.5 1 & 2.Black for numbering assignment placard, unless indicated otherwise by the Architect

### 3.00 EXECUTION

#### 3.01 WEATHER LIMITATION

Painting shall be performed only when the atmospheric temperature is above 50 degrees F. and the weather is not excessively windy, dusty, foggy or humid.

#### 3.02 LAYOUT OF MARKINGS

- A. The Contractor shall layout the markings at the locations and to dimensions indicated on the approved shop drawings. Chalk lines shall be approved prior to execution of the painting work.
- B. Contractor shall apply thin visible semi permanent indicator lines, over the approved chalk lines. These lines shall remain intact for 30 days until the asphalt concrete surface has cured. Re-chalk lines to the approved layout and paint pavement markings in conformance to this Section 3 days after the seal application has been completed.
- C. Word marking, letters, numerals and symbols shall be applied using stencils, templates, forms and guidelines.

### 3.03 SURFACE PREPARATION

- A. Before application of paint, the pavement surface shall be dry, free of dirt, grease, oil, acids, laitance or other foreign matter or surface contaminants, and from loose, peeling, or poorly bonded paint, which would reduce the bond between the paint and the pavement. Areas that need cleaning shall be scrubbed with a water solution of tri-sodium phosphate (10 percent Na<sub>3</sub> Po<sub>4</sub> by weight) or other cleaning solution approved by paint manufacturer. After cleaning, the surface shall be rinsed with water and dried before painting.
- B. Unless otherwise specified, markings on new and existing pavements shall be removed by an approved method.

### 3.04 EQUIPMENT

Pressurized, self contained paint machine capable of applying a straight line from 2 inches to 6 inches wide, with consistent coverage of a minimum of 100-110 square feet per gallon, gauged as specified hereinbefore.

### 3.05 APPLICATION

- A. Do not apply paint when air or surface temperature is below 50 degrees F, or when surfaces are damp and/or there is a chance of rain within 24 hours after application
- B. All pavement striping and markings shall conform to Section 310-5.6 of the SSPWC. Stencils or templates for markings not included shall conform to those shown in the SSP Standard Plans A20A through A24E.
- C. Paint shall be mixed in accordance with the manufacturer's instructions. Paint shall be applied to the pavement surfaces at the proper temperature, in its original consistency without the addition of any paint thinner to the minimum gauged thickness specified.
- D. Paint shall not be applied to new asphalt concrete surfaces prior to 3 days after material has been placed. Paint shall not be applied to bituminous slurry seal coat surfaces before 28 days after the material has been applied. Paint shall not bleed, curl or discolor when applied to surfaces. If bleeding or discoloring occurs the unsatisfactory areas shall be repainted at Contractor's expense.

- E. Machine-paint lines at a rate to cover not more than 100 square feet of surface per gallon of paint or as required to be completely opaque (equivalent to approximately one gallon for 350 lineal feet of 4 inch wide strip). Dry film thickness for striping and stenciled areas shall be **10 mils minimum**. Rate can increase to a maximum of 400 linear feet per gallon based on conditions of surfaces to be coated, so long as the dry film thickness remains above the minimum required.
- F. Striping: Provide straight-edged uniform line width of 4 inches, unless noted otherwise on the Drawings. Provide hairpin stripe hatching between handicap parking stalls as code requires.
  - 1. Stall Divisions: Provide between standard and compact size parking stalls, two white 4 inch wide solid stripes, spaced as indicated on Drawings. At handicap stalls provide two blue stripes in lieu of white stripes.
  - 2. Arrows and Pavement Signs: Paint directional arrows with stencils or other approved method. Stroke of letters shall be as indicated. Islands and "No Parking" areas shall have 4" stripes as indicated on Drawings.
  - 3. Apply required approved stencils at compact car stalls.
- G. Accessible Symbol: Install accessible signs and pavement marking at each accessible parking space. Apply 3'-0" by 3'-0" square International Accessible Symbol on pavement surface. On concrete surfaces, paint white reflectorized symbol on blue background square. On asphalt surfaces, paint additional white border around blue background square.
- H. Apply fire lane markings in accordance with Local Fire Marshal requirements. Use approved stencils for lettering.

### 3.06 TOLERANCES

Width of stripes shall not vary more than one-quarter inch, plus or minus from the width shown on Drawings. The alignment and straightness of stripes shall not deviate more than one-half inch in fifty feet. Deviations in excess of the tolerances stated herein shall be removed and the painting redone at the Contractor's sole expense.

### 3.07 PROTECTION OF EXISTING FACILITIES

Where pavement markings are applied adjacent to existing facilities, the Contractor shall protect adjacent surfaces from disfigurement. Disfigurement or paint stains shall be removed by the Contractor.

### 3.08 CLEANUP

Over-spray, dripped, and splattered paint shall be removed as soon as possible before curing, by means which will not damage the applied surface. Remove excess materials and waste from the site.

END OF SECTION

1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this section.
- B. Furnish all labor, materials, services, equipment and appliances to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Layout work and field measuring.
  - 2. Precast concrete wheel stops, only where indicated.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 09980: Parking Area Striping and Markings
- B. Section 09990: Parking Signage

1.03 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Complete lists of materials proposed for use giving the manufacturer's name, catalog number, catalog cut and MSDS sheets for each item.
- C. Detailed shop drawings indicating sizes and layout of parking bumper wheel stops.
- D. Manufacturer's current technical data, specifications, installation instructions, including relevant limitations, safety and environmental cautions, application rates and equipment to be used for each product specified

1.04 REGULATORY REQUIREMENTS

Comply with all requirements for handicap accessibility in accordance with California Building Code with Title 24 CCR Amendments, applicable section of Chapter 31A, Chapter 11B, and current ADA regulations. Refer also to "The California Access Compliance Source Accessibility Standards Interpretive Manual", CalACS.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery: Manufacturer's original unopened containers with labels and MSDS sheets in legible condition.
- B. Handling: Handle materials with care to prevent damage to units prior to installation. Protect anchorage materials from adulteration by infiltration. Conform to the manufacturer's environmental requirements relative to storage and handling of materials.

2.00 PRODUCTS

## 2.01 MATERIALS

- A. Concrete Parking Bumpers: Parking bumpers shall be standard precast concrete bumpers, not less than 7-1/2" wide, 5-1/2" high, 4'-0" or 6'-0" long (as indicated), with chamfered corners and drainage slots on underside. Fabricate using ready mix conforming to ASTM C94 and reinforced full length with not less than (2) No. 4 deformed reinforcing bars conforming to ASTM A615. Minimum compressive strength of concrete shall be 3,500psi at 28 days. Bumper surfaces shall be smooth and free of pits or rock pockets.
- B. Reinforcing Steel: Provide galvanized rebar conforming to ASTM A767 A615 Grade 60, deformed No.4 (1/4" minimum) anchoring pins to attach precast concrete wheel stops into the asphalt concrete surface parking lot paving and substrate below.
- C. Adhesive:
  - 1. Epoxy: Provide a two-component 100% solids, moisture tolerant, high modulus, flexible / semi-rigid, high strength, structural, smooth resin paste epoxy adhesive, conforming to ASTM C881 and AASHTO M235. Products shall be Master-Builders-Masterfill 300; Sikadur 51 NS/SL; Euclid 700, or equal.
  - 2. Polymerically Modified Resinous Composition: Crafcoc Quikstix adhesive is a hot applied adhesive / crack repair for asphalt and concrete surfaces.

## 3.00 EXECUTION

### 3.01 SURFACE PREPARATION

Before application of adhesives, the pavement surface shall be dry, free of dirt, grease, oil, acids, laitance or other foreign matter or surface contaminants, and from loose, peeling, or poorly bonded paint which would reduce the bond between the parking bumper wheel stop and the pavement.

### 3.02 PARKING BUMPERS

- A. Install precast parking bumpers only at parking spaces in accordance with the indicated layout.
- B. Bumpers shall be anchored to A.C. surfaces by driving not less than two 1/2" diameter galvanized pins in pre-drilled holes in the concrete bumpers not less than 2'-0" through the paving into the earth.
- C. Bumpers shall be applied to concrete surfaces by two component epoxy anchoring adhesive covering the entire bottom of the parking bumper full length and width then pressing down to join the two contact surfaces.
- D. Leave wheel stops securely anchored and in proper alignment.

### 3.03 PROTECTION OF EXISTING FACILITIES

Where wheel stops are applied to existing paving surfaces / existing facilities, the Contractor shall protect adjacent surfaces from disfigurement. Disfigurement from adhesive stains shall be removed by the Contractor.



3.04 CLEANUP

Spilled / splattered adhesives shall be removed as soon as possible before curing by means which will not damage the applied surface. Remove excess materials and waste from the site.

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. All non-illuminated signs, sign support, posts, concrete bases, inserts and attachments required for signs in-place.
  - 2. Accessible signs at accessible parking spaces.
  - 3. Health warning signage

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 02510: Asphalt Concrete Paving
- B. Section 02520: Site Concrete
- C. Section 09980: Parking Area Striping and Markings
- D. Section 09985: Parking Bumper Wheel Stops

1.03 CONDITIONS

DSA Requirements: Parking spaces for the disabled shall be marked according to CBC Sections 1129B.3 and 1129B.4.

1.04 QUALITY ASSURANCE

- A. Provide signs for assuring access for persons with disabilities in accordance with state and federal regulations.
  - 1. California Regulations: Comply with California Building Code
  - 2. Federal Regulations: Comply with Americans with Disabilities Act Accessibility Guidelines (ADAAG).
- B. Engineering: Responsibility for structural engineering of the signs is the responsibility of the sign fabricator and contractor. The Drawings provided are for the purpose of establishing design intent and desired visual appearance, and are not intended to restrict the fabricator or contractor if more suitable structural design or method of anchorage is required. Any such deviations from the Drawings or Specifications proposed must be approved by the District and Architect prior to commencing fabrication of the signs. Exterior signs including foundation systems to be engineered to withstand 100 mile an hour wind loads Submit calculations by a qualified state registered Engineer to substantiate each different type of sign in-place.

1.05 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340

- B. Complete shop drawings indicating all sign styles, lettering, material specifications, color, dimensions and installation details.

## 1.06 SYSTEM DESCRIPTION

- A. Comply with the requirements of CBC.
- B. Parking Lot Entrance Signs and Accessible Parking Space Identification Signs:
  - 1. Parking lot entrance signs shall comply with CBC, warning that cars parked in parking spaces reserved for people with disabilities will be towed.
  - 2. Parking spaces reserved for people with disabilities shall be identified with a reflective sign featuring the ISA, which shall comply the CBC. Van accessible spaces shall be identified with the term "Van Accessible" (CBC 1129B.5).
  - 3. Reserved parking spaces shall also be identified by the ISA at the foot of the space in compliance with CBC (CBC 1129B.5.1-2).

## 1.07 JOB CONDITIONS

Verify and be responsible for all dimensions and conditions for the work, especially those relating to placement of the signs in the finished localities. Notify the Architect of any variations from the dimensions and conditions shown on the Drawings that may result in an unacceptable installation.

## 1.08 GUARANTEE

- A. Guarantee all workmanship and materials for the signage and graphics furnished for a period of one (1) year after the final acceptance of the signage and graphics and, if during the guarantee period any fading, defects or faulty materials are found, immediately, upon notification by the District or Architect, proceed at no expense to District or Architect to repair or replace same together with any damage to all finishes, fixtures, equipment and furnishings that may be damaged as a result of defective materials or quality of work. There shall be:
  - 1. No de-lamination of any of the parts of the sign(s) or of the lettering from the sign face.
  - 2. No cupping, warping, or dishing in excess of the requirements stipulated in the specifications.
  - 3. No bubbling, crazing, chalking, rusting, or other disintegration of the sign face, of the messages or of the edge finish of the panels.
  - 4. No corrosion developing beneath any painted surface, except as the result of obvious vandalism or other external damage to those painted surfaces.
  - 5. No corrosion of the fastenings.
  - 6. No movement of the signs or components from their mountings. The signs must remain true and plumb, or as otherwise stipulated on the Drawings or in the Specifications, except as the result of obvious post-installation external damage.
  - 7. No fading of the colors when matched against a sample of the original color and material.

## 2.00 PRODUCTS

### 2.01 MATERIALS

- A. General: Conform to the highest standards of the industry, and as shown on the Drawings and as herein specified.
1. Typograph letters shall be Helvetica Medium, size as shown on Drawings, unless indicated otherwise on signage & graphic schedule. Alternative letterforms are not acceptable. Letter spacing shall be "normal".
  2. Margin Spacing Standard, unless shown otherwise.
  3. Interline Spacing Standard, unless shown otherwise.
  4. Arrows - Square shaft as indicated on drawings.
  5. Arrow/Symbol Placement and Spacing - as shown on drawings.
  6. Letters - vinyl/acrylic die-cut, premium reflective 3M 'Scotchlite' sheathing – "High Intensity Grade", or approved equal 5-year letters, 3.5 mils. thickness minimum and 6.0 mils. maximum.
  7. All materials shall be new stock, free from defects which impair strength, durability or appearance. All signs and components shall be complete and free from visual, structural or mechanical flaws.
  8. Concrete (for base mounted sign foundations) 2,500 psi concrete, minimum.
  9. Rebar: Grade 60, conforming to ASTM A615. Bars larger than 1/4" diameter shall be deformed.
  10. Accessible Parking Sign Posts: Secure post-mounted signs to 2" x 2"x 10' x 12 gage wall thickness, perforated square tubing, cold-formed carbon steel galvanized (conforming to ASTM A53, A120 seamless). Perforated pre-punched holes are to be 7/16" spaced on 1" centers. Bottom edge of sign a minimum of 80 inches above finished grade. Telespar product as manufactured by Unistrut Company (800) 468-9510, locally (800) 468-3791.
    - a. Provide 2-1/4" x 2-1/4" x 1'-6" x 12 gage wall thickness tubing sleeve anchor base for 1'-6" embedment into asphalt or concrete paving, leaving 2" exposed above finished slab surface for bolting in place.
    - b. Center at interior end of parking space within the parking bumper posts (bollard).
- B. Metal Signs / Aluminum (AL):
1. Sign Panel: Minimum .125 inch aluminum sheet.
  2. Debur and ease all edges.
  3. Apply vinyl wash primer followed by appropriate primer compatible with finish coat proposed.
  4. Finish Coat: Top quality semi gloss steel coating system enamel / polyurethane manufactured especially for exterior use on metal. Apply 3 coats minimum for 5 mil dry thickness minimum (excluding primer)
  5. Copy: Self adhering die-cut vinyl reflective, 3-M Scotchlite, or equal, compatible with sign face material, applied uniform in color, opaque and free from bubbles or other surface imperfections.
  6. Steel Support Post - Center Post (PM): Refer to selection above, and as indicated on the drawings.

## 2.02 PARKING SIGN SPECIFICS

- A. An additional sign shall also be posted, in a conspicuous place, at each entrance to off-street parking facilities, or immediately adjacent to and visible from each stall or space. The sign shall be not less than 17 inches by 22 inches in size

lettering not less than 1 inch in height, (helvetica medium) which clearly and conspicuously states the following:

"Unauthorized vehicles parked in designated accessible spaces not displaying distinguished placards or license plates issued for persons with disabilities may be towed away at Owner's expense. Towed vehicles may be reclaimed at \_\_\_\_\_ or by telephoning \_\_\_\_\_." Blank spaces shall be filled in with appropriate information as permanent part of the sign.

- B. Health Warning Signage: An additional health warning sign shall also be posted, in a conspicuous place, at each entrance to off-street parking facilities. The painted aluminum sign shall not be less than 14 inches high by 18 inches wide. Size and spacing of lettering, typeface, placement and colors to be in conformance with drawings, which clearly and conspicuously states the following:

"WARNING - Automobile fuel and its by-products contain chemicals known to the State of California to cause cancer or birth defects or other reproductive harm. This warning is made in pursuant to the California Health and Safety Code, Proposition 65, Section 25249.6."

### 3.00 EXECUTION

#### 3.01 GENERAL

- A. Furnish anchors, fastenings, attachment metals and other miscellaneous metal items needed to accomplish the work including fasteners embedded in substrate.
- B. Ensure that the design of all support structures and structural connections required for the performance of the work meet the requirements of the Contract Documents including code requirements.
- C. Fastenings:
1. Fastenings on sign-face surfaces shall not be exposed, except where noted.
  2. Sign-face surfaces shall not be deformed, distorted, or discolored by attachment of concealed fastenings.
  3. All fastenings shall be resistant to oxidation or other corrosive action because of their composition, completely through their cross sections.
  4. All work shall be secured with fastenings of the same color and finish as the components they secure where they are exposed to view, except where noted.
  5. Fabrication work with fastenings shall be utilized in strict accordance with their manufacturer's specifications, directions, recommendations, and as indicated on the reviewed shop drawings.

#### 3.02 INSTALLATION

- A. All signs shall be installed in the locations indicated on the Drawings, per design intent and approved shop drawings. Design intent drawings indicate minimum requirements only.
- B. All signs and graphics shall be installed plumb and true to line, level with adjacent elements.

- C. Installation shall be done in a manner to withstand all actions imposed by wind, water and other environmental forces.

### 3.03 ACCESSIBLE PARKING SIGNAGE INSTALLATION

- A. Do not begin erection of signage posts before final grading / paving is completed, unless otherwise permitted.
- B. Do not begin erection of signage posts / sleeves before final grading / paving is completed, with concrete set and cured, unless otherwise permitted.
- C. Remove all loose materials from bottom of holes and moisten soil prior to placing concrete. Center and align sleeves / posts in holes placing concrete around sleeves / posts in a continuous pour, tamping for consolidation. Insert sleeves / posts as applicable, a minimum 1'-6" deep. Dome adjoining concrete to shed water away from installation. Installed sleeves / posts shall be set vertically plumb.
  - 1. Two Piece Post Breakaway:
    - a. Install in minimum 6" diameter hole and leave completed sleeve a minimum of 3" above proposed finish grade.
    - b. Bolt posts to sleeve tubes using two (2) 1/2" diameter corner bolts.
    - c. Insert posts into sleeves for the full 1'-6" depth.
    - d. Check each post for plumb and vertical alignment.
  - 2. One Piece Posts – On Grade: Drill /core at finish grade or on finished paving / slab, coordinating post placement with paving or concrete slab foundation work for pre-pouring and /or sleeving slabs.
  - 3. Pipe Bollard Mounted
    - a. Do not begin erection of signage posts inside bollards before installation is complete and the pipe bollards are set and cured.
    - b. Center sign posts inside diameter of pipe bollard and fill with concrete so that post is a minimum of 1'-4" embedded.
    - c. Dome top to shed water, unless indicated otherwise. Posts shall be set plumb with vertical and top horizontal edges aligned.
  - 4. Surface Mounted Plate – On / Above Grade:
    - a. Bolt base plate / sleeve tube anchors to the slab on grade / paving using four 1/2" diameter Kwik-Bolt expansion anchors with minimum 3-1/2" embedment into concrete slab section. Dry pack as required for plumb installation.
- D. Wall Mounting: Bolt signs to masonry / concrete walls using theft-proof fasteners. Provide a minimum of two 1/2" diameter kwik-bolt expansion anchors with 1-1/2" embedment into wall centered at interior end of parking space with bottom edge of sign a minimum of 42 inches above finish grade.
- E. Sign Attachment:
  - 1. Fasten sign panel to installed posts using vandal-resistant fasteners conforming to the requirements indicated above.
  - 2. Install backing washers, lock-washers and nuts with ends peened / tack welded to prevent removal.
  - 3. Sign panels shall be installed with edges aligned with the post and top / bottom edges parallel to finished grade.
  - 4. Sign panels shall be installed so that the bottom edge in each different type of installation is in conformance with code requirements.





1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division 1 apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Signs
  - 2. Pre-cast concrete splash block
  - 3. Police Station letters.
  - 4. Knox box / fire padlocks

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 03300: Concrete and Concrete Finishes
- B. Section 05500: Miscellaneous Metal

1.03 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Manufacturer's product data catalogues with specifications and other data needed to prove compliance with the specified requirements with regards to size, materials, finishes, anchorage and quantities of items being supplied. Include printed recommendations for installation and maintenance instructions. Provide manufacturer's product data for all types of product options available / proposed for use.
- C. Submit any samples requested by the Architect for review and approval.
- D. Shop Drawings: Indicate sizes, fabrication, and mounting requirements. Indicate number, sizes, attachments and any other factor which may govern installations.
- E. Where items have finish involving choice of colors, colors will be selected by Architect from manufacturer's standards.

1.04 REQUIREMENTS

- A. The components indicated on the Drawings show dimensions established to accomplish the Architect's intended visual intent. The Contractor shall verify that the components to be provided for the work of this Section will fit the building's structural elements and conform to the visual design criteria and profiles indicated on the drawings without materially altering profiles and alignments.
- B. Any additional support, backing or footings required for the components shall be provided and installed as part of the work of this Section.

- C. Fastenings:
1. Fasten to gypsum board or plaster wall surfaces with screws into metal blocking, bolts or molly anchors, not less than 1/4" diameter. Screwing into gypsum board or lath with plugs is not acceptable.
  2. Fasten into concrete or masonry, with self-drilling masonry anchors, Phillips Redhead, Bulldog, Rawl Sabertooth, or equal.
  3. Other fastenings and attachments shall be as specifically noted with the specified product.
- D. Coordinate with the Fire Department, code requirements and the Owner for the type, size and location of the high-security key control lockbox prior to purchase.

## 1.05 COORDINATION

Coordinate with the Architect / District for selection of manufacturer's standard and / or additional product options and for selection of features, textures, colors, etc, prior to purchase and incorporating into the work.

## 1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

Protect the components during shipment to prevent damage. Protect fixtures, before, during and after installation until acceptance by Architect and occupancy by District.

## 2.00 PRODUCTS

### 2.01 MATERIALS

- A. Signs:
1. Toilet Room Signage: Provide 1/4" thick laminated colored plastic, core color contrasting to exterior face color or solid plastic with inset symbols. Unisex Toilet: 12" diameter circle with equilateral triangle, vertex pointing up, inscribed in circle; circle and triangle each 0.25" thick. ADAAG Toilet Room Signs: Provide international handicap symbol. Comply with ADAAG requirements for raised and Braille characters, pictorial symbols, finish and contrasts requirements. Mount to door surface using adhesive type as recommended by the sign manufacturer.
  2. Entrance Signs: All building entrances that are accessible to and usable by physically handicapped/physically disabled persons shall be identified with at least one standard sign and with additional directional signs, as required, to be visible to persons along approaching pedestrian ways. Provide 6" square decals with international handicapped symbol white on blue background with white border, and apply to glass at accessible entry doors.
  3. Room or Office Numbers: Numbering and assignment shall be as designated by the District's Representative. Plaques shall be 1/4"-3/8" plastic, not exceeding 2" x 4", color as selected by District's Representative. When raised or recessed characters or symbols are used, they shall conform to the following:
    - a. Letter Type. Letters and numbers on signs shall be raised or recessed 1/32" minimum and shall be sans-serif characters.
    - b. Symbol Size. Raised characters or symbols shall be a minimum of

5/8" high. Recessed characters or symbols shall have a 1/4" minimum stroke width.

- B. Pre-cast Concrete Splash Block: Provide one unit on the roof of the Elevator Lobby / Stair No.1 roof under the elevator shaft roof downspout. Product to be a typical fabrication / size with minimum compressive strength of 3000psi.
- C. Police Station Letters: Provide two different sets of fabricated clear anodized aluminum graphic letters of size, type and thickness as indicated on the drawings. Details shall indicate the following:  
South Elevation – POLICE: Letters 12" high x 1-1/2" thick, with stroke and typesetting as selected by the Architect to be Futura-Bold, unless indicated otherwise.  
North Elevation – POLICE STATION: Letters 8" high x 1-1/2" thick, with stroke and typesetting as selected by the Architect to be Futura-Bold, unless indicated otherwise.  
Products as manufactured by A.R.K. (800) 725-7266 or approved equal. Verify intent prior to execution. Refer to contract documents for exact mounting details.
1. South Elevation: Mounting shall be on the concrete building structure 1-1/2" off-set mount with stud pins set in drilled holes with adhesive
  2. North Elevation: Mounting shall be on the plaster fascia panel flush surface mounted with threaded stud pins into expansion anchors.
- D. High-Security Key Control Lockbox: Heavy duty, medium capacity (10 key) recessed mounted lockbox. Series 3200, the Knox Company (949) 252-8181 or approved equal. Minimum requirements to include:
1. 1/4" plate steel housing with a 1/2" thick steel door.
  2. Capacity: 30 cu. in.
  3. Box shall have interior gasket seal of neoprene material and 1/8" stainless steel lock cover with tamper seal mounting capability.
  4. Steel Finish: Pre-treat - zinc phosphate to Federal Standard TTC 490 Type II with polyester powder top coat, color as selected by Architect.
  5. Lock shall have double action rotating tumblers and hardened steel pins, accessed by a bias-cut key.

### 3.00 EXECUTION

#### 3.01 FIELD CONDITIONS

Verify drawing dimensions with actual field conditions. Inspect related work and adjacent surfaces. Report to Architect any conditions which prevent proper execution of this work.

#### 3.02 INSTALLATION

- A. Install products of this section in strict conformance to manufacturer's printed recommendations for installation and in strict accordance with drawing details. If discrepancies exist, or questions regarding design intent, consult with Architect prior to execution. Beginning installation will be considered acceptance of all conditions.
- B. Use materials, methods and recommended fasteners. Install in locations and at mounting heights indicated or, if not indicated, at heights to comply with code

requirements.

- C. Mount signs centered at approximately 60" above finished floor.
- C. Fasten products securely, rigidly true to plumb and horizontally level, at locations and heights indicated.
- D. Clean and polish exposed surfaces prior to final inspection.

END OF SECTION

1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division 1 apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Provide ground-set aluminum flagpole(s) as shown on drawing and as specified herein, with components as needed for a complete installation.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 03300: Concrete and Concrete Finishes
- B. Section 05500: Miscellaneous Metal

1.03 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Manufacturer's Literature: Furnish to the Architect three (3) copies of manufacturer's product data for each type of flagpole required with all materials and accessories proposed and printed recommendations for installation and maintenance instructions.
- C. Submit shop drawings indicating general layout, joining, anchorage, support systems and accessories with calculations for review and approval, sealed and signed by a California licensed Civil or Structural Engineer for design and anchorage of mounting and embed plates in conformance with applicable CBC code requirements.
- D. Submit samples of each metal finish used on the flagpole as requested by the Architect.

1.04 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide flagpoles capable of withstanding the effects of wind loads as determined according to NAAMM FP 1001-07 - Guide Specifications for Design of Metal Flagpoles, or to specified wind speed, whichever is more stringent.
- B. Base flagpole design on maximum standard size nylon flag suitable for use with pole or flag size indicated, whichever is more stringent.

1.05 QUALITY ASSURANCE

- A. Coordinate work of this Section with the work of related Sections for furnishing and installation of required anchorage.

- B. Provide each flagpole as a complete unit produced by a single manufacturer, including fittings, accessories, bases and anchorage devices. All poles shall be shipped and installed complete with all standard fittings included.
- C. Provide flagpole and installations constructed to withstand a 100 mph wind velocity minimum when flying fixed metal flag of appropriate size, as indicated.
- D. Flagpoles shall be installed by an accredited erection crew experienced in the handling, assembly and placement of poles.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Wrap flagpoles with a heavy Kraft paper or other lightweight wrapping and enclose in a hard fiber tube or other protective means. Store bare flagpoles in a dry location, protected from the weather and moisture, as recommended by the manufacturer.
- B. Ship to project site in one piece or as specified. If more than one piece is necessary, provide snug fitting precision joints with self-aligning, internal splicing sleeve arrangements for weather tight, hairline field joints.

### 2.00 PRODUCTS

#### 2.01 MANUFACTURER

District has selected Eder Flag Company 800-962-0956, Model EC45 IH Series. Alternates must meet the same aesthetics, functional criteria and performance requirements of the selected unit. Manufacturers include American Flagpole (800) 368-7171; Concord Industries, Inc. (800) 527-3902; Ewing (800) 663-7653; Michigan Flagpole (800) 875-3524; Pole-Tech Co. (800) 633-6733, or equal.

#### 2.02 FLAGPOLE TYPE AND CONSTRUCTION

- A. Aluminum Flagpole Construction, Fabricate from seamless, extruded tubing complying with ASTM B 221, alloy 6063-T6, having a tensile strength not less than 30,000 psi with a yield point of 25,000 psi. Heat-treat after fabrication to comply with ASTM B 597, temper T6.
  - 1. Provide cone-tapered flagpole per manufacturer's standard rate of taper.
- B. Assembly Construction: Internal Cam Cleat — Ground Set flagpole, 45 ft. nominal mounting height, with a minimum base wall thickness of 0.188 in., and a 6 in. butt diameter.

#### 2.03 MOUNTING

Foundation Tube: Galvanized corrugated steel foundation tube, .0635 inch [16 Gauge] minimum wall thickness, sized to suit flagpole and installation. Provide with 3/16 inch steel bottom plate and steel centering wedges all welded together. Furnish with 3/16 inch support plate, 3/4 inch diameter X 18 inch long steel ground (lightning) spike, all welded construction.

## 2.04 FITTINGS

- A. Single sheave truck, cast aluminum revolving, non-fouling internal halyard truck, cast aluminum body, with 26 stainless steel ball bearings, and 2-1/2" diameter plated steel sheave.
- B. 1/8" x 7 x 19 Mil-C-5424 Stainless steel aircraft cable
- C. Neoprene coated 2" diameter steel counterweight
- D. Nylon beaded retainer ring
- E. Gearless, self locking direct drive winch with six tumbler cylinder lock
- F. Collar: Manufacturer's standard spun aluminum flash collar to match flagpole.

## 2.05 MISCELLANEOUS MATERIALS

Concrete: Comply with requirements of Section 03300 – Concrete and Concrete Finishes

## 2.06 FINISHES

- A. Metal Finishes, General: Comply with NAAMM - Metal Finishes Manual for Architectural and Metal Products, for recommendations for applying and designating finishes.
- B. Aluminum: Finish designations prefixed by AA conform to the system established by the Aluminum Association for designating aluminum finishes.

## 3.00 EXECUTION

### 3.01 GENERAL

- A. Install flagpole, base assembly, and fittings in compliance with approved shop drawings and manufacturer's instructions.
- B. Provide positive lighting ground for flagpole installation.

### 3.02 PREPARATION

- A. Excavation: For foundations, excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete.
- B. Provide forms where required due to unstable soil conditions and for perimeter of flagpole base at grade. Secure forms, foundation tube, fiberglass sleeve, or anchor bolts in position, braced to prevent displacement during concreting.

### 3.03 FLAGPOLE INSTALLATION

- A. Set sleeve into hole so that top of tube is 2" above grade. Plumb sleeve vertically and brace so that sleeve will not move during pour.
- B. Pour concrete and trowel to desired finish. Keep inside of sleeve dry and free of concrete.
- C. Lay shaft on sawhorses, and remove wrappings from top and bottom of shaft, and from around cleat area. Leave balance of wrappings on shaft for protection during the set. If pole is two or three piece, assemble sections per instructions.
- D. Screw truck into top of pole, using pipe wrench to tighten. Screw threaded ball-stem into top of truck until ball will not turn further. Using wrench, tighten jam-nut against top of truck. Thread one end of rope halyard through the truck pulley and tape or tie ends of rope together. Flag-snaps may be attached after pole is erected. (If pole is double halyard system, repeat operation for second halyard.)
- E. Pick up shaft with nylon sling, rotate pole so that cleats will face in the desired direction, and set into center of foundation sleeve. If pole is two or three piece, a nylon choker must be used to prevent the bottom section from slipping off when lifted. Plumb pole vertically. Place wood wedges (not supplied) between pole and sleeve to prevent pole from shifting during final set.
- F. Tamp dry sand between pole and sleeve to permanently set pole. Be certain that sand is well compacted, otherwise pole may shift at a later time. Leave a 1" to 2" void at top of sleeve for sealer.
- G. Remove wedges. Place waterproof concrete immediately after mixing. Compact concrete in place by using vibrators. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks and uniform in texture and appearance. Provide positive slope for water runoff to base perimeter.
- H. Moist-cure exposed concrete for not less than 7 days or use a non-staining curing compound.
- I. Slip collar down pole onto concrete. Caulk into place on concrete, and around pole. Remove remainder of wrappings from pole.
- J. Attach flag-snaps to halyard by forming a loop in the rope, running the loop through the swivel-eye and over the snap, then pulling rope taut. Adjust distance between flag-snaps to accommodate the size flag being flown. Attach flag, run to peak, and tie off halyards on cleat.

END OF SECTION



## 1.00 GENERAL

### 1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. All non-illuminated signs, sign supports, inserts and attachments required for signs, in place.
  - 2. All painted graphic signs.

### 1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 03300: Concrete & Concrete Finishes
- B. Section 05500: Miscellaneous Metal
- C. Section 09870: Steel Coating System
- D. Section 09900: Painting

### 1.03 CONDITIONS – DSA Requirements

- A. Tactile Character Type: Tactile characters on signs shall be raised 1/32 inch minimum and shall be sans serif uppercase characters accompanied by Contracted Grade 2 Braille (see note below). CBC Section 1117B.5.5.1.
- B. Tactile Character Size: Raised characters shall be a minimum of 5/8 inch and a maximum of 2 inches high. CBC Section 1117B.5.5.2.
- C. Finish and Contrast: Contrast between character symbols and their background must be 70% minimum and have a non-glare finish. CBC Section 1117B.5.2.
- D. Proportions: Characters on signs shall have a width-to-height ratio of between 3.5 and 1:1 and a stroke width-to-height ratio of between 1:5 and 1:10. CBC Section 1117B.5.3. All letters measured must be uppercase. After choosing a typestyle to test, begin by printing the letters I, X, and O at 1 inch high. Place the templates 1:1 square over the X or O, whichever is narrower. If the character is not wider than 1 inch, nor narrower than the 3:5 rectangle, the proportions are correct. Use the 1:5 rectangle to determine if the stroke of the I is too broad, and the 1:10 rectangle to see if it is too narrow. If all the tests are passed, the typestyle is compliant with proportion requirement.
- E. Braille: California (Contracted) Grade 2 Braille shall be used whenever Braille is required in other portions of these standards. Dots shall be 1/10 inch on center in each cell with 2/10 inch space between cells, measured from the second column of dots in the first cell to the first column of dots in the second cell. Dots shall be raised a minimum of 1/40 inch above the background. Braille dots shall be domed or rounded. CBC Section 1117B.5.6.

Mounting location shall be determined so that a person may approach within 3 inches of signage without encountering protruding objects or standing within the swing of the door. CBC Section 1117B.5.7.

#### 1.04 SYSTEM DESCRIPTION

- A. Comply with the requirements of CBC.
- B. Evacuation Plans / Exit Stairs: Building of 2 stories or more, including parking garages shall have emergency evacuation plans installed at each entrance, at each elevator lobby and at each stairwell. Text shall be included: "In Case of Fire Do Not Use Elevators – Use Stairs." Such shall include the ISA along with appropriate text and / or arrows in conformance to CBC Section 1003.2.8.6.
- C. Elevator Hoist Way: Elevator hoist way shaft lobby doors shall be identified on each side by a 2" high raised character identifying the floor level accompanied by Grade 2 Braille below. A raised 5-point star shall in addition to the left to its numeral or letter identification, identify ground floor. Signs shall be in compliance with CBC Section 1116B.1.15. Contractor to coordinate whether this item is provided under the scope of work of the elevator section of work, otherwise it shall be provided as part of the work of this section. Mechanically attach floor level plaques to elevator entry frames. Stick-on attachment of plaques is not acceptable.

#### 1.05 QUALITY ASSURANCE

- A. Qualification of Sign Fabricator: All signing and related work required under this Section shall be performed by a specialists. The term "specialist" as used in this specification shall mean an individual or firm of established reputation, with a minimum five (5) years continuous operation, which is regularly engaged in and maintains a regular force of workers skilled in fabricating the items required herein.
- B. Sign fabricator will participate in a pre-production conference with the Owner's representative and the Architect to review the contract requirements, clarify the scope and nature of the work as outlined in the Drawings and Specifications, and to establish clear lines of responsibility and checkpoints for the performance of the work.
- C. Engineering: Responsibility for structural engineering of the signs and information devices is the responsibility of the sign fabricator. The Drawings provided are for the purpose of establishing design intent and desired visual appearance, and are not intended to restrict the fabricator if more suitable structural design or fabrication methods are suggested or required. Any such deviations from the Drawings or Specifications proposed must be approved by the Owner and Architect prior to commencing fabrication of the signs. Exterior signs to be engineered to withstand 100 mile an hour wind loads including foundation system. Submit calculations by a qualified state registered Engineer.
- D. Provide signs for assuring access for persons with disabilities in accordance with CBC and federal regulations - Americans with Disabilities Act Accessibility Guidelines (ADAAG).

1.06 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Samples of all materials and processes, including colors to be incorporated in the signs and graphics shall be submitted by the sign fabricator with review of such samples required before proceeding with fabrication of the actual signs and graphics.
- C. A prototype of each different type of sign (one of the painted metal sign, one laminated plastic, one acrylic, and one of the interior fiberboard signs) shall be fabricated and submitted for Architect's approval, unless waived by the Architect, prior to commencing fabrication of the remaining signs of these types. Each prototype shall include mounting mechanism and hardware.
- D. Complete shop drawings indicating all sign styles, lettering, material specifications, color, dimensions, assembly and installation details.

1.07 JOB CONDITIONS

- A. Verify and be responsible for dimensions and conditions of the work, especially those relating to placement. Notify the Architect of any variations from the dimensions and conditions shown on the Drawings that may result in an unacceptable installation. Failure of this stipulation may result in Contractor having to relocate signs that may be blocked by piping, landscaping, signs, lights, or other construction elements.
- B. Powder-activated fasteners / anchors may not be shot or drilled into post tensioned concrete slabs and beams without the prior written permission by the Architect or Structural Engineer, as to exact type and location proposed. Each / every location of proposed penetrating fastener shall be x-rayed as required to guarantee non-destructive practices to post tension cable(s) / reinforcing rebar structural elements Operators shall be certified in accordance with California Industrial Safety Orders.

1.08 GUARANTEE

- A. Guarantee all workmanship and materials for the signage and graphics furnished for a period of one (1) year after the final acceptance of the signage and graphics and, if during the guarantee period any fading, defects or faulty materials are found, immediately, upon notification by the Owner or Architect, proceed at no expense to Owner or Architect to repair or replace same together with any damage to all finishes, fixtures, equipment and furnishings that may be damaged as a result of defective materials or quality of work. There shall be:
  - 1. No de-lamination of any of the parts of the sign(s) or of the lettering from the sign face.
  - 2. No cupping, warping, or dishing in excess of the requirements stipulated in the specifications.
  - 3. No bubbling, crazing, chalking, rusting, or other disintegration of the sign face, of the messages or of the edge finish of the panels.
  - 4. No corrosion developing beneath any painted surface, except as the result of obvious vandalism or other external damage to those painted

- a. Tactile characters/symbols shall be raised 1/32 inch from sign plate face. Signs shall be of one-piece construction; added-on and/or engraved characters are unacceptable.
  - b. Text shall be converted to Grade 2 - Braille.
  - c. Provide 1/32" raised perimeter border as detailed.
  - d. All letters, numbers and/or symbols shall contrast with their background - either light character on a dark background or dark characters on a light background. Refer to Signage & Graphic Schedule. Character and background shall have matte finish.
2. Signage:
- a. Plaque material shall consist of melamine plastic laminate, approximately 1/8" thick, with core painted a contrasting color and rated non-static, fire-retardant and self-extinguishing. Plastic laminate shall be impervious to acids, alcohol, solvents and abrasives.
  - b. Letters and numbers shall be centered on sign.
  - c. Grade 2 Braille shall be placed directly below last line of letters or numbers, except for room number signs, where they shall be placed directly behind the last number.
  - d. Radius corners 2" unless noted otherwise.
3. Accessories: Mounting hardware shall be manufacturer's standard vinyl foam tape or holes and screws or silicone adhesive as noted and selected by Architect.
- G. Interior Non-Illuminated Acrylic Signs (AC), sign with raised lettering and border:
1. Material and Fabrication:
- a. Acrylic sign construction shall consist of a 080" thick cast acrylic plastic face laminated to a 080" cast acrylic base. The sign finish shall be semi-matte and shall be between 25-35 degrees of gloss in its natural condition. Sign edges shall be straight, smooth and free from saw marks and other imperfections. The corners of the sign shall be square.
  - b. Graphics shall be subsurface applied onto the cast acrylic plastic face prior to the application of the background color and lamination to the acrylic plastic base.
  - c. Sign lettering and graphics shall be provided in the sizes, colors and letter styles as shown on the Drawings and Signage & Graphic Schedule. All lettering shall be executed in such a manner that all edges and corners of the letterforms are correctly spaced true, clean, graphically precise.
  - d. Sign colors, configurations, sizes and methods of installation shall be as shown on the drawings and Signage & Graphic Schedule.
- H. Interior Non-Illuminated Painted Signs Graphics (PF) (walls and columns):
1. Materials and Application Methods: All signs and graphics in this category shall be painted directly on concrete walls and columns, within the parking structure by the Frisket procedure. Paint used shall be a type suitable for substrate being painted in a semi-gloss finish.
- a. Surface to be painted must be thoroughly cleaned and any major surface imperfections. On concrete and concrete block walls, use "Fixall", or equal first to fill pockets and apply two coats of primer. Finish per Section 09900 - Painting.

- b. Finish coat of paint shall be applied in a way to produce a hard, crisp edge, and be free from brush marks and shall be white.
- c. Apply low tack adhesive letters of appropriate copy (on pre-spaced application tape).
- d. Spray on finish paint of required color.
- e. Remove letters to expose finish copy.
- f. Colors shall be as per Signage & Graphics Schedule.
- g. Background painting for columns and walls, excluding color-coding, will be provided under work of the Painting Section. All other painting shall be provided under this Section.

### 3.00 EXECUTION

#### 3.01 FABRICATION AND ASSEMBLY

- A. Furnish anchors, fastenings, attachment metals, and other miscellaneous metal items needed to accomplish the work, including fasteners embedded in concrete or building walls.
- B. Carefully study the drawings and be responsible for the correct direction of arrows on all signs, and for requesting a change of spacing if required to fit on the intended sign panel or space.
- C. Ensure that the design of all support structures and structural connections required for the performance of the work meet the requirements of the Contract Documents, including code requirements.
- D. All bonded or fabricated panels shall have faces of such flatness that when measured from corner to corner along the diagonal, the maximum deviation from nominal plane of surface shall not exceed 1/16" for measured distances up to 5'.
- E. Colors, materials, hardware and fittings actually used on the signs and structures shall match the approved samples.
- F. Fastenings:
  - 1. Fastenings on sign-face surfaces shall not be exposed, except where noted.
  - 2. Sign-face surfaces shall not be penetrated during fabrication or installation of signs, except where noted.
  - 3. Sign-face surfaces shall not be deformed, distorted, or discolored by attachment of concealed fastenings.
  - 4. All fastenings shall be resistant to oxidation or other corrosive action because of their composition, completely through their cross sections.
  - 5. All work shall be secured with fastenings of the same color and finish as the components they secure where they are exposed to view, except where noted.
  - 6. Fabrication work with fastenings shall be utilized in strict accordance with their manufacturer's specifications, directions, recommendations, and as indicated on design intent drawings.

#### 3.02 INSTALLATION

- A. All signs shall be installed in the locations indicated on the Drawings, per design

intent and approved shop drawings. Design intent drawings indicate minimum requirements only.

- B. All signs and graphics shall be installed plumb and true to line, level with building components and adjacent elements.
- C. Installation shall be done in a manner to withstand all actions imposed by wind, water and other environmental forces.

3.03 SIGNAGE AND GRAPHICS SCHEDULE

Refer to Drawings.

3.04 INTERIOR MASTER COLOR CODING SCHEDULE

Refer to Signage and Graphics Schedule.

END OF SECTION

## 1.00 GENERAL

### 1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions, and Division I apply to work of this Section.
- B. Furnish all labor materials, services, equipment and appliances required to perform all work to complete the Contract, including, but not limited to, these major items:
  - 1. Twenty-five (25) full length lockers / 11 in Staff Shower and 14 in Hallway – 1 at each location to be ADA accessible
  - 2. Twenty-five (25) Master combination padlocks

### 1.02 RELATED WORK IN OTHER SECTION

- A. Section 05500: Miscellaneous Metal
- B. Section 09110: Metal Framing and Furring

### 1.03 REFERENCE STANDARDS

- A. California Building Code (CBC)
- B. California Code of Regulations (CCR) Title 24 State Building Code and Accessibility Standards.
- C. Americans with Disabilities Act / ADA Requirements. ADAAG - Americans with Disabilities Act (ACT) Accessibility Guidelines for Buildings and Facilities.

### 1.04 CONDITIONS

- A. DSA Requirements
  - 1. Provide latch and locking hardware that does not require twisting, pinching or grasping to operate.
  - 2. Provide shelf and pole at 48" max. AFF and lower shelf at 15" min. AFF. (Reach requirements per CBC 1118B.5)
  - 3. Provide 1% of total lockers or one minimum accessible locker per CBC Section 1115B.8.5.
- B. Conform to the ADA requirements detailed on 4/A5.05 and related notes

### 1.05 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Product Data: Submit manufacturer's product data, specifications and shop drawings for all items proposed to prove compliance with the specified requirements.

## 2.00 PRODUCTS

### 2.01 MANUFACTURE

Provide products as manufactured by Republic Storage Systems Company Inc., Lyon Metal Products, or approved equal.

### 2.02 MATERIALS

- A. All products shall be of selected manufacturer's standard, including fabrication, hardware and accessories. Provide units with approved handles, latching device, louvers, number plates, interior equipment, etc. Selected manufactured or fabricated equipment must meet the following minimum requirements:
1. Size: Provide single-tier 6'-0" high x 12" wide x 1'-6" deep lockers. One (1) locker at each location (Hallway and Staff Shower) is to be ADA accessible.
  2. All parts shall be made of mild cold rolled sheet steel. All steel shall be free from imperfections.
  3. Construction: Lockers shall have flat, smooth metal surfaces without warp, dents or distortions. Assembled units shall be rigid and square. Bolt or rivet heads shall not be exposed on faces of doors.
  4. Doors: Shall be 16 gauge flanged on all four edges with a formed full channel shape on the lock side of fully concealed right angle formations across the top and bottom.
  5. Provide doors with manufacturer's standard tamperproof chrome plated die cast handle and case, with integral padlock strike.
  6. Door Frames: Uprights shall not be less than 16 gauge steel. Cross members shall not be less than 16 gage. Exposed front frame edge shall be 1" in width, a 12" side frame and a 3/8" vertical door strike width on the hinge and latch side.
  7. Hinges: Shall be at least 2" high 5-knuckle, full loop, tight pin style, securely welded to frame and riveted to the inside of the door flange. Locker doors over 48" high shall have three hinges.
  8. Body: Consists of 24 gage flanged as needed for added strength and rigidity to insure tight joints.
  9. Base: Provide 14 gage "Z" base or 4" closure base in lieu of legs.
  10. Top: Provide minimum 22 gage steel sheet sloped 30 degree for closure of open space above the upper row of lockers to ease housekeeping.
  11. Finish: Phosphatize surfaces of steel for corrosion resistance. Finish with heavy coat of baked enamel. Zinc plate bolts and nuts.
  12. Color: Color as selected by the District
  13. Locking Provisions: Verify with the District / Architect the specific door handle detailing to accommodate desired type of locking hardware / padlocks to be used, prior to processing of submittals.
  14. Provide standard self-locking shackle action, stainless steel outer case, 3-number combination dialing padlocks. Master No. 1502, or approved equal.
  15. ADA Provisions:
    - a. Provide one interior shelf fabricated of minimum 20 gage steel sheet with 1/2" downturned sides and rolled edges that lock into two adjustable shelf brackets on each side.
    - b. Latch: The unlatching force shall not exceed 5 lbs applied in the



- direction of travel, per ADAAG 4.13.11
- c. ISA Signage: Provide a blue and white symbol of accessibility in conformance with CCR Title 24, Cal ACS and ADAAG requirements. Mount to door surface using adhesive type as recommended by the sign manufacturer.

### 3.00 EXECUTION

#### 3.01 INSTALLATION

- A. Lockers shall be installed as indicated on the Drawings, in accordance with the manufacturer's printed instructions and approved shop drawings.
- B. Locker units shall be fastened together side to side. Also anchor to walls. All fasteners shall be tamper-proof. Provide special tools for removal.

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division 1 apply to work of this section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work complete the Contract, including but not limited to these major items:
  - 1. Fire extinguishers, cabinets and accessories

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 05500: Miscellaneous Metal.

1.03 CONDITIONS – DSA Requirements

Fire extinguisher cabinets must comply with CBC Sections 1117B.6 and 1118B.

1.04 REFERENCE STANDARDS

- A. American Society for Testing and Materials (ASTM)
- B. Underwriters Laboratories Inc. (UL)
- C. National Fire Protection Association (NFPA) 10, Portable Fire Extinguishers
- D. California Fire Code Table 140 A
- E. CCR Titles 8, 19, and 24, California Code of Regulations

1.05 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Manufacturer's product data for all types of extinguishers and cabinets proposed for use. Include rating and classification, details showing mounting methods and dimensioned configuration, relationships of box to surrounding construction, door hardware, cabinet type, materials, trim style, cabinet and door construction, knock-out panel size / style and materials. Failure to submit all items required shall not relieve the Contractor from conforming to the specified requirements.
- C. Submit shop drawings indicating methods of mounting, anchorage and support. Provide a plan indicating the dimensioned layout / location of units in compliance with code requirements for area coverage.
- D. Samples: Submit any samples as Architect may request to demonstrate cabinet construction, finishes or accessories.

## 1.06 REQUIREMENTS

- A. As a minimum locate fire extinguishers as shown on the drawings. Contractor shall supply and install sufficient extinguishers to comply with the type, quantity and travel distance requirements of NFPA 10 and CCR Titles 8, 19, and 24, whichever is the most restrictive without additional cost to the Owner.
- B. Contractor shall coordinate with local fire jurisdiction (State Fire Marshal) to verify the number and classification of extinguishers required for the area to be covered at time of bid. No payment will be made during construction for assumptions contrary to California Fire Code and local (State) jurisdictional requirements.
- C. Ensure that fire extinguisher cabinets are sized to accommodate fire extinguishers of the size, type and capacity indicated or required.
- D. Provide multi-purpose extinguishers (ABC) in parking areas and either dry-chemical (BC) or carbon dioxide type in all mechanical, electrical or elevator equipment rooms in conformance with governing requirements.
- E. ADA Accessibility Guidelines (ADAAG) / code specifies / requires that the maximum forward reach to the handle of a fire extinguisher be 48" above the floor. Verify the actual mounting heights for selected cabinets housing this equipment for exact dimensions of the cabinets and the positioning of the fire equipment within that cabinet. Adjust mounting details and associated signage mounting accordingly.
- F. Conform to the specified requirements for cabinet fabrication and finish in spite of the conflict that may exist by the listing of several manufacturers, models and/or model numbers. Manufacturers listed are for comparison of make and model only, and not listed as a guaranteed acceptance of compliance. Contractor shall verify that proposed items comply with the specified requirements.

## 1.07 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain extinguishers and cabinets from one source from single manufacturer.
- B. UL Listed Products: Fire extinguishers shall be UL listed and labeled with UL Listing Mark for type, rating and classification of extinguisher.
- C. Fire extinguishers and their placement shall comply with NFPA 10, "Standards for Portable Fire Extinguishers", CCR Title 19, Division 1, Chapter 3 and Titles 8, and 24; including all referenced standards.
- D. Reviewed submittals that do not clearly indicate the materials, make, model, finish or fabrication details of the units proposed and are returned without specific comment addressing fabrication conformance shall not relieve the Contractor from his obligation from providing units that do comply with the requirements listed herein. Units subsequently purchased and installed that do not comply shall be removed and replaced with new cabinets that conform with the specified requirements at no additional cost to the Owner.

## 2.00 PRODUCTS

### 2.01 FIRE EXTINGUISHERS AND CABINETS

#### A. Manufacturer:

1. Larsen Manufacturing Company
2. J.L. Industries
3. Potter-Roemer, Inc.
4. Standard Fire-West
5. Samson Metal Products, Inc.
6. Modern Metal Products
7. Or equal

#### B. Cabinets:

1. Surface mounted 18-gage steel or .180" aluminum cabinets with concealed rolled or break-formed edges for the cabinet, face panel frame, trim and door. Increase standard thickness or laminate enclosure as necessary to comply with the requirements specified herein and to guarantee the cabinet to be free of oil canning. Cabinet face frame and door / trim assembly shall be fabricated into a single unit for welded attachment to the cabinet enclosure with all formed corners mitered and without sharp corners or edges, welded to the interior of sides, bottom and top (concealed), ground and dressed smooth.

**NOTE:** Cabinet enclosures that attach face frame / door assembly perimeter frame outside of the cabinet box enclosure exposed to view, and/ or where fabrication is by rivets or screw attachment in lieu of concealed welding, are not acceptable.

2. Provide a two coat baked acrylic-enamel finish, consisting of a prime coat and a thermosetting topcoat or powder coat finish, color as selected by Architect. Shipment to the site with only the manufacturer's standard prime coat as a finish is not acceptable.
3. Provide a lever handle with cam-action latch as standard door operating hardware for cabinet type, trim style, door material and style indicated. Provide concealed or continuous type hinge permitting cabinet door to open 180 degrees.
4. Provide door with center break glass door panel of tempered clear float glass panel 1/8" minimum thickness. In addition to 'FIRE EXTINGUISHER' red vinyl die-cut lettering, include manufacturer's sticker with the following text: "In case of fire break glass and open door from inside".
5. Roof top (weather exposed) cabinets shall be fabricated from either 18-gage stainless steel with a #4 brushed finish or a minimum .180" sheet aluminum finished with a standard clear satin anodized finish
6. All rear of cabinet (backside) mounting holes shall be predrilled at the factory.
7. Coordinate cabinet selections indicated herein with the fabrication requirements noted above, inclusive of the functional operation, hardware, finish or mounting differences of the unit model numbers listed. Conflict shall be brought to the Architects attention prior to selection and submittal.
  - a. Larsen - Architectural Series 2409-SM
  - b. J.L. Industries - Ambassador 1013E20FE

- c. Potter-Roemer Inc. - Alta Series 7024-E-VW
- d. Standard Fire-West - Series 4000 surface mounting, steel-SBG
- e. Samson Metal Products, Inc.
- f. Or equal

C. Wall Brackets - For use in mechanical, electrical and elevator equipment rooms: Provide manufacturers standard, 16 gage red glossy polyester coated steel wall bracket with spring-type band and retaining clip designed to prevent accidental dislodgement of extinguisher. Potter-Roemer Model #3903, or manufacturers equal. Identify bracket-mounted extinguisher with 'FIRE EXTINGUISHER' sign in red vinyl letter decals applied to wall surface. Use letter size, style, and location selected by the Architect.

D. Extinguishers: Provide minimum 10 pound capacity rechargeable multi-purpose dry chemical suitable for use in fighting Class A, B, and/or C fires. Coordinate extinguisher size, layout and area coverage and Fire Department corrections. The extinguishers shall be red enameled steel, pressurized type equipped with a pressure gauge, discharge hose and nozzle, squeeze-grip lever handle and all-metal head assembly. Supply with a mounting bracket (if not installed in a cabinet). Halogenated (Halon) fire extinguishers are not permitted.

<p>***  <u>Throughout Parking Structure A-B-C Type</u>          10 lb. Multi-purpose 4A60BC Required          2A:10BC, or 4A:20BC          20 lb. Multi-purpose 20A: 120BC - Option</p>	<p><u>Mechanical, Electrical and          Elevator Equipment Rooms</u>          B-C Type; 2A:10BC Min. Required          10 lb. Dry Chemical or Carbon          dioxide</p>
<ul style="list-style-type: none"> <li>1. Larsen's - MP10 / MP20</li> <li>2. J.L. Ind. - Cosmic - 10E / 20E</li> <li>3. Potter - Roemer, Inc. - 3010 / 3020</li> <li>4. Modern Metal Products - Wing 10HK / 20HK4.</li> <li>5. Standard Fire West - ABC 10 / 20</li> </ul>	<ul style="list-style-type: none"> <li>1. Larsen's - CD10</li> <li>2. J.L. Ind - Sentinel 10</li> <li>3. Potter-Roemer - 3310 / 3410</li> <li>Standard Fire West C10</li> <li>5. Or equal</li> </ul>

**3.00 EXECUTION**

**3.01 INSPECTION**

- A. Verify actual field conditions. Inspect related work and adjacent surfaces. Report any conditions that prevent proper execution of this work.
- B. Coordinate layout of work before beginning installation.
- C. Verify servicing, charging and tagging of all fire extinguishers.

**3.02 INSTALLATION**

- A. Install products of this Section in conformance with manufacturer's instructions and code requirements of agencies having jurisdiction, as approved by the Architect, using materials, methods and recommended fasteners. Install in locations and at mounting heights indicated or, if not indicated at heights to comply with ADA Accessibility Guidelines (ADAAG). Refer to paragraph 1.05

Requirements. Install all cabinets and/or extinguishers with the top of the extinguisher not more than 42 inches above the floor.

- B. Fasten cabinets securely, rigidly plumb and level at locations and heights indicated.
- C. Install extinguishers in cabinets or on brackets. Adjust for a sturdy top and bottom support.
- D. Align hinges, latch or miscellaneous hardware for proper operation and uniform clearance.
- E. Clean and polish exposed surfaces prior to final inspection
- F. Remove and replace damaged, defective or undercharged units.

END OF SECTION





1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Supplementary General Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Restroom / Staff Shower and Custodial Closet accessories
  - 2. Grab bars
  - 3. Mirrors
  - 4. Shower seat

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 09110: Metal Framing and Furring
- B. Section 09250: Gypsum Wallboard
- C. Section 09310: Ceramic Tile
- D. Section 09900: Painting

1.03 CONDITIONS

- A. DSA Requirements
  - 1. Toilet accessories required to be accessible shall be mounted at heights according to CBC Section 1115B.8
  - 2. The grab bar can not project more than 3" into the 48" minimum clear space in front of the water closet. CBC Section 1115B.4.1.3.
  - 3. Toilet paper and feminine napkin dispensers located on the grab bar side of an accessible toilet room or stall should not project more than the grab bar. The accessory shall not be located closer than 1-1/2" clear of the tangent point of the grab bar. Accessories surface mounted above grab bar will restrict usability.

1.03 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340
- B. Manufacturer's Data: Include construction details, material descriptions and thickness, dimensions, profiles, fastening and mounting methods, specific options and finishes for each type of accessory specified.
- C. Setting Drawings: For cutouts required in other work, include templates, substrate preparation instructions and directions for preparing cutouts and installing anchoring devices.
- D. Product Schedule: Indicate types, quantities, sizes and installation locations by room of each accessory required.

- E. Maintenance Data: Provide operating instructions, maintenance manuals, lists of replacement parts and service recommendations and keys required for each type of locked accessory.

#### 1.04 QUALITY ASSURANCE

- A. Source Limitations: Provide products of same manufacturer for each type of accessory unit and for units exposed to view in same areas, unless otherwise approved by the Architect.
- B. Product Options: Accessory requirements, including those for materials, finishes, dimensions, capabilities and performance are established by specific products indicated as scheduled in the Drawings.
  - 1. Products of other manufacturers with equal characteristics shall be approved by the Architect.
  - 2. Do not modify aesthetics effects, except as approved by the Architect. Where modifications are proposed, submit comprehensive explanatory data to the Architect for review.

#### 1.05 REQUIREMENTS

- A. Review drawings and coordinate manufacturer's model numbers with each particular application, surface or semi-recessed mounting. Notify the Architect of any discrepancies for final approval.
- B. Toilet accessories required to be accessible shall be mounted at heights according to CBC Section 1115B. Coordinate accessory locations with other work to prevent interference with clearances required for access by disabled persons, proper installation, adjustment, operation, cleaning and servicing of accessories.
- C. Provide mirrors of sizes specified or as detailed on the Drawings. Provide tilting unit as required by handicap code requirements.
- D. Fastenings: Fasten on gypsum board wall surfaces with screws into metal blocking, or with bolts or molly anchors, not less than 1/4" diameter. Screwing into gypsum board or plaster with plugs will not be acceptable.

#### 1.06 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver items in manufacturer's original unopened protective packaging. Store and handle products and materials of this section in the manufacturer's original protective packaging to prevent physical damage or defect to finished surfaces.
- B. Protection: Maintain protective covers on all units until installation is complete. Remove protective covers at final cleaning.

#### 1.07 WARRANTY

Warrant all mirrors for five (5) years against silver spoilage after date of substantial completion.

## 2.00 PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURERS

- A. To establish standards of quality, operation, appearance and performance, model numbers have been selected from the catalog of Bobrick Washroom Equipment, Inc. The manufacturers listed below are to provide the standard for acceptable alternates. Alternates will only be considered if approved in advance by the Architect, prior to submittals. Alternate manufacturers are as follows:
1. American Specialties, Inc.
  2. McKinney / Parker Washroom Accessories, The Charles Parker Company
  3. Bradley Corporation. - Washroom Accessories Division

### 2.02 MATERIALS

- A. Stainless Steel: ASTM A167, ASTM A666, Type 302/304, 18-8 alloy, stainless steel with a #4 satin finish.
- B. Sheet Steel: ASTM A366 cold-rolled, commercial quality. Surface preparation and metal pretreatment as required for applied finish.
- C. Galvanized Steel: ASTM A653, G60 (Z180).
- D. Chromium Plating: ASTM B456, Service Condition Number SC2 (moderate service), nickel plus chromium electro-deposited on base metal.
- E. Mirror Glass: ASTM C1036 Type I, Class I, Quality q2, nominal 6.0 mm thick, with silvering electroplated copper coating and protective organic coating complying with FS DD-M-411.
- F. Galvanized Steel Mounting Devices: ASTM A153, A386 hot dip galvanized after fabrication.
- G. Fasteners: Screws, bolts and other devices of same material as accessory unit, tamper and theft resistant when exposed and of galvanized steel when concealed.

### 2.03 FABRICATION

- A. General: Fabricate units with seamless one-piece face trim flange construction. Weld corners, leaving no open miters on exposed face.
- B. Surface Mounted Accessories: Fabricate units with tight seams and joints and exposed rolled edges. Hang doors and access panels with continuous stainless steel hinge. Provide concealed anchorage where possible.
- C. Framed Glass-Mirrored Units: Fabricate frames for glass mirrored units to accommodate glass edge protection material. Provide mirror backing and support system that permits rigid, tamper-resistant glass installation and prevents moisture accumulation.
1. Provide galvanized steel-backing sheet not less than 0.035 inch and full mirror size with non-absorptive filler material. Corrugated cardboard is not

- acceptable filler.
2. Provide mirror unit mounting system that permits rigid, tamper and theft resistant installation. One piece galvanized steel wall hanger device with spring action locking mechanism to hold mirror unit in position with no exposed screws or bolts.
- D. Keys: All doors shall be provided with a tumbler lock with all locked dispensing units, keyed like. Provide universal keys for internal access to accessories for servicing and re-supplying. Provide minimum of six keys to Owner.
  - E. On interior surface not exposed to view or back surface of each accessory, provide printed, waterproofed label or stamped nameplate indicating manufacturers name and product model number.

#### 2.04 ACCESSORY LIST

Refer to drawings for location, type of accessory and accessory schedule. Refer to Paragraph 3.04, below - Schedule. Basis of design is Bobrick Washroom Equipment, Inc.

### 3.00 EXECUTION

#### 3.01 INSPECTION

- A. Check opening scheduled to receive units for correct dimensions, alignment of blocking, support backing plates for frames and preparation that would affect installation of accessories.
- B. Verify spacing of plumbing fixtures that affect installation of accessories.
- C. Do not begin installation of toilet accessories until surfaces are acceptable, openings, as applicable are verified, and adjoining construction and/or surface finishes are installed in place.

#### 3.02 INSTALLATION

- A. Install accessories at locations and heights indicated. Install according to manufacturer's instructions, using fasteners appropriate to substrate indicated and recommended by the unit manufacturer. Drill holes to correct size and application that is concealed by item with 1/4" tolerance. Mount surface-mounted accessories to backing plates with vandal proof machine screws. Finish exposed fasteners to match items secured. Install all products level, plumb and firmly anchored in locations and at heights indicated.
- B. Secure mirror to walls in concealed, tamper resistant manner with special hangers, toggle bolts or screws. Set units level, plumb and square at locations indicated according to manufacturer's written instructions for substrate indicated.
- C. Install grab bars to withstand a downward load of at least 250 lbs. when tested according to method in ASTM F446. Install manufacturer's recommended anchor system for grab bars.
- D. Mount all accessories per Title 24 CCR requirements.

### 3.03 ADJUSTING AND CLEANING

- A. Adjust accessories for proper operation. Verify that mechanisms function properly. Replace damaged or defective items.
- B. Remove temporary labels and protective coatings.
- C. Clean and polish all exposed surfaces according to manufacturers written recommendations.
- D. Deliver keys and instruction sheets to District.

### 3.04 SCHEDULE

- A. Provide each item complete with screws and fittings, including concealed anchorage as necessary to provide a secure mechanical attachment. Catalog numbers are from Bobrick Washroom Equipment, Inc. Submit equivalents to the Architect for approval.
  - 1. Furnish and install the following items, from items as indicated on the drawings:
    - a. Toilet seat cover dispenser, surface mount, B-221
    - b. Toilet tissue dispenser, Classic Series, twin roll B2740
    - c. Soap dispenser: B-4112 (lotion soap), surface mount.
    - d. Mirror: Fixed angle frame mirror with stainless steel frame B-2903, 24" x 36"
    - e. Stainless steel grab bars, 1-1/2" diameter, satin finish with concealed mounting, B-6806 Series, (1) 3'-6" long and (1) 2'-6" long
    - f. Robe hook: Classic Series double hook, single B-672
    - g. Shower seat, surface mounted L-shaped, slotted solid phenolic, B-5181
    - h. Extra heavy-duty shower curtain rod, Classic B6047 Series  
B204-1 Shower curtain hook  
B204-2 Vinyl shower curtain
    - i. Mop and broom holder B-223
    - j. Towel shelf with towel bar, 24" American Specialties, Inc #7311
    - k. Hand dryer, Semi-recessed mounted, high-speed 'Jet-Towel' by Mitsubishi Electric (206) 547-4591

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Provide a fully integrated on-line, real-time PARKING COUNT CONTROL SYSTEM (PCCS) that shall function in manner described herein.
- C. List of Abbreviations:
  - 1. PCCS PARKING COUNT CONTROL SYSTEMS
  - 2. ID Identification
  - 3. NEMA National Electrical Manufacturing Association
  - 4. UPS Uninterruptible Power Supply

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 03300: Concrete and Concrete Finishes
- B. Section 10430: Signage and Graphics
- C. Section 16000: Electrical

1.03 SYSTEM DESIGN

- A. System Design: This system shall be a PCCS that will monitor counts for vehicles parked in the structure, as they enter / exit the facility. The system includes space availability signs at the entrances South B1 entrance and the North Ground level entrance informing parking patrons of the available parking spaces in the structure.
- B. Primary components of integrated system shall include:
  - 1. Space available panel signs at entrances
  - 2. Vehicle detectors, detector loops and count/controller/boards.
  - 3. Parking Count Control System computer
- C. System Configuration
  - 1. One entry and one exit lane at the south side of the garage B1 Level each equipped with dual detector loops, directional vehicle detector, one count controller board for both lanes and other equipment as shown on the drawings. A parking space available panel sign indicating available spaces shall be provided at the south entrance to the structure.
  - 2. One entry and one exit lane at the north side of the garage Ground Level each equipped with dual detector loops, directional vehicle detector, one count controller board for both lanes and other equipment as shown on the drawings. A parking space available sign indicating available spaces shall be provided at the north entrance to the structure.

3. The parking structure will be treated as one parking zone for overall occupancy and count purposes.
4. The PCCS computer including all necessary software and hardware shall be provided in the Communications Room of the parking structure. The computer shall be used to monitor, control and generate reports of occupancy status of the parking structure.

D. Bid Requirements:

1. Base Bid includes provision of all material, labor, equipment, and services necessary to furnish and install fully integrated PCC system.
2. Bidder shall submit the following with bid:
  - a. List of sub-contractors, identifying nature of work that shall be performed.
  - b. List of manufacturer of each primary component of system.
  - c. Total PCCS cost and unit costs of each component, cost of alternates and/or deducts as delineated on Bid Form.
  - d. Qualifications of Contractor, Manufacturer(s) and Installer(s) of each primary component with Bid. Each submittal shall include three most recently installed, complete projects that are similar in magnitude, complexity, and dollar value. Information shall include names, locations, contacts, telephone numbers, date of installation, number of lanes in facility and description of types and quantities of equipment.
  - e. Bidder shall:
    - i. Examine drawings.
    - ii. Identify in writing appropriate location of all computers and office equipment
    - iii. Identify in wiring any constraints or conflicts where equipment shall be installed.
  - f. Submit detailed schedule showing Bidder's understanding of project requirements including milestones for shop drawings, fabrication, delivery, installation, testing, training and substantial completion. Milestones shall also include special project requirements related to coordination with work by others and phasing.

E. Work Included:

1. Fabricate, deliver, and install all new PCCS equipment as described in this Section.
2. Comply with all applicable codes and standards
3. Review plans and specification to be certain that all functional requirements, as described, can be achieved with equipment to be supplied.
4. Provide Shop Drawings and product literature as specified herein and in Division 1.
5. Coordinate final and precise layout of conduits, stubs, detector loops, and anchor bolts with those responsible for installation.
6. Provide and install all necessary device control wiring and communications wiring to equipment provided in this contract. Furnish and install all modems, electronics and communicating equipment for communication network. Terminate and connectorize all communications cabling. Test, adjust and interface circuits prior to installation of PCCAS equipment. Provide and install detector loops. Make all connection of



- wiring to components.
- 7. Attend construction meetings, provide schedules as requested, and schedule fieldwork that shall be coordinated with other trades.
- 8. Test equipment in accordance with Part 3 of these specifications.
- 9. Provide record drawings, operating manuals, maintenance manuals, spare parts, and training sessions as specified herein.

F. Work by Others:

- 1. All electrical conduit and power wiring as shown on Contract Documents.
- 2. Phone line for modem-to-modem data communication.
- 3. All changes to new construction of islands, curbing, drainage, bollards, signage and pavement markings

1.04 SUBMITTALS

- A. Provision: Comply with Section 01300 / 01340.
- B. Schedule: Contractor shall submit schedule of fabrication, deliver, installation and testing within 30 days after award of contract. Update schedules at 30-day intervals.
- C. Shop Drawings:
  - 1. Dimensioned drawings showing plans, elevations, sections and large-scale details indicating coordination and relationships with other construction.
  - 2. Product literature for each component or product.
  - 3. Wiring diagrams detailing wiring for power, signal and control systems, and differentiating clearly between wiring installed by manufacturer, installer and others, such as electrical sub-contractor.
- D. Samples: Submit samples of paint finishes and other elements to be selected by District within 30 days after approval of contract. Approval/selections will be returned to Contractor within 30 days of submittal.
- E. Operating Documentation: Prior to initiation of field test and training, Contractor shall deliver one hard copy and one reproducible copy of operations manuals, maintenance and administration manuals.
- F. Record Drawings: Provide District with a reproducible set of drawings and a CAD file in AutoCAD 2000 format showing any modifications or clarifications not present on original Contract Drawings including actual equipment field wiring diagram and electrical circuitry and service schematics.
- G. Contractor shall also deliver to District original copies of all licenses, registrations, documentation, disks and other media as may have been included with those commercially available software packages provided with system. In addition, Contractor shall ensure that all licenses, registrations and warranties have been transferred to District prior to final software turnover.
- H. The Contractor shall deliver a Training Plan which shall include a description of training courses, course materials and manuals.

- I. Testing Plan and Documentation: Provide a test plan for review and approval by District and Engineer/Architect 30 days prior to start of first test. Plan shall include demonstration of compliance with specification, contractual compliance, definitions of all test objectives, participant responsibilities, documentation for test, and procedures for dealing with failures during test. Provide three copies of checklists which detail tests for every functional requirements of each entry and exit lane, specified supplies/spare parts, training, operating and maintenance manuals and provide space for sign-offs by Contactor and District's Representative.

#### 1.05 QUALITY ASSURANCE

- A. Allow District and/or its Representative(s) free access to facility at any time to observe installation process.
- B. Provide seven days notice to District and Engineer/Architect to review completed installation prior to acceptance testing.
- C. Provide equipment incorporating features which minimize maintenance and meet the following requirements:
  1. Provide for ease of performance verification and failure detection while minimizing effort required for adjustment.
  2. Provide unobstructed access to equipment components.
  3. Minimize requirements for special tools and test equipment.
  4. Provide for easy removal and replacement of components.
- D. Provide a system and components that have a service life of (10) ten years and specify periodic maintenance requirements in maintenance manual to meet that life expectancy.
- E. Contractor shall be responsible for all software and insure that communications are properly received and sent by all computers and peripheral devices.

#### 1.06 QUALIFICATIONS

- A. Contractor/Installer shall:
  1. Have continuously worked successfully with equipment manufacturer for minimum of three (3) years.
  2. Be approved in writing by PCCS manufacturer(s).
  3. Provide in writing proof of installer's manufacturer's training within last two years.
  4. Have a manufacturer approved equipment service center in sufficient proximity to respond on-site to service calls within four hours.

#### 1.07 DELIVERY, STORAGE and HANDLING

- A. Contractor Shall:
  1. Assume care, custody and control of all PCCS equipment and components.
  2. Replace damaged materials at no cost to District.
  3. Deliver equipment to site packaged to prevent damage and marked

- for easy identification.
4. Store equipment in original containers in clean, dry location designated by General Contractor or District and agreed to by PCCS Contractor.

## 1.08 TIME OF COMPLETION

Contractor shall coordinate installation and testing of equipment so that District may begin operation of PCCS at time parking facility is opened to public for use. First 30 days of operation after opening of new facility shall constitute test period as described in Part 2 of this Specification.

## 1.09 WARRANTY

- A. General: Contractor shall warrant equipment and installation (100% parts and labor) for period of one year from date of final acceptance by District. System shall be maintained and service against any and all malfunctions due to manufacturing or installation defects at no cost to District during warranty period. Maintenance shall include preventive maintenance per manufacturer's recommendations, or as necessary to keep equipment in good working order. Contractor shall be responsible for performing all maintenance and repair during warranty period, including all preventive maintenance and repair work performed under warranty to give to District at end of warranty period.
- B. Warranty Period: Warranty period shall begin after Contractor has demonstrated satisfactory performance of completed PCCS as specified in Part 3, "Operational and Test Cycle."
- C. Response: Warranty response period shall be five days per week, 10 hours per day excluding holidays. Response time from initiation of trouble call to on-site response of qualified service technician shall not exceed four hours.
- D. Repair: Contractor shall repair or replace all defective or damaged items delivered under contract by end of calendar day the following day on which notice was given by District or its agent. Contractor may elect to have any replaced item returned to manufacturer at not additional expense to District. If Contractor is not available, District / operator personnel may affect repairs. Contractor shall then reimburse District for parts and labor necessary to correct deficiencies as defined within warranty clause and time. Contractor shall pre-qualify appropriate District / Operator personnel to effect repairs and identify types of repair each trained individual is qualified to perform after training of District personnel.
- E. Limitations: Warranty shall not cover acts of vandalism, damage caused by third party, or natural phenomena. Warranty shall not cover damage caused during maintenance actions by untrained/unapproved District personnel.

## 2.00 PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURER - For Primary Components (TCS / Daktronic's)

- A. Acceptable manufacturers (Or equal's) for any and all primary components shall

meet the following requirements.

1. Manufacturer shall have been continuously in operation for past five (5) years.
2. Manufacturer shall have current version of each primary component currently operating successfully in tow or more parking facilities of similar size and activity.
3. Manufacturer shall be able to demonstrate successful performance of proposed system and equipment. Proof of successful performance shall be submitted as specified herein.

## 2.02 PROJECT SITE CONDITIONS

- A. PCCS components shall operate dependably within environmental conditions Indigenous to Moorpark, California. Components located in a 24-hour climate controlled office shall be capable of normal performance in a business environment. Outdoor equipment shall be capable of operating in temperature extremes of geographic area stated.
- B. Special electrical power and grounding.
  1. Furnish and install on-line, regulating computer grade uninterruptible power supply (UPS) for:
    - a. District will provide "clean" power that for purposed of this Project shall be defined as 115 VAC +/-10% and 60 Hz from circuits dedicated to PCCS. Contractor shall provide any additional power conditioning required for operation of system as described herein.
    - b. Provide dust and noise protection in strict accordance with equipment manufacturer's recommendations.
    - c. Equipment layout shall be in strict accordance with manufacturer's recommendations to allow proper movement of air through and around equipment.

## 2.03 EQUIPMENT COMPONENTS

- A. Provide complete operational parking system with all necessary components. It is PARCS Contractor's SOLE RESPONSIBILITY to provide every component necessary for a complete functioning system.
- B. See Contract Drawings for equipment layout.
- C. Spare Components: Furnish the following spare components, complete and ready to use, prior to commencement of operational testing and maintain inventory of spare components at this level as components are used during warranty period. After expiration of warranty period, District will pay for replacement of parts as used from this inventory.
  1. One communication controller/board
  2. Two relays for count and lane monitoring (if required by proposed system)

## 2.04 EQUIPMENT PERFORMANCE SPECIFICATIONS

- A. General Conditions
  1. All devices shall have compatible communication ports with selectable

- baud rates for all communications and connections to all computer hardware.
2. Internal components shall be modular and plugged for easy maintenance and replacement.
  3. Control logic and communication boxes shall be provided for all wiring connections.
  4. Corrosion resistant connection boxes shall be provided for all wiring connections.
- B. PCCS Computer: Computer including all necessary hardware and software shall provide the following counting functions:
1. Every vehicular entry or exit lane location shown on the drawings shall serve as a counting location. Each counting location shall be equipped with two vehicle detection loops to provide directional logic at each location and shall transmit counting pulses to the PCCS computer. Each entering vehicle shall subtract a count of one from number of available spaces. Each exiting vehicle shall add a count of one to number of available spaces. Directional logic shall be installed so that a vehicle entering an area through an entrance lane, through an exit lane count location shall be counted as an inbound vehicle. Vehicle exiting an area through an exit lane, through an entrance lane count location shall be counted as an outbound vehicle.
  2. Each area shall have a programmable threshold. Threshold shall be used to trigger "full status." When full status is reached, count system shall operate in one of two modes, selectable by District. Mode one signals an alarm and relies on human intervention to activate appropriate dynamic signs. Mode two automatically activates appropriate dynamic signs.
- C. Entrance Space Availability Signs: These signs shall be multiple message LED as shown on the drawings. Signs shall be provided at both, the north and south entrances and shall be column or pole-mounted. Sign shall be activated automatically from the PCCS computer.
- D. Vehicle Detectors: Vehicle detectors shall be intelligent detectors with directional logic where required herein. Detectors shall contain microprocessor logic to differentiate direction of traffic flow, and can send a violation alert signal when a vehicle backs out of lane. Detectors shall:
1. Automatically maintain peak sensitivity regardless of rain, snow or other environmental conditions. Different sensitivity settings shall be provided to allow tailgating vehicles of varying height and size to be optimally detected.
  2. Detectors in each location shall be housed in a NEMA 4 enclosure.
  3. Have a light on front panel to indicate presence of vehicle.
  4. Modular plug-in construction or built in, and easily serviced. Be self-tuning and self-compensating, and tune its loop environment, rather than relying upon condition to crystal controlled frequencies.
  5. Require no tools or meters for setting unit that is completely automatic except for initial settings.
  6. Have a three-position frequency switch. No two frequencies shall be same, to prevent crosstalk or interference between loops in proximity of each other.

- E. Inductive Loops: Inductive loops shall be cut-in paving surface:
  - 1. Be formed by three to four turns of 16-gauge single-conductor wire.
  - 2. Not be spliced.
  - 3. Have loop leads which are:
    - a. Limited to a length of 100 feet
    - b. Have a four-twist minimum per foot and located at a minimum of 18 inches from electrical power lines.
    - c. Be contained in separate conduit to prevent interference from electrical signals.

### 3.00 EXECUTION

#### 3.01 PROJECT COORDINATION

- A. General: Meet with District, Engineer/Architect, and General Contractor within 30 days of contract award to verify all details of PCCS. Schedule, as related to Work done under General Contract, shall be achieved with adequate time for hookup, testing, and trial period as specified herein.
- B. Submittals: Provide those responsible for related work with:
  - 1. Installation diagrams, details and templates for setting mounted equipment.
  - 2. Templates and cast-in-inserts to anchor freestanding equipment to curbs and bases.
  - 3. Electrical wiring diagrams and details.
  - 4. Electrical installation requirements.
  - 5. Electrical power requirements.
- C. Meetings: Meet with Electrical Contractor, before any rough-in work begins.
  - 1. To review building plans as they related to PCCS equipment.
  - 2. To explain details or precautions necessary to assure that all parking control equipment shall work properly.
  - 3. To determine that all required conduits and wiring are properly laid out.
- D. Additional Wiring: Provide all additional conduit and wiring which is need for total system performance but which was not noted on Contract Documents. There shall be no additional cost to District for these items.

#### 3.02 INSPECTION OF WORK BY OTHERS

Upon written notice from Contractor that entire work or an agreed portion thereof is complete. District representative(s) and Contractor shall make final inspection of Work. District and/or representative will the notify Contractor in writing of all particulars in which Work has been found incomplete or defective. Contractor shall immediately take such measures as are necessary to remedy such deficiencies.

#### 3.03 INSTALLATION OF PARTS

- A. Install PCCS in accordance with manufacturer's recommendations and approved Shop Drawings.
- B. Installation and Start-Up: Contractor shall be responsible for installation of all

control and communication wiring and Contractor supplied equipment and its interfacing and interconnection with District supplied equipment. Contractor shall authorize and accept responsibility for application of power to equipment and initiation of operation, be responsible for running all initial diagnostics and system generation programs necessary to provide complete working system.

### 3.04 TEST AND ACCEPTANCE PROGRAM

- A. General: schedule and format for all system acceptance testing shall be submitted to Engineer/Architect and District and shall be approved prior to start of Installation Tests. Provide a check list of testing of each lane of equipment for all functions.
- B. Inspections and Testing: Inspections and tests observed by District and Engineer/Architect shall not relive Contactor of responsibility for providing hardware, software, and documentation in accordance with this Specification.
- C. Installation Test Demonstrations: Upon installation of each count control equipment or office equipment, an installation tests shall be performed. This test shall exercise equipment an installation test shall be performed. This test shall exercise equipment in accordance with specific test procedures document required in Part 1 of this Specification as well as test every function if equipment. An District's representative may witness tests. Contractor shall notify District and Engineer/Architect in writing at least one week prior to each official test session. In event that first test is not successful, Contractor shall correct noted deficiencies and notify District and Engineer/Architect, at least two days in advance that test session is ready to resume. Contractor shall promptly correct all problems encountered at Contractor's expense.
- D. Substantial Completion includes the following:
1. All PCCS equipment included in project has passes installation test.
  2. All communications from equipment to count control system computer has passed installation test.
  3. All electronic signage is complete and has passed installation test.
  4. All spare parts, stock and manuals are on site and have been approved.
  5. All training is complete to District's satisfaction.
  6. District has been given all test checklists.
- E. Thirty-Day Operational Test and Final Acceptance: Upon completion of all installation tests, demonstrations and training required herein. District or its agents shall operate complete system for test period of thirty days. When installation is phased, completion of all installation tests demonstrations and training of each phase shall be designated at beginning of thirty-day test period. Contractor shall have a qualified and experienced technician on site eight hours per day during 30-day test. When not on site, technician shall be on call with a one-hour response time to an emergency call. During this period, the following performance standard shall be met in order for final acceptance to be issued.
1. All electronic components shall be operational without downtime or programming problems for complete monthly reporting cycle. For each downtime period of more than one hour but less than eight hours or programming problem that delays report cycle, two working days will be

added to acceptance cycle.

3.05 TRAINING

Contractor shall develop and implement a training program for District's personnel. Such training program shall be implemented through use of classroom training and/or other forms of training that Contractor shall propose.

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division 1 apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Supervise installation of power supply location by Electrical Subcontractor and verify suitability for pay station equipment.
  - 2. District shall furnish the equipment (1-unit per floor, 1-unit in Lot G, east of the parking structure and 1-unit in Lot SP-X, south of the parking structure – 6 units total). Contract is for District -Furnished, Contractor Installed (DFCI) installation.
  - 3. Contractor shall coordinate with the District for scheduling, transport and responsibility of the equipment to / at the site.
  - 4. Contractor shall coordinate power supply required, and provide the necessary conduit, wiring and j-boxes as provided under the work of other sections.
  - 5. All power conduits and wiring shall be furnished and installed by the electrical section to each pay station location.
  - 6. The Contractor shall cooperate with the equipment installer and coordinate his work with the work of the pay station equipment installer.
  - 7. Any additional conduit with wire or conduit modifications necessary for a completely operable installation of the pay station system.
  - 8. Coordinate for the placement of pipe bollard protection around the pay station equipment.
  - 6. Coordinate that District furnished equipment and completed installation is in compliance with CBC / Title 24 requirements.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 03300: Concrete and Concrete Finishes
- B. Section 05500: Miscellaneous Metal
- C. Division 16: Electrical

1.03 PAY STATION CONCEPT

Vehicular: Upon parking car, the parker shall walk up to the pay on-foot machine and pay the flat rate required and obtain from the pay station, a parking ticket for the appropriate amount. Parker is then required to walk back and display the parking ticket on the parked cars dashboard. Purchase of a new ticket will be required for each day.

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01300 / 01340.
- B. Shop drawings complete with all dimensions, shapes, sizes, methods of

fabrication and assembly, wiring diagrams, conduit sizes, etc., shown and noted and all details for installing items in the work included.

- C. Brochures and descriptive data of all accessories, including the installation of equipment and the trouble-free operation of the complete system.
- D. Operating and maintenance instructions, manuals and spare parts list for the unit.

#### 1.05 QUALITY ASSURANCE

Furnish fabrication and installation of all items under this Section to the best manufacturing standards and installed by a factory authorized and experienced installer having a minimum of five (5) years successful experience in this type of work.

#### 1.06 WARRANTY

The Contractor shall provide a one (1) year guarantee (parts and labor) to cover all installed units of this contract to function as specified and maintain total system operation. Contractor shall provide manufacturer trained qualified maintenance personnel during the warranty period

#### 1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle equipment, before, during and after installation in conformance with manufacturer's recommendations.
- B. Protect equipment from damage resulting from work of other trades. Repair or replace damaged equipment, as directed by Architect.

### 2.00 PRODUCTS

#### 2.01 MANUFACTURE

Equipment: New, first quality, computerized, model - MODEL 400 – Pay & Display, by Space Machines Sales & Service Center; manufactured by Pacific Parking Systems, Inc. 216 C Technology Drive, Irvine, CA 92618, (800) 663-7008, (949) 453-9898, (949) 453-9595 Fax, techsupport@pacpark.net email

#### 2.02 GENERAL OPERATION

- A. System is capable of accepting \$1, 5, 10, & 20-dollar bills, nickels, dimes, quarters, both U.S. versions, dollar coins, with optional credit cards and smart cards towards the purchase of time.
- B. Utilizes a paper audit trail supported by a nonvolatile electronic record of all transactions.
- C. Systems are capable of functioning as a single unit or operate in a networked environment of up to 64 units on a network.
- D. Supported by a PC, IBM compatible, and Windows based software package, allowing user manipulation of rate structure and system configuration from a local or remote site.

- E. Each system is capable of utilizing a solar power supply. Battery backup is added in the event of a loss of the system power source.

## 2.03 GENERAL SPECIFICATIONS

### A. Case:

1. Case constructed of 9-gauge steel.
2. Case design is such that it is large enough to allow easy removal of internal components, bill acceptor, coin acceptor, printer, etc.
3. Case color to: High gloss yellow & white.
4. Case includes a locking system that utilizes four locking points and requires two keys to open.
5. Case designed to bolt to a steel pedestal 12" x 12" square.
6. Case dimensions: 16" W x 22" H x 18" D with an approximate weight of 150 lbs., with internal components installed.
7. Case locks are a Medeco Lock, keyed with a proprietary combination exclusively for new installations.
8. All components, including machine front, are on a slide-drawer, to allow entire drawer to pull out from the case.

### B. Front Display:

1. The system utilizes a front display, 4 lines by 40 characters.
2. The display is a liquid crystal type.
3. The display is housed in a stainless steel case 26"x 19"
4. The display is recessed behind a clear 1/4" thick lexan cover.
5. The display is backlit for visibility during periods of low/no light.
6. Character sizes are easily changed /modified as desired, with the capability of custom graphics, I.E., arrows, etc.

### C. Buttons: (Pay & Display)

1. (6) Six sealed pressure sensitive buttons, with one of the buttons clearly marked "cancel" and one clearly marked "help"
2. Buttons are coated for anti-static resistance.

- D. Keypad: 1. 3x4 Numeric Keypad mounted to exterior or interior for pay by space or auditor/programming functions.

### E. Coin/Ticket Cup:

1. Constructed of stainless steel.
2. Mounted to the front door.
3. Ticket cup includes a clear lexan door, stainless steel covers coin return.
4. Separate compartments for receipts and coin return.

### F. Bill Acceptor:

1. Bill acceptor has a lockable bill vault.
2. Easily removed for servicing, no tools are required for removal.
3. Utilizes 34 VDC @ 2.5 amps.
4. Capable of accepting \$ 1, 5, 10, 20, dollar bills.
5. Bill denomination acceptance is set utilizing eight switches.
6. Bills are stacked in a vertical position.

7. Bill acceptor is capable of stacking up to 1000 bills.
  8. Bill acceptor is capable of being configured to accept bills in any possible directions.
  9. Bill acceptor is able to have credit pulses configured with DIP switches.
  10. Capable of communication based on bill inserted and allows for system to calculate and dispense change due.
  11. Capable of verifying bill, transmitting information to controller, and holding bill in a non-stacked, escrowed position, pending approval to stack the bill, from the system controller.
  12. Bill acceptor will be capable of accepting new version U.S. bills through simple software updates as they are issued.
  13. Bill acceptor will accept all new version U.S. currency.
  14. Bill acceptor utilizes optical reading sensors.
- G. Coin Acceptor
1. Manufactured by a U.S. based company.
  2. Accepts U.S. nickels, dimes, quarters and dollar coins.
  3. Easily removed for serviceability, no tools are required to remove coin acceptor.
  4. Utilizes 34 VDC @ 2.5amps.
- H. Coin Bag
1. Utilizes a locking system to prevent unauthorized entry.
  2. Capable of holding a minimum of \$ 600.00 in coins.
  3. Includes a locking system which, when removed, and is padlocked, will not allow access to the coins nor allow the bag to be re-inserted until the padlock is opened, and the locking mechanism within the coin box is reset.
  4. Activates a micro-switch, which when removed, automatically prompts the system to issue current cash box ticket.
  5. Box receptacle to have large access mouth for ease of emptying.
- I. Thermal Printer
1. Printer utilizes thermal printing technology.
  2. Printer stores the dot pattern structure in an EPROM & FONT prom.
  3. Utilizes 24 VDC @ 2.5amps.
  4. Printer is easily removed for servicing, no tools required.
  5. Printer paper roll is capable of dispensing a minimum of 4,500 receipts per roll.
  6. Printer utilizes thermal paper capable of not turning black up to 140F
  7. Receipt length is adjustable with a standard width of 2 3/8".
  8. Thermal paper used includes empty roll warning indicator, sequential numbering on receipt back and red notification to place other side up to be valid.
- J. Transaction Storage
1. Transactions are stored in a Windows .dat file format.
  2. The processor maintains a separate database for all credit card transactions and cash transactions.
  3. Credit card transactions are stored in a format compatible with credit card payment systems.

4. Transactions are tracked in a sequentially numbered series. Data can be tracked / identified via the sequential number issued to a specific transaction.
5. Separate data areas are set aside for storage of security access exceptions and internal diagnostic data.
6. Stored in nonvolatile memory that cannot be manipulated with system software. Data stored is held within systems protected transaction storage. System power loss or controller removal will not cause the loss of transaction history.
7. Transaction data is held in excess of 10,000 transactions.
8. Transactions history can be pulled from system giving individual, hourly, daily and monthly transactional history reports.

K. Transaction Processing

1. The system utilizes a minimum of three transaction-processing modes, on-line, networked, and off-line.
2. During off-line conditions, terminals continue to function in an off-line configuration.

L. Processor Software:

1. The processor software provides the following functions:

- a) Network access
- b) Customer interface
- c) Enforcement user interface
- d) Currency handling
- e) Credit / smart card processing
- f) Printer interface
- g) Power management
- h) Terminal diagnostics
- i) Local database management

2. The processor utilizes a network interface consisting of three layers; physical layer, data link layer, and message layer.
3. Terminal maintenance, audit reports, and stall information is accessible from the display/keyboard.

M. Power Management Unit

1. Battery Back-up is provided in the event of a power loss.
2. With solar applications, batteries are utilized for storage of power during periods of little to no daylight.
3. Solar power application will run exclusively on solar power with supplied batteries.

N. In-Ground Mount Pedestals

1. 13" x 10" x 48" (in-ground) square tubular steel, 1/4" plate with a hollow center for pulling power/communication lines through to pedestal top.
2. Color to be: Flat black.
3. Surface mount dimensions: 13" x 10" x 30"

O. Card Options

1. Card option can be supplied with any MODEL 400 and can be mounted by two screws directly to the MODEL400 faceplate.

2. Card reader is capable of accepting ISO 7816-3 Smart Cards and ISO 7810 financial cards.
- P. P.C. Software - System Host Software:
1. Is Windows compatible, capable of single, variable, & multi-rate programming.
  2. Allows user to select options at the end of a rate period to include; allow/not allow purchase of time exceeding the shift/rate maximum, allow/not allow purchase of time past the end of a rate/shift period, allow/not allow user to purchase time through a specified shift down time at no charge, allow/not allow purchase of time through a closed day at no charge.
  3. Allows the user to select the rate for each individual day and have the ability to designate a day closed, or free parking day.
  4. Allows user to configure a secondary daily rate structure to be activated by a specified day.
  5. Allows time to be purchased in 15-minute blocks or by the minute.
  6. Includes at least 6 rate tables for editing.
  7. Includes a minimum of 3 shifts per rate table.
  8. Rate tables allow user to select from the following options; select the time of day that each individual shift will begin, set the maximum amount of money that will be accepted in a given shift, set the expire time of a given shift, allow the purchase of multiple days, allow multiple day purchases to be either 24 hrs. From purchase date or 24 hrs. From expire time of a shift, allow for a period of time during a shift that the system will shut down, able to set a per minute rate, able to select the number of 15 minute blocks per hour and the rate to be charged for the 15 minute blocks, and is able to automatically print a receipt.
  9. Allows rates to be edited by the hour.
  10. Allows user to assign a three character, alpha numeric, designation for each machine.
  11. Allows a minimum time purchase to be set.
  12. Able to edit the length of time the audible alarm will sound.
  13. Able to set the start of a day.
  14. Allows for an option to print/not print receipts.
  15. Able to set a maximum number of tickets to be sold in a day.
  16. Able to set an amount, that no bills above that amount will be accepted.
  17. Able to set the maximum amount of money that will be accepted.
  18. Able to set the maximum change to be given.
  19. Able to use a token in place of the U.S. dollar coin and set the value of that token.
  20. Able to select what to do during a printer error.
  21. Has at least four change options to include; change only, no refund tickets, refund tickets only, no change, change first, then refund tickets, reject bills over max change when lit.
  22. Able to set/modify credit card parameters to include; enable/not enable credit cards, accept/not accept American Express, MasterCard and Visa, accept/not accept a credit card when off-line, set minimum/maximum credit amounts and set a default amount.
  23. Able to accommodate a minimum of 9000 spaces.
  24. Able to vary rates by stall range, with a minimum of 5 changes.

25. Able to set an expiration window to show expired/going to expire stalls, on enforcement reports.
26. Able to set an enforcement access code.
27. Able to set an inactivity time-out for the backlight on the display.
28. Able to select, allow/not allow customer to extend time.
29. Able to modify the top line of printed receipts with 25 characters.
30. Able to modify 3 lines, 21 characters per line, on a refund ticket.
31. Able to set an "out of service" phone number.
32. Able to preset 97 days per year, to charge a special rate.
33. Does not allow for user manipulation of audit historical data.

Q. Remote Processing Software - Communications Software:

1. Communications software includes the following options, dial modem, hang-up modem, and wait for call, receive/send audit commands and lot functions.
2. Accesses to vital communications areas are password protected.
3. Password protected.
4. All system phone numbers are held in a phone directory for ease of accessing phone numbers.
5. Has the ability to hang up the modem via the communications software.
6. Able to set software to wait for an incoming call from a remote site.
7. Able to receive the following items, Transactions: current, all read only, and backup, exception log, Diagnostics.
8. Transactions can be retrieved in the following manners; Current: all transactions since the last audit, All: all transactions stored in the circular queue, Read Only: reads all transactions but does not put down an end of collection and backup - reads transactions from the SPT source.
9. Records security information to include; - Door open/door closed, Cash bag in, cash bag out. Date, time and machine number are recorded with each entry.
10. Keeps a log of all transactional events. The log information includes; individual purchases, receipt numbers generated, power outages, system restarts.
11. Communications software is able to receive processor configuration tables.
12. Communications software is able to send configuration tables, diagnostic levels and bad card files.
13. Communications software is able to set the diagnostic level to none, error, warning or information.
14. Communications software is able to send a bad credit card file to update credit cards that are to be rejected.
15. Communications software is able to set the date and time.
16. Communications software is able to add time to a selected stall.
17. Communications software is able to check the status of a selected stall.
18. Communications software is able to view network status and indicate which terminals are currently on-line or off-line.
19. Communications software is able to remotely monitor the following areas, status, cash box, audit, power, and version.
20. Communications software is able to view the amount of change available and the amount of money currently in the coin bag and bill vault.

21. Communications software is able to view the current audit totals and current grand totals to include; cash, credit, cash card, refunds and overpayment.
22. Communications software is able to view the current status of the following items; Bill Acceptor: disabled, jammed/not jammed, Bill Stacker: full/not full, Coin Acceptor: enabled/disabled and jammed/not jammed, Card Reader: present/not present, Cash Bag: installed/not installed, Door: open/closed, Lock: open/closed, Peripheral Power: on/off, Watchdog Timer: enabled/disabled and Change light: on/off.
23. Communications software is able to view current power management status for a specified party-line number.
24. Communications software is able to view information concerning the current software version being utilized.
25. Communications software is unable to modify passwords required to initiate entrance to communications software and access and log on to remote systems.

### 3.00 EXECUTION

#### 3.01 VERIFICATION OF CONDUITS

Equipment supplier and installer shall verify the adequacy / location of conduit runs shown on the contract drawings for pay station equipment communications and power. If the layout indicated is not adequate for the proposed operation or is not in compliance with the manufacturers requirements shall be brought to the Contractor's attention. Costs associated with modifications to the structure, conduit and / or electrical power or operation signal / function supply shall be assumed by the Contractor at no additional contract cost to the District.

#### 3.02 INSTALLATION

- A. The equipment to be installed as the work of this contract will require certain items to be placed within the concrete structure. Requirements of the work of this Section include supervision of the related work of other sections that effects the installation and wiring of all equipment furnished under this Section.
- B. Unless directed, specified or indicated otherwise, install materials, equipment, etc., in strict accordance with the manufacturer's recommendations, the approved shop drawings, the Architect's instructions, the requirements specified herein and in accordance with the California and National Electrical Codes.

#### 3.03 OPERATION

Contractor shall instruct the District's personnel in the operation and maintenance of the pay station equipment installed as the work of this Section.

END OF SECTION



1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Supplementary General Conditions and Division 1 apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Horizontal manually operated roller shades

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 08410: Aluminum Storefront and Window Wall
- B. Section 08520: Aluminum Windows

1.03 REFERENCE STANDARDS

- A. National Fire Protection Association (NFPA) 701
- B. California Administrative Code Title 19
- C. Department of Transportation Motor Vehicle Safety Standard 302 Flammability of Interior Materials

1.04 SUBMITTALS

- A. Provisions: Comply with Section 01340.
- B. Materials list of items proposed to be provided under this section.
- C. Manufacturer's specifications and other data sheets needed to prove compliance with the specified requirements.
  - 1. Preparation instructions and recommendations
  - 2. Finishes, material descriptions, dimensions of individual components
  - 3. Construction and installation instructions
  - 4. Manufacturers recommendations for maintenance and cleaning
- D. Shop drawings and diagrams in sufficient detail to show fabrication, working and assembly drawings, installation, anchorage and interface of the work of this section with the work of adjacent trades,
- E. Manufacturer's printed recommended installation procedures which, when approved by the Architect will become the basis for accepting or rejecting actual installation procedures used on the Work.
- F. Sample: Provide one (1) sample shade of each type specified. Unit(s) shall be furnished complete with all required components, mounting and associated hardware, instructions and warranty.

## 1.05 QUALITY ASSURANCE

- A. Supplier: Manufacturer, subsidiary or licensed agent shall be approved to supply the products specified, and to honor any claims against product presented in accordance with warranty.
- B. Installer: Installer shall be qualified to install specified products by prior experience, demonstrated performance and acceptance requirements of manufacturer, subsidiary, or licensed agent. Installer shall be responsible for an acceptable installation.
- C. Uniformity: Provide manual roiling shades of only one manufacturer for entire project.
- D. Mock-Up: Provide one (1) mock-up shade for each roller shade type / assembly specified.

## 1.06 JOB CONDITIONS

- A. Prior to shade installation, building shall be enclosed.
- B. Interior temperature shall be maintained between 60 deg.F and 90 deg.F during and after installation; relative humidity shall not exceed 80%. Wet work shall be complete and dry.

## 1.07 WARRANTY

Lifetime Limited Warranty: Fabrics shall be warranted for 5 years. Specific product warranties shall be available from manufacturer or its authorized agent.

## 2.00 PRODUCTS

### 2.01 MANUFACTURER

Hunter Douglas (800) 727-8953, [www.hunterdouglascontract.com](http://www.hunterdouglascontract.com), or approved equals by Lutron, Mecho Shade, or equal.

### 2.02 MANUAL ROLLER SHADES

- A. Product: Hunter Douglas Contract "RB500 Manual Roller Shades"
- B. Materials:
  - 1. Fabrics: Inherently anti-static, flame retardant, fade and stain resistant, light filtering, room darkening, & blackout fabrics providing 0% - 14% openness factors. Fabric weights to range between 6.00 oz/sq.yd – 20.70 oz/sq.yd., containing fiberglass, PVC, polyester, acrylic, vinyl laminates, cotton, & vinyl coatings. Finish selected by Architect from manufacturers available contract colors.
  - 2. Control Systems:
    - a. Clutch Operated: Engineered heavy duty chain drive pulley operating system consisting of metal clutch housing and locking plug containing minimum 6 ribs and inserted at minimum of 2-1/4"

- into roller tube. Lift torque enhancement provided by counter balance system with integrated spring support module. Utilization of adjustment-free continuous qualified T304 stainless steel ball chain with 110 lbs breaking strength for precise control, smooth operation and ensuring a uniform look. Chain tensioner to be compliant with WCMA safety standard A100.1-2010 and must prevent the clutch system from moving the roller shade through lowering and raising if not properly installed as specified in ANSI Standard Section 6.5.2. Components will be maintenance free from adjustments or lubrication for trouble-free operation.
- b. Crank Operated: Gear box assembly made from die cast aluminum and steel construction with steel crank insert. Permanent (or detachable) steel handle with flexible universal joints for easy turning force.
  3. Dual Roller Shades: Universal mount steel brackets with 2 separate solar and room darkening blackout roller shades operating independently of each other.
  4. Roller Tube: Circular-shaped aluminum tube extruded from alloy and temper 6063 T-6, 2" outside diameter extruded tube to have a .063" wall thickness (2.5" outside diameter to have a .079 wall thickness). Heavily reinforced with minimum six internal ribs providing additional tensile strength and allows for secure placement of clutch & end plug.
  5. Heavy Duty Tube Bearing Plug: Die cast metal and reinforced idler assembly containing spring loaded end plug with positive locking wheel allows for up to 7/8" adjustment and provides for a secure installation and removal of shade. Locking tube bearing plug contains minimum 6 ribs and inserted a minimum of 2-3/8" into roller tube.
  6. Bottom Bar: Extruded aluminum weight in a sealed pocket hem bar provides tracking adjustments and uniform look.
  7. Mounting Hardware: Manufacturer's standard heavy duty bracket constructed of hardened 1/8" thick steel to support full weight of shade with bracket screw hole covers to provide uniform look. Integrated leveling device for enhanced level adjustment of overall shade. Locking mechanism on bracket adapter provides for a secure installation and removal of the shade.
  8. Fascia: 'L' shape removable aluminum extrusion valance that attaches to brackets and conceals roller shade.
  9. Roller Shade Pocket: Extruded aluminum alloy U shape housing for recessed mounting in acoustical tile or drywall ceilings. 5.25" (or 9") in diameter with aluminum closure mount.
  10. Blockout System: Extruded aluminum side channel with concealed mounting brackets. Bottom bar with nylon wool pile to prevent light leakage.
  11. Additional Available Options: RB500 Bottom Bar, Reverse Roll Detachable Spline, Internal Auto Stop Mechanism, Coupled and Banded.

### 2.03 FABRICATION

Shade measurements shall be accurate to within +/- 1/8" or as recommended in writing by manufacturer.

### 2.04 FABRICS

Fabric selection shall be from the manufacturer contract standards available.

## 2.05 ADDITIONAL MATERIALS

Provide other materials, not specifically described but required for a complete and proper installation, using specified manufacturers standard horizontal roller shade installations as a project standard. All materials are subject to the approval of the Architect.

## 3.00 EXECUTION

### 3.01 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.
- B. Contractor shall be responsible for inspection on site, approval of mounting surfaces, installation conditions and field measurement for this work.

### 3.02 INSTALLATION

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this section.
- B. Install the work of this section shall be in strict accordance with the original design, the approved shop drawings, the manufacturers printed recommended standards and installation procedures as detailed on contract drawings, and as approved by the Architect.
- C. Adequate clearance shall be provided to permit unencumbered operation of shade and hardware.
- D. Anchor all components firmly into position for long life under regular and hard use.
- E. Clean finish installation of dirt and finger marks. Leave work area clean and free of debris.

### 3.03 DEMONSTRATION

Demonstrate operation method and instruct Owner's personnel in the proper operation and maintenance of the roller shades.

END OF SECTION

1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this Section.
- B. Furnish all labor, materials, services, equipment and appliances to perform all work to complete the Contract, including but not limited to these major items:
1. Furnish and install hydraulic elevators complete and operable with all appurtenances.
  - \*\*\*\*\* 2. Deferred Approval: Identifies this as a Division of State Architect (DSA) deferred approval item under this Contract. Deferred approval work as covered by this Contract and as indicated by the specific provisions in the General Conditions, Special Conditions, District-Contractor Agreement and/or Contract Documents shall be in conformance with the requirements as specified herein.

1.02 CONDITIONS – DSA Requirements

Elevators shall comply with all of the accessibility requirements of CBC Section 1116B and 3001.1.1 with exception and 3001.3. See additional requirements in Passenger Elevator Requirement handout.

1.03 RELATED WORK IN OTHER SECTIONS

- A. Legal Hoist Way and Pit Enclosure:
1. Clear plumb hoist way with variations not to exceed 1" at any point.
  2. Bevel cants 25 degrees from vertical over any rear or side-wall ledges that project 2" or more into the hoist way. (Not required on hoist way).
  3. Divider beams between adjacent elevators at each floor and car rail supports (building supports) and shall be under 0.50g horizontal seismic force, 12'-0"oc maximum.
  4. Install guide rail bracket supports in concrete, as required, 12'-0"oc maximum. (Supports, to be provided by Elevator Contractor as indicated on the shop drawings.)
  5. Provide a 3'-0" square hole in pit floor for Elevator Contractor to install the protective secondary containment casing of 10 gage oversized steel casing to be cut down and edge poured integral to the pit floor infill. Provide a water stop around the steel casing prior to pouring concrete. Fill casing interior with concrete after PVC inner casing and hydraulic jack installation.
  6. Opening in hoist way wall for hydraulic piping, underground piping trenching and backfill.
  7. Cut and patch walls and floors if necessary.
  8. Block outs for push-button stations, hall lanterns and position indicators.
  9. Continuous hoist way entrance sill supports, if required, and grout under sill after installation. Coordinate with elevator installer.
  10. Pit ladder and pit screen

11. Protect open hoist ways and entrances during construction per OSHA Regulations.
  12. Protect cab(s), entrance(s) and special metal finish from damage after installation.
  13. Hoist way / ventilation.
  14. A fused 120V, 20A, single-phase power supply in elevator pit.
- B. Suitable light and convenience outlets in machine room with light switches located within 18" from lock jamb side of machine room door.
- C. A fused Mainline-switch or circuit breaker in the machine room per the National Electric Code with feeders from mainline switch to controller.
- D. A fused 120-volt, 20 amp single-phase, power supply to each controller.
- E. Temporary power and illumination as required by elevator Contractor to install, test and adjust elevator equipment.
- F. Telephone and intercom connection at the controller in machine room.
- G. Finish painting for shaft interior refer to Section 09900.
- H. Electrical supply, refer to Division 16.

1.04 DEFERRED APPROVAL

- A. Installation of all deferred approval items and systems shall not be started until the following procedures have been complied with:
1. Contractor(s)/Sub-Contractor(s) design professional(s) shall prepare detailed plans/drawings and engineering calculations under the supervision of, and signed by a professional Structural or Civil Engineer registered in that discipline in the State of California.
  2. It shall be the Contractors responsibility, and that of his registered professional(s) to present stamped and signed, by both the design professional and the Contractor, shop drawings and calculations to the Architect/Structural Engineer of record for review, approval, signature and stamp prior to Contractors submittal to DSA for deferred approval plan check and permit.
  3. Obtain and pay for all permits and fees.
- B. Requirements:
1. The Architect/Structural Engineer will review the Contractors shop drawings, calculations and material data for consistency with the design intent only. Contract drawings indicate design intent and shall be used as providing the minimum standards required for fabrication, support and anchorage. The review does not relieve the Contractor and the Contractors design professionals of their responsibilities.
  2. The Architect/Structural Engineer reserves the right to review and/or modify the design professionals drawings / calculations and specifications to suit any project condition created by the acceptance of deferred approval items. Requested changes or revisions shall be re-engineered and resubmitted for re-review in conformance with project submittal,

Section 01340. If required, Contractor shall resubmit to DSA as required. Changes resulting from such modifications shall be performed at no extra cost to District.

3. Contractor shall pay for the services of the Architect/Structural Engineer for review of Design/Build work for submittal and re-submittal of Contract Drawing changes resulting from approval of deferred approval items by DSA. Contractor to also pay for any/all additional plan check and permit fees required resulting from the changes of the original Contract Documents required by the Design/Build work.

C. Related Requirements:

1. Contractor shall coordinate pertinent related work and modify surrounding work as required to properly integrate the Work affected by each deferred approval item, to provide that each is complete and fully integrated into the project/construction required by Contract Documents and in full conformance with agency requirements, at no additional cost to District.
2. Include as part of each deferred approval item miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation, whether or not mentioned or detailed as part of the required approval.

#### 1.05 REFERENCE STANDARDS

A. Compliance with Regulatory Agencies: Comply with the most-stringent applicable provisions of following Codes and/or Authorities, including revisions and changes in effect on date of these specifications.

1. CCR Title 8, Subchapter 6, Elevator Safety Orders (Register 79, No. 1, 1-6-79 with all update amendments), CCR, Title 24, Part 7.
2. Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks, AMSE/ANSI A17.1 and CAN/ CSA B44
3. Inspectors' Manual, AMSE/ANSI A17.2-1 and CAN/ CSA B44.
4. California (National) Electrical Code, No. ANSI/NFPA and Title 24, CCR.
5. Life Safety Code, NFPA No. 101.
6. The California Elevator Safety Construction Code., Title 24, CCR, Part 7.
7. Accessible Code, Title 24, CCR, Part 2, CBC Section 3001 and American with Disabilities Act (ADA).
8. Requirements of and any other Codes, Ordinances and Laws applicable within the governing jurisdiction.

#### 1.06 SUBMITTALS

A. Provisions: Comply with Section 01300 / 01340.

B. Within 60 days after award of contract and before beginning equipment fabrication submit shop drawings and required material for review, complete, as outlined in Section 01340, Division 1. Allow 30 days for response to submittals.

1. Scaled and Fully Dimensioned Layouts: Plan of pit, hoistway and machine room indicating equipment arrangement, elevation section of hoistway, details of car enclosures, entrances, etc.

2. Design Information: Indicate equipment lists, reactions and design information on layouts, seismic equipment designs, legal and otherwise required clearance between equipment furnished and other building parts.
  3. Power Confirmation Sheets; Include motor horse power, code letter, starting current, full load running current, and demand factor for applicable motors.
  4. Finish Material: Submit samples, 3" x 12" samples of actual finishes.
  5. Signal Fixtures: Submit shop drawings and manufacturers brochures of all units including mounting provisions and details.
  6. Indicate on shop drawings required ladder, access doors, hatch locations, separator beams and screens, as well as any other requirements, even though these items are furnished under separate sections. All information pertaining to installation of elevators, equipment and other related work shall be furnished.
  7. Manufacturers literature on the environmentally friendly (synthetic) bio-degradable-hydraulic fluid.
- C. Provide written information necessary for proper maintenance and adjustment of the equipment prior to final acceptance and final payment as follows:
1. Straight line wiring diagram of as-installed elevator circuits with index of location and function of all components. Mount installation diagrams on masonite panels and leave on the job. Provide two (2) final corrected-sets after job acceptance for the Owner's file.
  2. Lubricating instructions including recommended grade of bio degradable synthetic-fluids lubricants.
  3. Parts catalogs for all replaceable parts including ordering forms and instructions.
  4. Refer to Section 01730 - Operating and Maintenance Data requirements.
- D. Submit to DSA required drawings with calculations as required for deferred approval, refer to Section 01100 - Special Project Procedures.

#### 1.07 QUALITY ASSURANCE

- A. These specifications are written to establish requirements for Electro-Hydraulic Passenger elevator installation. Manufacturers shall submit proposals based upon installation of equipment of their manufacture to provide the same service, control features and operation.
- B. Approved Manufacturers / Installer: Approved manufacturers and installers must be local with established sales and service within 100 miles of the project. Local service office only will not be considered adequate.
1. Hydraulic Elevators: Selected by the District are Otis Elevator Company, Mitsubishi and Republic Elevator Company. Alternates manufacturers that may be considered with the approval of the District are KONE and ThyssenKrupp Elevator Company.
  2. Car Enclosures: Brice-Southern, Globe Van Doorn, Hauenstein & Burmeister, Otis Elevator, or KONE and ThyssenKrupp Elevator Company,.
  3. Hoistway Entrances: Brice-Southern, Hauenstein & Burmeister, Schindler, Tyler, Otis Elevator Co., or KONE and ThyssenKrupp



C. Document Verification; In order to discover and resolve conflicts or lack of definition that might create construction problems, Contractor must review contract documents for compatibility with their products prior to bidding. Review structural, architectural, electrical and mechanical drawings and specifications. Contractor's compliance with all provisions of contract documents is required. Owner will not pay for changes to structural, mechanical, electrical or other systems required to accommodate bidders equipment.

1. Elevator bidders shall submit a written report to the Architect at least ten (10) days prior to the bid-due date for the work covered by this section. This report shall include the following statement:

"We have examined the drawings and specifications for work included in our contract and for the related work. Except for the items described in the attached list, we have discovered no errors, omission, impractical details or conflicts between our work and that of other trades or conditions which would require deviations from the drawings and specification."

2. With their proposal, submit a statement listing the specific items which their installation deviates, if at all from the specifications and describing in detail the nature and performance of the alternate equipment.
3. Elevator Contractor shall assume all responsibility and bear all cost for electrical modifications, or any building modifications including engineering costs, if required to be different from those shown on drawings or specified for the installation of respective equipment.
4. The Contractor shall be responsible for a complete operable installation.
5. Certify the adequacy of the proposed electrical power supplies indicated on the electrical drawings.  
(List items for which clarification is necessary. If none, so state.)
6. The California Elevator Safety Construction Code, Title 24, CCR, Part 7.
7. Handicapped Code, Title 24, CCR, Part 2, and American with Disabilities Act (ADA).
8. Requirements of and any other Codes, Ordinances and Laws applicable within the governing jurisdiction.

D. All controls, lanterns and instruments exposed to the weather, i.e., wind driven rain shall be housed in watertight/weather tight enclosures with elements completely sealed against the weather.

1.08 MINIMUM DESIGN CODE REQUIREMENTS - Refer to Paragraph 2.01, Equipment Summary for specific project requirements.

- A. The elevator car size and configuration must be adequate to accommodate a stretcher or gurney. (Title 24, Part 2, CCR, Section 3003.5)
- B. The minimum elevator platform size, with side opening doors shall be 68" wide by 54" deep (door to wall) or 80" by 54" for elevators with center opening doors. (Title 24, Part 2, CCR, Section 3003.4.1A, 3003.4.7.)
- C. The elevator doors shall have a 3'-6" minimum clear opening. (Title 24, Part 2, CCR, Section 3003.4.4)

- D. Install a handrail at 32" (if handrail does interfere with controls, otherwise meet 34"-38" requirement) above the elevator car platform with a 1-1/2" minimum clear space between the handrail and the wall. (Title 24, Part 2, CCR, Section 3003.4.12)
- E. The centerline of the alarm button and emergency stop switch shall be at a nominal 35" and the highest floor button cannot be higher than 54" above the car floor. Elevator floor buttons shall be located within 4'-6" above the finish floor for side approach or 48" when there is only a frontal approach. (Title 24, Part 2, CCR, Section 3003.4.8)
- F. Except for photo electric tube bypass switches, the emergency controls, including the emergency stop and alarm, shall be grouped in or adjacent to the bottom of the panel and shall be no lower than 35" from the floor. Only one set of controls per elevator car need comply. (Title 24, Part 2, CCR, Section 3003.4.8)
- G. An audible signal shall sound to tell a passenger that the car is stopping or passing a floor served by the elevator. (Title 24, Part 2, CCR, Section 3003.4.9)
- H. Provide 54" maximum high emergency hands-free telephone. (Title 24, Part 2, CCR, Section 3003.4.10)
- I. The telephone shall have audio communication abilities. (Title 24, Part 2, CCR, Section 3003.4.7a)
- J. Elevator floor selection buttons shall have square shoulders, 3/4" min. high, a detectable operating motion, illuminated and raised 1/8". Install a white on black 5/8" minimum high Arabic numeral on the left side of the floor number, an alphabet character or standard Braille symbol below the numeral with a 3/8" minimum space or other means of separating rows of control buttons. (Title 24, Part 2, CCR, Section 3003.4.14)
- K. Identify elevator controls and emergency equipment with raised symbols, including but not limited to emergency stop, door open, door close, alarm and telephone. The main entry floor call button shall be designated by a raised star on the left side of the floor designed. (Title 24, Part 2, CCR, Section 3003.4.8a)
- L. Provide an automatic door-opening device that stops and reopens the car door when the door is obstructed while closing. Elevator door opening sensors, not requiring contact to activate, shall be located between 5" and 29" AFF. The door-reopening device shall remain effective for 20 seconds minimum and the doors may close in accordance with ANSI 17.1-88 or ASME 17.1-1990. (Title 24, Part 2, CCR, Section 3003.4.5)
- M. Automatic elevators shall stop within 3/8" of the floor under normal loading and unloading conditions with a 1-1/2" maximum clearance between the car platform and the hoist way landing edge. (Title 24, Part 2, CCR, Section 3003.4.2)
- N. Exterior elevator call buttons shall be located 42" AFF maximum, shall be 3/4" minimum in size and raised 1/8". (Title 24, Part 2, CCR, Section 3003.4.9a)

- O. A visual elevator hall lantern and audible signal shall be provided at each hoist way entrance indicating to the prospective passenger the car answering the call and its direction of travel as follows: (Title 24, Part 2, CCR, Section 3003.4.15a)
  - 1. The visual signal for each direction shall be a minimum of 2-1/2" high by 2-1/2" wide and visible from the proximity of the hall call button. (3003.4.15a)
  - 2. An audible signal shall sound once for the up direction and twice for the down direction or be of configuration that distinguished between the elevator up and down travel. (3003.4.15a)
  - 3. The centerline of the fixture shall be located a minimum of 6'-0" (72") in height from the lobby floor. (3003.4.15a)
  - 4. The use of in-car lanterns, or on the doorjamb, visible from the proximity of the hall call buttons and conforming to the above requirements will be acceptable. (3003.4.15a)
  - 5. Use arrow shapes for visible signals.
- P. The minimum acceptable time from notification that a car is answering a call (lantern and audible signal) until the doors of the car start to close shall be calculated by the following equation:  $T = D/(1.5 \text{ ft/sec})$ . T is the total time in seconds and D is the distance in feet from a point in the lobby or landing area that is 60" directly in front of the farthest call button controlling that car to the centerline of its hoist way door. (Title 24, Part 2, CCR, Section 3003.4.6.1)
- Q. The minimum acceptable time for the doors to remain fully open shall be not less than 5 seconds. (Title 24, Part 2, CCR, Section 3003.4.5)
- R. Passenger elevator landing jambs on all elevator floors shall have the number of the floor on which the jamb is located, designated by raised Arabic numeral which are a minimum of 2" in height and raised Braille symbols which conform to Section 1117B.5.2 located approximately 5' above the floor on the jamb panels on both sides of the door so that they are visible from within the elevator. Raised Braille symbols shall be placed directly to the left of the corresponding raised Arabic numerals. The raised characters shall be on a contrasting background. (Title 24, Part 2, CCR, Section 3003.4.16a)
- S. Maintain a clear 48" by 30" space under the elevator call button permitting a person using a wheelchair to approach and use the call button.

#### 1.09 PERMITS, TESTS AND INSPECTIONS

- A. Obtain and pay for permits, licenses and inspection fees necessary to complete the elevator installation.
- B. Perform tests required by Consultant, Governing Authority and/or the ASME / ANSI A17.1 Safety Code for Elevators and Escalators, with procedures described in ASME/ANSI A17.2 Inspector's Manual for Elevators and Escalators, in the presence of authorized representatives.
- C. Supply personnel and equipment for tests and final reviews indicated in Part 3, at no added cost.

## 1.10 WARRANTY

- A. Materials and workmanship of the elevator installation shall comply in every respect with contract documents. Unless due to ordinary wear and tear, or improper use or care by Purchaser, correct defects which develop within one year from date of final acceptance of work to the satisfaction of the Architect, District, or Consultant at no additional cost.
- B. Provide a twenty (20) year warranty covering watertight and corrosion resistance of the outer steel casing and additional closed bottom P.V.C. casing around the cylinder. For remote location machine rooms, hydraulic lines are to be encased in PVC piping lines.
- C. Make modifications, adjustments, improvements, etc., to meet performance requirements in Parts 2 and 3 of these specifications.

## 1.11 MAINTENANCE

- A. Interim:
  - 1. When one or more elevators are near completion and declared ready for service, the District or Contractor may accept elevators for interim use and place them in service before entire installation of all elevators have been completed and accepted.
  - 2. During this period District or Contractor may pay Elevator Contractor a mutually agreed amount per elevator for preventive maintenance. Indicate amount per unit per month with bid.
- B. Include with New Equipment Contract (Warranty Period):
  - 1. The Elevator Contractor shall furnish preventive maintenance on all equipment described herein for a period of 12 months commencing on date of final acceptance of the elevator system, including 24 hour emergency callbacks. The maintenance shall include systematic examinations, cleaning, adjustments and lubrication of all equipment, as required to maintain manufacturers warranty requirements. Repair or replace electrical and mechanical parts whenever required and shall use only genuine, standard parts produced by the manufacturer of the equipment installed. Maintain elevator machine room, hoistway, and pit in clean condition.
  - 2. All maintenance work shall be performed by competent personnel under the supervision and direct employ of the Elevator Contractor.
  - 3. The District, at his option, may choose to delete this 12 month preventative maintenance agreement from the capital contracts and to pay this amount in 12 equal installments directly to the Elevator Contractor during the warranty period in which the work is being accomplished.
- C. Contract:
  - 1. Bidders shall also quote the monthly cost for a 5-year maintenance agreement to commence on completion of the 12-month maintenance period in "B" above. Submit quote based upon terms and conditions of the elevator manufacturer's standard preventive maintenance agreement.

Under this agreement, the equipment performance requirements, as specified, shall be provided at all times.

2. If this contract is accepted, the contract price may be adjusted at the expiration of the new installation service period and thereafter as provided in the contract.
3. Agreement shall not be worded as automatically accepting the maintenance agreement, unless option is accepted by the District. There shall be no penalties for non-acceptance.

D. **Maintenance Availability:** The final elevator installation shall be able to be maintained by any licensed elevator maintenance company without the need of conferring, cooperation, purchase or leasing of equipment, special tools, or maintenance/repair of any component from the installing elevator company or manufacturer. Installed equipment not meeting this requirement shall be removed and replaced with conforming equipment at no cost to District.

#### 1.12 CAB

- A. The elevator manufacturer shall be responsible for the following:
1. Furnish and install complete cabs as detailed and specified.
  2. Furnish and install all electrical controls and signal fixtures and wire complete.
  3. Furnish and install conduit and wiring to lighting and ventilating fixtures provided.
  4. Furnish and install wiring and traveling cables for hands-free telephone unit.
  5. Provide two (2) additional pair of shielded traveling cables for District's 'Future' use. Make provisions for future intercom and security cameras. Equipment installed and furnished by others.
  6. Furnish and install headers, tracks and sill threshold, as applicable.
  7. Furnish and install hangers and gibs on car doors and hang doors.
  8. Furnish and install car operating panels and position indicator controls, indicators and faceplates.
  9. Furnish and install metal non-vision wings.
  10. Basic construction shall be 14 gage steel minimum.

#### 1.13 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in manufacturer's original unopened protective packaging.
- B. Store materials in original protective packaging. Prevent soiling, physical damage or wetting.
- C. Protect equipment and exposed finishes during transportation, erection and construction period against damage and stains.

### 2.00 PRODUCTS

#### 2.01 EQUIPMENT SUMMARY - PASSENGER ELEVATORS:

NUMBER:	TWO (2) ELECTRO-HYDRAULIC PASSENGER ELEVATORS No. 1 & 2.
CAPACITY:	3,500 LBS.
SPEED:	125-150 feet per minute full load up, and 150 feet per minute full load down.
CAR ENCLOSURE:	As specified.
CAR OUTSIDE DIMENSIONS:	7'-0" wide by 6'-2" deep.
CAR INSIDE DIMENSION	6'-8" wide 5'-5" return panel to back wall.
LANDING SERVED:	From Basement B1 landing to the third (roof) level.
STOPS:	Four (4) all in line for each elevator.
TRAVEL:	Approximately 32'-10"
CONTROL AND OPERATION: (Microprocessor Based Systems)	Duplex automatic
ENTRANCES TYPE:	Side opening, horizontal slide UL "B" label 1-1/2 hour.
ENTRANCES SIZE:	3'-6" side by 7'-0" high.
DOOR OPERATION:	Medium speed, side gurney accessible, heavy duty, master dc operation, minimum opening speed 1-1/2 fps
MOTOR CONTROL:	SCR Soft start with closed transition start
POWER SUPPLY:	480 volts / 3 phase, 60 hertz, alternating current.
LIGHTING SUPPLY:	120 volts / 60 cycles alternating current.
MACHINE LOCATION:	Remote from hoist way at basement level. Hydraulic oil line to pits shall run below grade in a PVC sleeve. Fluid to be used shall be synthetic, environmentally friendly oil.
SIGNALS:	One (1) riser of illuminated vandal-resistant call buttons in the lobby at each floor served. Illuminated vandal-resistant push buttons in each car.
HALL LANTERNS:	At all floors, combination hall car position indicator LED and hall lantern with adjustable audible handicapped signals (electronic chimes or tone), sound twice for down direction.
NOTE:	<ol style="list-style-type: none"> <li>1. Roof level indicator is to be housed in a watertight enclosure and completely sealed against weather.</li> <li>2. All controls mounted for handicapped access. Car push buttons shall be vandal-resistant "Color Coded" illuminated diode ring around the flat stainless steel buttons to designated floor level, as selected by Architect.</li> </ol>
ADDITIONAL FEATURES:	<ul style="list-style-type: none"> <li>• Fireman's emergency service in car and hall,</li> <li>• Electronic passenger sensing device, seismic provisions per Title 8 and local Code, reduced voltage starting,</li> <li>• Heavy duty motor, 120 starts</li> <li>• Oil viscosity control,</li> <li>• Sound isolation system (Mason or equal),</li> <li>• Braille symbols and raised Arabic numbers in car and hall (no stick-on plates)</li> </ul>

- Simplex independent service.
- Full width fascias primed finish.
- A battery-powered emergency cab return / lowering unit.
- Products-of-combustion sensors controls (NFPA No.72D) at all enclosed levels at elevator lobbies or where required to initiate firemen's return feature to designated floor level. Elevator company to hook up.
- As-built wiring diagrams operating instructions, and parts ordering information.
- ADA -"Hands-Free", self-dialing, vandal resistant, two-way communication system with recall, tracking and voiceless communication emergency notification/phone.
- Tamper-resistant fasteners for signal fixture faceplates.
- Hydraulic fluid cooler unit(s). Refer to paragraph 2.03 B.
- Voice Guidance System: A synthesized voice instructs passengers on the current status, floor number, etc. & synthesized voice that instructs passengers in case normal operation is suspended.

## 2.02 MATERIALS

- A. Steel
1. Sheet Steel (Furniture Steel for Exposed Work): Stretcher leveled, cold-rolled, commercial-quality carbon-steel, complying with ASTM A366, matte finish.
  2. Sheet Steel (for Unexposed Work): Hot-rolled, commercial quality carbon steel, pickled and oiled, complying with ASTM A569.
  3. Structural Steel Shapes and Plates: ASTM A6, ASTM A36 and ASTM A108.
- B. Stainless Steel: Type 302 or 304 complying with ASTM A167 with standard tempers and hardness required for fabrication, strength and durability. Sheets shall be minimum 14 gage for door facings and 16 gage minimum for entrance frames and front returns.
- Apply mechanical finish on fabricated work in the locations shown or specified. (Federal Standard and NAAMM nomenclature) with texture and reflectivity required to match Architect's sample. Protect with adhesive-paper covering.
1. No 4: Bright brushed directional polish (satin finish). Graining directions in longest dimension.
  2. Rigidized Stainless Steel: Pattern 5WL. All patterned finishes shall be 20 gage laminated to the manufacturers standard plain-finished steel panel.
- C. Aluminum: Extrusions per ASTM B221; sheet and plate per ASTM B209.
- D. Fire Retardant-Treated Particleboard Panels: Minimum 3/4" thick backup for stainless steel panels, edged and faced as shown, provided with suitable anti-warp backing. Meet ASTM E84 Class "I" rating with flame-spread rating of 25 or less, registered with Local Authorities for elevator finish materials.
- E. Paint: Clean exposed metal of oil, grease, scale and other foreign matter and factory paint one shop coat of either manufacturer's standard rust-resistant primer or specified primer in conformance with finish system specified. After

erection, provide a minimum of one finish coat of industrial enamel paint to items specified. Concealed galvanized metal need not be painted, unless indicated otherwise, or required in an exposed shaft.

1. All equipment and metal work installed as a part of this work that does not have special architectural finish that is exposed in the hoist way, including cab framing/construction and shrouding, either above or below the cab shall be painted black.
2. Apply a minimum of one coat paint to all equipment including machine, motors, generator, controllers, selectors etc., as required for a complete inter-phase installation.

### 2.03 CYLINDER AND PLUNGER (JACK & POWER UNITS)

- A. Jack Unit: The jack unit shall be of sufficient size to lift the gross load the height specified and shall be factory tested to insure adequate strength and freedom from leakage. No brittle materials shall be used in the jack construction. Jack units shall consist of the following parts: A plunger of heavy seamless steel tubing accurately turned and polished; a stop ring shall be electrically welded to the plunger to positively prevent plunger leaving the cylinder; an internal guide bearing; packing or seal of suitable design and provided with a pipe connection and air bleeder. Brackets shall be welded to the jack cylinder for supporting the elevator on pit channels. An auxiliary safety bulkhead shall be provided in the lower end of the cylinder.
- B. Power Unit – Submersible: Oil pumping and control mechanism shall be compactly and neatly designed with all of the components listed below combined in a self-contained unit; structural steel outer base with tank supports; floating inner base for mounting motor pump assembly; metal drip pan; a positive displacement pump; an electric induction motor; an oil control unit with the following components build into a single housing; master-type control valves which include holding, direction, bypass, stopping, manual lowering functions; a high pressure relief valve; a check valve; an automatic unloading up start valve; a lowering and leveling valve; a shut off valve, a magnetic controller, oil reservoir with protected vent opening, oil level gauge, outlet strainer, and muffler all mounted on isolating pads. Enclose entire unit with a removable sheet steel panels lined with sound absorbing material.

All system are to also include hydraulic fluid cooling units; Noren HyTec Cooler (650) 853-3011, or equal. Model to be required for specific manufacturers equipment. Include an oil temperature thermostat to maintain hydraulic oil at a predetermined operating temperature.

- C. The pump shall be especially designed and manufactured for oil-hydraulic elevator service. It shall be of the positive displacement type, inherently designed for steady discharge with minimum pulsations to give smooth and quiet operation. Output of pump shall not vary more than 10% between no load and full load on the elevator car.
- D. Drive shall be by multiple V-belts and sheaves of number and size to insure maximum factor of safety.



- E. Motor shall be especially designed for heavy-duty oil-hydraulic elevator service and of duty rating to comply with herein specified speeds and loads.
- F. Oil control unit shall consist of the following components, all built into a single housing. Welded manifolds with separate valves to accomplish each function will not be acceptable under this specification. All adjustments shall be accessible and shall be made without removing the assembly from the oil line:
  - 1. Relief Valve shall be externally adjustable, and shall be capable of bypass in the total oil flow without increasing back-pressure more than 10% above that required to barely open the valve.
  - 2. Up Start and Stop Valve shall be externally adjustable and designed to bypass oil flow during start and stop of motor pump assembly. Valve shall close slowly, gradually diverting oil to or from the jack unit insuring smooth up starts and up stops.
  - 3. Check Valve shall be designed to close quietly without permitting any perceptible reverse flow.
  - 4. Lower Valve and Leveling Valve shall be externally adjustable for drop-away speed, lowering speed, leveling speed and stopping speed to insure smooth "Down" starts and stops. The leveling valve shall be designed to level the car to the floor in the direction the car is traveling when slowdown is initiated.
  - 5. Each controller shall be of the full magnetic type or solid-state integrated circuitry. Silver to silver contacts shall be utilized on all relays and Contractors. Thermal overload-relays to be provided to protect the motor. All component switches to be mounted in a NEMA 1 enclosure.
  - 6. Mainline Strainer: A mainline strainer of the self-cleaning type equipped with a 40 mesh element shall be installed in the oil line.
  - 7. Viscosity Control: Complete hydraulic electronic control shall be provided which shall maintain all of the synthetic environmentally friendly hydraulic fluid in the reservoir, pump and control valve at a maximum temperature of 100 degrees F. (+/- 5%) at all times. If the oil temperature drops below this present minimum, the elevator shall be dispatched to the lowest terminal floor at which point the pump shall bypass oil in the system without car motion until the temperature is reached. Normal response to passenger demand shall not be affected by this control. Resistance type heating elements will not meet the intent of this specification.

#### 2.04 WELL FOR CYLINDER

- A. The well hole for the cylinder shall be sunk into the ground by the Elevator Contractor. No additional compensation will be allowed for unforeseen conditions of any kind or spoil removal.
- B. Elevator Contractor shall install a closed bottom, 18" diameter 10 gage steel outer casing and a additional closed bottom watertight PVC inner casing in the ground with a twenty (20) year watertight warranty.
- C. Install outer steel casing with a butyl bentonite waterstop lined around the perimeter prior to pouring the pit floor block out infill concrete. Install watertight secondary containment sleeve over the jack assembly prior to insertion into the outer steel casing. Extend PVC sleeve through pit floor slab to underside of jack

support beams and seal with non-permeable membrane. The inside diameter of the PVC sleeve shall be capable of containing 110% of the hydraulic fluid system capacity. Seal well opening at the pit floor with hydraulic quick setting cement. Provide vision ports.

#### 2.05 SOUND INSULATING PANELS

Sound insulating panels shall be manufactured of reinforced 16-gage steel with a 1" thick 12# core of fiberglass affixed to interior mounted on all four open sides of the power unit frame.

#### 2.06 SOUND ISOLATING COUPLINGS

A minimum of two sound-isolating couplings shall be installed in oil line in the machine room between pump and jack.

#### 2.07 VIBRATION PADS

Vibration pads shall be mounted under the power unit assembly to isolate the unit from the building structure.

#### 2.08 EMERGENCY TERMINAL STOPPING DEVICE

- A. An emergency terminal stopping device for speeds over 100fpm shall be provided that shall operate independently of the normal terminal stopping device should it fail to slow down the car at the terminal as intended. They shall be so designed and installed that a single short circuit caused by a combination of grounds or by other conditions shall not prevent their functioning.
- B. Normal and emergency terminal stopping devices shall not control the controller switches unless two or more separate and independent switches are furnished, two of which shall be closed in either direction of travel to complete the circuit to the control valve solenoids in the down direction and to complete the circuit to the pump motor for the up direction of travel.

#### 2.09 AUTOMATIC TERMINAL LIMITS

Electric limit switches shall be placed in the hatchway near the terminal landings and be designed to cut off the electric current and stop the car should it run beyond either terminal landing.

#### 2.10 AUTOMATIC SELF-LEVELING

The elevator shall be provided with a self-leveling feature that will automatically bring the car to the floor landings. This self-leveling shall within its zone, be entirely automatic and independent of the operating device and shall correct for over-travel or under-travel. The car shall also be maintained approximately level with the landing irrespective of the load.

#### 2.11 BUFFERS

Substantial buffers shall be furnished and installed in the elevator pit. They shall be mounted on continuous channels fastened to the elevator guide rail or securely anchored to the pit floor and substantial extensions will be provided, if required.

## 2.12 PIPING

- A. Pipe of adequate size and thickness shall be installed between the pumping unit and the cylinder head. All steel piping below ground shall be protected with a high quality protective coating such as extruded polyethylene, wrapped tape coating system, hot applied coal tar enamel or fusion bonded epoxy and installed in a schedule 40 PVC sleeve. Provide 12" clean granular sand minimum all around pipe. A shut-off valve shall be provided in the pit for maintenance and adjusting purposes.
- B. Provide watertight schedule 40 PVC sleeves for underground piping with secondary containment provisions between elevator machine room and pit.

## 2.13 CONTROLLER

- A. A microprocessor controller shall be provided including necessary starting switches of adequate size together with all relays, switches and hardware required to accomplish the operation specified. Overload relays shall be provided to protect the motor against overloading.
- B. Provision of non-proprietary solid-state microprocessor controls as manufactured by Motion Controls Engineering or Elevator Controls Corporation. If a field tool is required to adjust, service or diagnose any part of the elevator, such tool and supporting documentation is to be provided and become the unrestricted-ownership of the Owner. Each two-car group or more system shall be provided with an inbuilt 12 inch computer monitor and keyboard in the machine room.

## 2.14 CAR STALL PROTECTIVE CIRCUIT

- A. A protective circuit shall be provided that will stop the motor and the pump and return the car to its lowest landing in the event the car does not reach its designated landing within a predetermined time interval. This circuit will permit a normal exit from the car but prevent further operation of the elevator until the trouble has been corrected.
- B. Emergency Return Unit: A battery-powered emergency return unit shall be provided. In the event of a power outage, the unit will return the car to the lowest landing, open the doors and shut down.

## 2.15 REDUCED VOLTAGE STARTING

Reduced voltage starting shall be furnished that will limit both the initial starting current and peak current. Provide SCR Soft start with closed transition start.

## 2.16 SPECIAL CYLINDER PROTECTION

Two coats of Polyken ply P.V.C. tape with a 50% overlap and final wrap of heavy kraft-paper or equal shall be applied.

#### 2.17 WIRING

All wiring and electrical interconnections shall comply with the governing codes. Insulated wiring shall have flame retardant and moisture-proof outer covering and shall be run in conduit, tubing or electrical wire-ways. Traveling cables shall be flexible and suitably suspended to relieve strain on individual conductors.

#### 2.18 HOISTWAY OPERATING DEVICES

Normal terminal stopping devices shall be provided. When an emergency terminal stopping device is also required, it shall be furnished and the controller switches and circuitry arranged in accordance with the requirements of the ANSI Code.

#### 2.19 PIT SWITCH

An emergency stop switch shall be located in the pit.

#### 2.20 CAR FRAME

A suitable car frame fabricated from formed or structural steel members shall be provided with adequate bracing to support the platform and car enclosure. The car frame shall be isolated from the platen by means of rubber isolation mounts. The buffer striking plate on the underside of the car frame plant members must fully compress the spring buffers mounted in the pit before the plunger reaches its down limit of travel. Rubber tired roller or slide type guides shall be mounted on top and bottom of the car frame to engage the guide rails.

#### 2.21 GUIDES

Steel elevator guide rails shall be furnished to guide the car. Erect plumb and securely fastened to the building structure.

#### 2.22 DOOR OPERATION

- A. Doors on the car and at the hoist way entrances shall be power operated by means of quality operator mounted on top of the car. The motor shall have positive control over door movement for smooth operation. The car door shall have a safety shoe to cause instant reopening should contact be made with any obstruction during the closing cycle.
- B. Door operation shall be automatic at each landing with door opening being initiated as the car arrives at the landing and closing taking place after expiration of a time interval. A car door electric contact shall prevent starting the elevator away from the landing unless the car door is in its closed position.
- C. Car Door Safety Device: Multi-beam infrared door reversal device shall be furnished with the following operation:

1. The doors shall be prevented from closing from their full open position if a person comes within the zone of detection. The detection zone shall extend from the sill level to a height of 72" across the entire width of the door opening. If a person or object enters the zone as the doors are closing, the doors shall reverse and reopen. The doors shall re-close after a minimal time interval. A passenger entering or leaving the car shall cause the doors to stop and reverse.
  2. After a stop is made the doors shall remain open for a time interval to permit passenger transfer, after which the doors shall close automatically. This interval shall be less for a car call stop than for a hall call stop or a coincident car/hall call stop.
  3. If the doors are prevented from closing for a fixed time period, the door protective device shall be rendered inoperative, a buzzer shall sound on the car and the doors shall close at approximately half speed. Normal operation shall resume at the next landing reached by the car.
  4. The device shall be capable of detecting any color / shape opaque object within the zone of detection.
- D. In case of power interruption or failure of the operator, it shall be possible to open the doors manually from within the car.

## 2.23 INSPECTION OPERATION

- A. A key switch shall be provided in the car to permit operation of the elevator from on top of the car for inspection purposes with car and hall buttons inoperative.
- B. An operating fixture shall be provided on top of the car containing continuous pressure "UP" and "Down" buttons for operating the elevator, and emergency stop button and toggle switch that makes the top of the car inspection devices operative.
- C. Interlocks: Each hoist way entrance shall be equipped with an approved type interlock tested as required by Code. The interlock shall be designed to prevent operation of the car away from the landing until the doors are locked in the closed position as defined by Code and shall prevent opening the doors at any landing from the corridor side unless the car is at rest at that landing or is in the leveling zone and stopping at that landing. Interlocks shall bear Underwriter's Laboratories "B" label of approval.
- D. Hoist way access switches: Switches required by the California Code of Regulations, Title 8 Elevator Safety Orders shall be furnished to allow authorized persons to gain control of the elevator and access to the elevator hoist way. The switches shall be used in conjunction with the inspection, 'Car Key Switch' and 'Car Top Inspection Station'.

## 2.24 MUFFLER

A blowout proof muffler designed to minimize transmission of fluid pulsations shall be furnished in the piping system between the pump and the cylinder.

## 2.25 BATTERY STANDBY POWER TRANSFER

- A. Upon loss of normal power, provide controls to automatically lower the cars nonstop to the lowest landing. Upon arrival at the lowest landing, the elevator doors shall open automatically and remain open until regular door time is expired. The elevator shall then become deactivated. The standby power source shall be provided via 12-volt dc battery units installed in machine room, including solid-state charger and testing means mounted in a common metal container. Batteries are to be rechargeable lead-acid or nickel-cadmium with a ten (10) year life expectancy.
- B. Upon restoration of normal power, the elevator(s) shall automatically resume normal operation.

### 3.00 OPERATIONS OF ELEVATORS

#### 3.01 FREE CAR DUPLEX AUTOMATIC OPERATION

- A. The generation of each elevator from within the car will be such that the momentary pressing of one or more buttons will send the car to designated landings. Stops will be made in the order in which the landings are reached by the car, irrespective of the sequence in which the buttons have been pressed. During this operation the car will also answer calls from landings, but only one car will respond to any one call, and it will be the car nearest the call and set for the direction of the hall button pressed. The control will be arranged so that normally one car will be parked at the ground floor landing and the other, a free car, parked at the landing it last served, to be available to answer subsequent hall calls. Should both cars happen to finish their calls at the ground floor landing, the car that arrived there first will become a free car to answer subsequent hall calls.
- B. An idle free car will answer any hall call, either above or below the floor where it is standing, except hall calls at the ground floor landing which will be answered by the car at the ground floor landing.
- C. When the free car is clearing calls, the other car will answer hall calls:
  - 1. Upon registration of an up hall call below the up traveling car.
  - 2. Upon registration of an up or down hall call above the down traveling free car.
  - 3. When the free car is delayed beyond a predetermined time interval.

#### 3.02 EMERGENCY STOP SWITCH

An emergency- stop switch shall be provided in the car, designed to cut off current supply to motor and down direction valves and bring the car to rest independent of the regular generating devices.

#### 3.03 EMERGENCY SERVICE

- A. Fireman Key Switch:
  - 1. Provide a Firemen's key operated switch at Ground Level. Key shall be removable in the "On" or "Off" positions. When the switch is in the "On" positions, the elevator controlled by this switch and which is on automatic

service shall return non-stop to the ground level landing and the doors shall open and remain open. Provide a third position to override a heat or smoke sensing device, if such a device is provided or required.

2. The key switch at the ground level shall have two (2) positions "On" and "Off".

**B. Elevator Recall Interface Module:**

1. Activation of the smoke/heat detector in an elevator machine room, or in an elevator lobby on all but the designated primary floor (Ground Level) for that elevator, shall cause closure of a set of relay contacts within the Fire Alarm Control Panel (FACP) for the express purpose of effecting recall of that elevator (and only that elevator) to the primary floor. Activation of an elevator lobby smoke / heat detector on the designated primary floor for that elevator shall cause closure of a set of relay contacts within the FACP for the express purpose of effecting recall of that elevator (and only that elevator) to the designated alternate floor.
2. Actuation of an elevator machine room heat detector at 180 deg. F shall shut-down the main line power to the elevators via the shunt trip coil on the circuit breaker.
3. Coordinate with Division 16 for Electrical and Fire Alarm sections for the specific requirements of the recall operation.

**3.04 CAR ENCLOSURE:**

- A. WALLS:** Sides and rear, 14 gage cold rolled furniture quality steel, stretcher leveled, substantially reinforced for rigidity, lightproof joints, car exterior black baked enamel finish, cutouts reinforced, flush panel construction with all panels fastened to the platform.
1. Interior Finish: Removable or applied panels, 3/4" compressed wood core, panel face and wrapped edges shall be laminated with 20 gage #4 satin finish stainless steel finish. Provide 3/4" recess between panels, painted black.
  2. Rear wall shall have 9/16" laminated glass panel 0'-4" from finish floor to ceiling, full width of cab. Glazing shall be per code.
- B. HANDRAIL:** Handrails, rear wall only, 1-1/2" o.d. stainless steel with #4 satin finish, mounted at 3'-6" & 2'-10" above finished floor. Verify with governing code for handrail requirements.
- C. FRONT:** Front returns, posts and transom, 14 gage manufacturer's standard steel laminated with 20 gage 1-LTH satin finish rigidized 304 stainless steel; integral construction swing return panel.
- D. CANOPY:** 12 gage cold rolled furniture quality steel, stretcher leveled, suitable reinforced to withstand the distributed weight of two men and fastened to the side walls in a suitable manner for rigidity, top exit included.
- E. VENTILATION:** Ventilation, 2-speed / variable exhaust blower mounted in top ceiling with grille and flow through concealed vents at panel base. Car exhaust fan is to be sized to provide two air changes per hour.

- F. CEILING: Suspended 18 gage stainless steel panelized (6 panels) ceiling with a #7 mirrored finish with indirect fluorescent perimeter lighting and concealed access panel.
- G. DOORS: Side opening doors to be constructed of 16 gage cold rolled steel laminated with 20 gage, 1-LTH satin finish rigidized 304 stainless steel, flush design sides.
- H. EMERGENCY LIGHTING: Mounted in canopy.
- I. SILL: Extruded aluminum.
- J. TELEPHONE CABINET: Provide hands-free ADA compliant self dialing vandal resistant two-way communication system with recall, tracking and voiceless communication emergency notification/phone unit mounted in front return panel complete.
- K. FLOORING: 12" x 12" x 3/16" thick vinyl/marble chip tile, Marble Mosaic Classic Series 600 by Fritz Chemical Co., or equal with contrasting color border at cab perimeter with 4" tile base.
- L. ACCESSORIES: Digital or electric car position indicator with audible handicapped signals / electronic passenger sensing device.

### 3.05 EMERGENCY LIGHTING AND POWER PROVISIONS

- A. An emergency power unit shall be furnished in each car to adequately illuminate the car and provide power for emergency alarm bell and fan, in the event of a power failure in the building. Battery to be rechargeable lead acid or nickel cadmium with ten (10) year minimum life expectancy.
- B. Coordinate with ASME Section 102, Rule 102.2, C, 3, 4, 5, for fire protection and power supply inter-phase.

### 3.06 CAR OPERATING PANEL

- A. A main car-operating panel shall be mounted in each car and shall contain the devices required for the specified operation.
- B. The panel shall include illuminated push-buttons marked to correspond to the landings served, an "emergency stop" switch, a "door open" button, door close button, a key operating car light and ventilating fan switch. The floor push-button shall be illuminated when a call has been registered and shall remain illuminated until the car reaches the indicated floor. The operation of the "emergency stop" switch in the car shall, in addition to stopping the car, cause the alarm bell to ring.

### 3.07 CAR AND HALL POSITION INDICATOR

- A. An electric or digital car position indicator of approved design and location shall be provided in each elevator car. Indicator shall consist of a finished faceplate with glass and numerals behind each of which will be a small shielded light bulb, so arranged that as the car travels through the hoist way, its position shall be indicated by the illumination of the numeral corresponding to the landing at which the car is stopped or passing. Direction arrows shall be included.



- B. An electric or digital position indicator shall be provided outside each car at ground floor lobby over each doorway. Such indicators shall identify level at which each car is positioned at all times and direction of travel (up and down arrows). Roof level indicator is to be housed in a watertight enclosure and completely sealed against weather.

### 3.08 ILLUMINATED BUTTONS

Car and hall buttons shall contain integral illumination which shall light upon registration of a call and extinguish only when that call is answered. Car buttons shall be color-coded per Architects direction to indicated floor levels. Car push buttons shall have an inner core of plastic, color-coded, outer portion to illuminate.

### 3.09 ALARM BELL

An emergency alarm bell shall be connected to a plainly marked push button in the car.

### 3.10 AUXILIARY VENTILATION

The car enclosure shall be furnished with an exhaust blower.

### 3.11 HOLLOW METAL ELEVATOR ENTRANCES

- A. Door Hangers and Tracks: For hoist way sliding doors, furnish and install sheave type two point suspension hangers and tracks complete. Sheaves shall have polyurethane tires with ball bearings properly sealed to retain grease. Hangers shall be provided with an adjustable slide to take up-thrust of the doors. Tracks are to be drawn steel shapes, smooth surface shaped to conform to the hanger sheaves.
- B. Hoist Way Entrances: Hoist way entrances of the hollow metal, horizontal sliding type shall be furnished and installed complete at each of the hoist way openings. Entrances shall consist of frames as detailed on the drawings. Provide extruded aluminum sills, doors, hangers, hanger supports, hanger covers, full width fascia plates, sight guards, and all necessary hardware, and shall bear Underwriter's Laboratories "B" labels.
- C. Finish: Doors and frames at all floors of each elevator shall be finished with 1-LTH satin finish rigidized 304 stainless steel.

### 3.12 ACCESSIBILITY PROVISIONS

Elevators shall comply with all applicable State of California Title 24, Part 2, CCR, ADA requirements regarding equipment location, access, approach and height to operating buttons, Braille numbers, etc.

### 3.13 LANTERNS

- A. A hall lantern with an audible signal shall be installed at each landing entrance for each elevator. Lanterns when illuminated shall indicate the elevator car that will stop at the landing and in which direction the car is set to travel.

- B. As soon as a car has reached a predetermined distance from a floor at which it is going to stop, the corresponding hall lantern shall be illuminated and the signal shall sound. The hall lantern shall remain illuminated until the car doors close in preparation for leaving the floor. When hall position indicators are provided, the lantern shall be combined in the faceplate of the position indicator.
- C. Finishes: Faceplates to be #4 satin finish stainless steel.
- D. Combination 'Position Indicator and Hall Lantern' shall be installed at Ground Floor.

### 3.14 OWNER'S MANUALS AND WIRING DIAGRAMS

Three (3) sets of Owner's Manuals, Parts Lists, Suggested Parts Inventory and Complete Wiring Diagrams for the group of elevators will be presented to the Owner upon completion and acceptance of elevator work.

### 3.15 PERFORMANCE REQUIREMENTS

- A. **Guaranteed Performance:** Contract speed will mean speed in the up direction with full capacity load in the car. Speed variation under any loading condition in either direction shall not be more than 5%.
- B. **Door Open Time:** 1.3 seconds minimum, 1.6 maximum, from start of opening to fully open.
- C. **Door Closing:** 3.3 seconds maximum for fully open / fully closed position.
- D. **Operating Qualities:** Starting shall be smooth and comfortable without obvious steps of acceleration. Stopping and leveling shall be smooth and without jars or bumps.
- E. Full speed riding shall be free from vibration and swaying.
- F. When cars are standing at floors with the doors open they shall remain firmly stopped and shall not "teeter".
- G. Leveling accuracy shall be 3/8" under any load condition.
- H. The cars shall not move appreciably from side to side during the opening and closing of the doors.
- I. **Capacity:** Stop and hold up to 125% of rated load.
- J. **Floor to Floor Performance Time:** 13.0 seconds from start of doors closing until doors are 3/4 open and car level and stopped at next successive floor under any loading condition or travel direction for 10'-2" floor to floor dimension.

- K. Pressure: Fluid system components shall be designed and factory tested for 500psi. Maximum operating pressure shall be 400psi.

3.15 COOPERATION

Elevator Contractor shall cooperate with the General Contractor for painting and cleaning elevator shaft interiors.

END OF SECTION



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## 1.00 GENERAL

### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.02 SUMMARY

- A. This Section includes the following:
1. Piping materials and installation instructions common to most piping systems.
  2. Sleeves.
  3. Escutcheons.
  4. HVAC demolition.
  5. Equipment installation requirements common to equipment sections.
  6. Painting and finishing.
  7. Supports and anchorages.

### 1.03 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for plastic materials:
1. CPVC: Chlorinated polyvinyl chloride plastic.
  2. PE: Polyethylene plastic.
  3. PVC: Polyvinyl chloride plastic.
- G. The following are industry abbreviations for rubber materials:
1. EPDM: Ethylene-propylene-diene terpolymer rubber.
  2. NBR: Acrylonitrile-butadiene rubber.

#### 1.04 SUBMITTALS

- A. Submittals shall be in hard copy book form with contractor's name, address, phone number and email address.
- B. Proposed Products List: Include all materials specified Division 15 including VRV system, control materials, refrigerant piping, insulation, fans, grilles and registers, ducting, air balance supports and anchors, equipment curbs. Products specified in the following Sections:
  - 1. Division 15 - Mechanical
  - 2. Project Drawings.
- C. Equipment and materials shall be ordered only after satisfactory review by Architect and Engineer.
- D. The following statement applies to all items reviewed: "Checking is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor is responsible for dimensions which shall be confirmed at the job site; fabrication processes and techniques of construction; coordination of his work with that of other trades; and the satisfactory performance of his work."
- E. Contractor shall clearly mark the submittal sheet as to which model number, size, color, etc. when there is more than one choice available.
- F. Maintain a complete set of the most current reviewed submittal and shop drawings on site during construction.
- G. Submit product data grouped to include complete submittals of related systems, products, and accessories in a submittal bound in a three ring binder with table of contents and section tabs. See specification Section 01330 for additional submittal requirements including quantity and form of submittal. Product sheets shall clearly identify electrical characteristics, options provided, color, model number and equipment tag as indicated on the drawings.
- H. The first submittal shall be comprehensive and complete.

#### 1.05. DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

#### 1.06 COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for HVAC installations.

- B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate requirements for access panels and doors for HVAC items requiring access that are concealed behind finished surfaces.

#### 1.07 REGULATORY REQUIREMENTS

- A. Conform to 2010 California Building Code.
- B. Fire Protection: Conform to 2010 California Fire Code, and California State Fire Marshall Regulations, Title 19, Public Safety.
- C. Plumbing: Conform to 2010 California Plumbing Code.
- D. Mechanical: Conform to 2010 California Mechanical Code.
- E. Electrical: Conform to 2010 California Electrical Code.
- F. Obtain approved inspections from authority having jurisdiction.
- G. Conflicts: Where conflict or variation exists amongst Codes, the most stringent shall govern.

#### 1.08 PROJECT/SITE CONDITIONS

- A. Install work in locations shown on drawings, unless prevented by project conditions.
- B. Prepare drawings showing proposed rearrangement of work to meet project conditions, including changes to work specified in other Sections. Obtain permission of owner before proceeding.
- C. Piping locations shown are diagrammatic only. Contractor shall verify locations of all lateral stubs, offsets, etc. required in the field. The actual locations of lines, cleanouts and connections may vary provided that complete systems are installed in compliance with codes. It is not the intent of the drawings to show necessary offsets required to avoid structure or other trades. It is the intent of this paragraph that all costs associated with this paragraph be borne by the contractor. Any proposed significant deviations from the drawings shall proceed only after satisfactory review by District and Engineer. Right-of-Way: Lines which pitch have the right-of-way over those which do not pitch. Lines whose elevations cannot change have right-of-way over lines whose elevations can be changed.
- D. Refrigerant pipe and duct locations: Heating and air conditioning unit, piping and duct locations shown are approximate only. Contractor shall verify locations of all structural members and existing conditions in the field, and locate units and ductwork to avoid interference. All clearances required by unit manufacturer shall be maintained. Entire installation shall be in accordance with codes and the recommended installation procedures published by the manufacturers. It is not the intent of the drawings to show necessary offsets and transitions required to

avoid structure or other trades. Contractor to provide all needed offsets and transitions.

- E. Construction observation: In addition to the requirement for obtaining inspections by the local jurisdiction, contractor shall notify Engineer at appropriate times during the construction process so that Engineer can visit site to become generally familiar with the progress and quality of contractor's work and to determine if the work is proceeding in general accordance with the contract documents.
- F. Scaling of drawings: In no case shall working dimensions be scaled from plans, sections, or details from the working drawings. If no dimension is shown on the architectural drawings, the prime contractor shall request in writing that the architect or engineer provides clarification or the specific dimension.

#### 1.09 QUALITY ASSURANCE

- A. Qualification of Manufacturer: Products used in work shall be produced by manufacturers regularly engaged in the manufacture of similar items.
- B. Qualification of Installer: Use adequate number of skilled workman, thoroughly trained and experienced in the necessary crafts, and completely familiar with the specified requirements contained in the plans and specifications.
- C. Maintain uniformity of manufacturer for equipment used in similar applications and sizes.
- D. Provide products and materials that are new, clean, free from defects, damage, and corrosion.
- E. Provide name/data plates on major components with manufacturer's name, model number, serial number, date of manufacturer, capacity data, and electrical characteristics permanently attached in a conspicuous location on the equipment.
- F. Applicable equipment and materials to be listed by Underwriters' Laboratories and manufactured in accordance with ASME, AWWA, or ANSI standards. Power using equipment shall be meet the California energy efficiency standards as defined in the current Title 24 requirements.
- G. All equipment and materials shall be installed in a neat and workmanlike manner.

#### 1.10 DRAWINGS AND SPECIFICATIONS

- A. Drawings and specifications are intended to complement each other. Where a conflict exists between the requirements of the drawings and/or specifications, immediately and before commencing work, request clarification from Engineer.
- B. The Engineer shall interpret the drawings and the specifications, and the Engineer's decision as to the true intent and meaning thereof and the quality, quantity, and sufficiency of the materials and workmanship furnished thereunder shall be accepted as final and conclusive.



- C. All provisions shall be deemed mandatory except as expressly indicated as optional by the word "may" or "option"
- D. Examine and compare the contract drawings and specifications with the drawings and specifications of other trades. Report any discrepancies to the architect. Install and coordinate the work in cooperation with the other trades.

## 2.00 PRODUCTS

### 2.01 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

### 2.02 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 15 piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

### 2.03 JOINING MATERIALS

- A. Refer to individual Division 15 piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
  - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
    - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
    - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
  - 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.

- G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

## 2.04 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
  - 1. Underdeck Clamp: Clamping ring with set screws.
- E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.

## 2.05 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Cast brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
  - 1. Finish: Polished chrome-plated

## 3.00 EXECUTION

### 3.01 REFRIGERANT PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 15 Sections specifying piping systems.
- B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons for penetrations of walls, ceilings, and floors.
  - 1. New Piping:
    - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
    - b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
- M. Sleeves are not required for core-drilled holes.
- N. Permanent sleeves are not required for holes formed by removable PE sleeves.
- O. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.
- P. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
  - 1. Cut sleeves to length for mounting flush with both surfaces.
    - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
  - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
  - 3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
    - a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
    - b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
    - c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing.
      - 1). Seal space outside of sleeve fittings with grout.
  - 4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint.

- Q. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Install steel pipe for sleeves smaller than 6 inches in diameter.
  2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
  3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- R. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- S. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.
- T. Verify final equipment locations for roughing-in.
- U. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

### 3.03 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 15 Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded

pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

### 3.04 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- D. Install equipment to allow right of way for piping installed at required slope.
- E. All equipment, ducts, and piping shall be firmly anchored to building structural elements

### 3.05 PAINTING

- A. Painting of HVAC systems, equipment, and components is specified in Division 09 Sections "Interior Painting" and "Exterior Painting."
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

### 3.06 CONCRETE BASES

- A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
  1. Construct concrete bases if dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
  2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
  3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
  4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  5. Install anchor bolts to elevations required for proper attachment to supported equipment.
  6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

7. Use 3000-psi , 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section "Cast-in-Place Concrete."

### 3.07 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor HVAC materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

### 3.08 COMMISSIONING

- A. All mechanical equipment and controls shall be commissioned and fully-function tested to verify the proper operation. A written operation report of all equipment shall be provided to the engineer and commission agent two weeks prior to substantial completion. The air balance report shall be submitted to the engineer and commission agent two weeks prior to substantial completion.
- B. VRV system shall have factory start-up with 3 hours of factory training for District's facilities personnel. Training shall include programming of system.

END OF SECTION

**1.00**    GENERAL**1.01**    RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02**    SUMMARY

- A. This Section includes the following hangers and supports for HVAC system piping and equipment:
1. Steel pipe hangers and supports.
  2. Trapeze pipe hangers.
  3. Metal framing systems.
  4. Thermal-hanger shield inserts.
  5. Fastener systems.
  6. Pipe stands.
  7. Equipment supports.
- A. Related Sections include the following:
1. Division 05 Section "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.
  2. Division 15 Section "Vibration and Seismic Controls for HVAC Piping and Equipment" for vibration isolation devices.
  3. Division 15 Section(s) "Metal Ducts" for duct hangers and supports.

**1.03**    DEFINITIONS

- A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

**1.04**    PERFORMANCE REQUIREMENTS

- A. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- C. Design seismic-restraint hangers and supports for piping and equipment per 2007 SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems. Hazard level is "AA."

## 1.05 SUBMITTALS

- A. Product Data: For the following:
  - 1. Steel pipe hangers and supports.
  - 2. Thermal-hanger shield inserts.
  - 3. Powder-actuated fastener systems.
- B. Welding certificates.

## 1.06 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."
- B. Welding: Qualify procedures and personnel according to the following:
  - 1. AWS D1.1, "Structural Welding Code--Steel."
  - 2. AWS D1.2, "Structural Welding Code--Aluminum."
  - 3. AWS D1.3, "Structural Welding Code--Sheet Steel."
  - 4. AWS D1.4, "Structural Welding Code--Reinforcing Steel."
  - 5. ASME Boiler and Pressure Vessel Code: Section IX.

## 2.00 PRODUCTS

### 2.01 MANUFACTURERS

- A In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

### 2.02 STEEL PIPE HANGERS AND SUPPORTS

- A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. B-Line Systems, Inc.; a division of Cooper Industries.
  - 2. ERICO/Michigan Hanger Co.
  - 3. Tolco Inc.
- C. Galvanized, Metallic Coatings: Pregalvanized or hot dipped.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.
- E. Refrigerant Pipe Support: Provide EPDM clamp insert at all pipe clamps at refrigerant piping.



### 2.03 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.

### 2.04 METAL FRAMING SYSTEMS

- A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. B-Line Systems, Inc.; a division of Cooper Industries.
  - 2. ERICO/Michigan Hanger Co.; ERISTRUT Div.
  - 3. Unistrut Corp.; Tyco International, Ltd.
- C. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

### 2.05 FASTENER SYSTEMS

- A. Mechanical-Expansion Anchors: Insert-wedge-type interior/exterior steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used. Install per ICC listing.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Hilti, Inc.
  - 2. ITW Ramset/Red Head.
- C. Sheet Metal Screws for secure pipe and duct supports to wood structure
- D. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. TEK Screws
  - 2. or equal with self drilling feature and ICC report

### 2.06 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

### 2.07 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized. All exterior steel shall be hot dipped aluminized.

- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, non-shrink and nonmetallic grout; suitable for interior and exterior applications.
  - 1. Properties: Non-staining, noncorrosive, and nongaseous.
  - 2. Design Mix: 5000-psi, 28-day compressive strength.

### 3.00 EXECUTION

#### 3.01 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use rubber pipe isolators at refrigerant pipe clamps.
- E. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of non-insulated or insulated stationary pipes, NPS 1/2 to NPS 30.
  - 2. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24, if little or no insulation is required.
  - 3. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
  - 4. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of non-insulated stationary pipes, NPS 1/2 to NPS 2.
- F. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
  - 2. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
  - 3. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
  - 4. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- G. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
    - a. Light (MSS Type 31): 750 lb.
    - b. Medium (MSS Type 32): 1500 lb.
    - c. Heavy (MSS Type 33): 3000 lb.

- H. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
  - 2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
  - 3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- I. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.
- J. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.
- K. Use mechanical-expansion anchors instead of building attachments where required in concrete construction.

### 3.02 HANGER AND SUPPORT INSTALLATION

- A. Steel Pipe Hanger Installation: Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Trapeze Pipe Hanger Installation: Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
  - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
  - 2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
- C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.
- D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- E. Fastener System Installation:
  - 1. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- F. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- G. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- H. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

- I. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.1 (for power piping) and ASME B31.9 (for building services piping) are not exceeded.
- J. Insulated Piping: Comply with the following:
  - 1. Attach clamps and spacers to piping.
    - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    - c. Do not exceed pipe stress limits according to ASME B31.1 for power piping and ASME B31.9 for building services piping.
  - 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
    - a. Option: Thermal-hanger shield inserts may be used.
  - 3. Shield Dimensions for Pipe: Not less than the following:
    - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
  - 4. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.
- K. All pipes and ducts shall be braced per 2008 SMACNA Seismic Restraint Manual Guidelines For Mechanical Systems. Seismic hazard level is "A".

### 3.03 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Provide lateral bracing, to prevent swaying, for equipment supports.
- C. Anchor all equipment to resist seismic motion.

### 3.04 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.05 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.06 PAINING

- A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces. If material is galvanized spray with cold galvanizing.
  - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION



1.00 GENERAL1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
  - 1. Equipment labels.
  - 2. Warning signs and labels.
  - 3. Pipe labels.
  - 4. Duct labels.
  - 5. Stencils.
  - 6. Valve tags.

1.03 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

1.04 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

2.00 PRODUCTS2.01 EQUIPMENT LABELS

- A. Metal Labels for Exterior Equipment:
  - 1. Material and Thickness: Brass, 0.032-inch (0.8-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
  - 2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).

3. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  4. Fasteners: Stainless-steel self-tapping screws.
  5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Plastic Labels for Interior Equipment:
1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.
  2. Letter Color: Black.
  3. Background Color: White.
  4. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
  5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).
  6. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  7. Fasteners: Stainless-steel self-tapping screws.
  8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.
- D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

## 2.02 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch (3.2 mm) thick, and having predrilled holes for attachment hardware.
- B. Letter Color: Black.
- C. Background Color: White.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F (71 deg C).
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch (64 by 19 mm).



- F. Minimum Letter Size: 1/4 inch (6.4 mm) for name of units if viewing distance is less than 24 inches (600 mm), 1/2 inch (13 mm) for viewing distances up to 72 inches (1830 mm), and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information, plus emergency notification instructions.

### 2.03 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Pre-tensioned Pipe Labels: Pre-coiled, semi-rigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
  - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
  - 2. Lettering Size: At least 1-1/2 inches (38 mm) high.
- D. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

### 2.04 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch (6.4-mm) letters for piping system abbreviation and 1/2-inch (13-mm) numbers.
  - 1. Tag Material: Brass, 0.032-inch (0.8-mm) minimum thickness, and having predrilled or stamped holes for attachment hardware.
  - 2. Fasteners: Brass beaded chain.
- B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch (A4) bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
  - 1. Valve-tag schedule shall be included in operation and maintenance data.

## 3.00 EXECUTION

### 3.01 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

### 3.02 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

### 3.03 PIPE LABEL INSTALLATION

- A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
  - 1. Near each valve and control device.
  - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
  - 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
  - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
  - 5. Near major equipment items and other points of origination and termination.
  - 6. Spaced at maximum intervals of 50 feet (15 m) along each run. Reduce intervals to 25 feet (7.6 m) in areas of congested piping and equipment.
  - 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- B. Pipe Label Color Schedule:
  - 1. Refrigerant piping:
    - a. Background Color: White.
    - b. Letter Color: Black.

### 3.04 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
  - 1. Valve-Tag Size and Shape:
    - a. Refrigerant: 2 inches (50 mm), round.
    - b. Hot Water: 2 inches (50 mm), round.
  - 2. Valve-Tag Color:
    - a. Refrigerant: Natural.
    - b. Hot Water: Green.
  - 3. Letter Color: Black

## 1.00 GENERAL

### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.02 SUMMARY

- A. Section Includes:
  - 1. Insulation Materials:
    - a. Flexible elastomeric.
    - b. Mineral fiber.
  - 2. Adhesives.
  - 3. Sealants.
  - 4. Field-applied jackets.
  - 5. Tapes.
  - 6. Securements.
- B. Related Sections:
  - 1. Division 01 Section "Indoor Air Quality (IAQ) Management".
  - 2. Division 15 Section "Plumbing Insulation."
  - 3. Division 15 Section "Metal Ducts" for duct liners.

### 1.02 SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, thickness, and jackets (both factory and field applied, if any).
- B. Shop Drawings:
- C. Qualification Data: For qualified Installer.
- D. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- E. Field quality-control reports.

### 1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and

adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

#### 1.06 COORDINATION

- A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 15 Section "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application, duct Installer for duct insulation application, and equipment Installer for equipment insulation application. Before preparing piping and ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

#### 1.07 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

### 2.00 PRODUCTS

#### 2.01 INSULATION MATERIALS

- A. Flexible Elastomeric for refrigerant pipes: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials. Glue all joints with manufacturer sealant.
  1. Products: Subject to compliance with requirements, include, but are not limited to, the following:
    - a. Aeroflex USA Inc.; Aerocel.
    - b. Armacell LLC; AP Armaflex.
    - c. RBX Corporation; Insul-Sheet 1800 and Insul-Tube 180.

#### 2.02 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. Metal Jacket: Install at exterior locations including at garage interior.
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Products, Division of ITW; Metal Jacketing Systems.
    - b. PABCO Metals Corporation; Surefit.
    - c. RPR Products, Inc.; Insul-Mate.
  - 2. Aluminum Jacket (0.016" with formed aluminum fittings).

### 2.03 SECUREMENTS

- A. Bands:
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Products; Bands.
    - b. PABCO Metals Corporation; Bands.
    - c. RPR Products, Inc.; Bands.
  - 2. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, ½ inch.
  - 3. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.
- B. Insulation Pins and Hangers:
  - 1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch-diameter shank, length to suit depth of insulation indicated.
    - a. Products: Subject to compliance with requirements, provide one of the following:
      - 1). AGM Industries, Inc.; CWP-1.
      - 2). GEMCO; CD.
      - 3). Midwest Fasteners, Inc.; CD.
      - 4). Nelson Stud Welding; TPA, TPC, and TPS.

### 3.00 EXECUTION

#### 3.01 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
  - 1. Verify that systems and equipment to be insulated have been tested and are free of defects.
  - 2. Verify that surfaces to be insulated are clean and dry.
  - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.02 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

#### 3.03 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment, ducts and fittings, and piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment, duct system, and pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Keep insulation materials dry during application and finishing.
- F. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- G. Install insulation with least number of joints practical.

3.04 REFRIGERANT PIPE INSULATION

- A. Insulate all interior refrigerant pipes with 3/4" wall closed cell insulation with glued joints. Exterior insulation, including at garage interior, shall be 3/4" wall and covered with aluminum l jacketing (0.024") with formed aluminum elbows.

END OF SECTION

1.00 GENERAL1.01 SECTION INCLUDES

- A. Basic Mechanical Requirements specifically applicable to Division 15 Sections, in addition to the general requirements.
- B. Plumbing work includes the following: furnish and install all piping and plumbing fixtures shown on the plumbing, mechanical, architectural drawings described in these specifications. In connection with this work, contractor shall also furnish and install all necessary work, devices, hardware and systems required to make said systems properly and safely operable, including, but not limited to, mounting hardware, framing, insulation, valves, flashing, cleanouts, cutting, concrete coring and cutting, patching, and fixture insulation.

1.02 WORK SEQUENCE

- A. Install work in phases to accommodate Owner's construction requirements. Refer to Architectural, Structural, Civil, and Electrical Drawings for the construction details and coordinate the work of this division with that of other divisions. Order the work of this division so that progress will harmonize with that of other divisions and all work will proceed expeditiously. During the construction period, coordinate mechanical schedule and operations with General Contractor and any other related subcontractor.
- B. Coordinate related work and modify surrounding work as required.

1.03 SUBMITTALS

- A. Submit on the following:
  - 1. All pipe, fittings, insulation, hangers and supports, labels, fixtures, adhesives and sealants, and equipment that is planned to be installed on this project.
- B. Proposed Products List: Include Products specified in the following Sections:
  - 1. Division 15 - Plumbing.
  - 2. Project Drawings.
- C. Submit product data grouped to include complete submittals of related systems, products, and accessories in a single submittal bound in a three ring binder with table of contents and section tabs. See specification section 13300 for additional submittal requirements. shall clearly identify electrical characteristics, options provided, color, model number and equipment tag as indicated on the drawings.
- D. Equipment and materials shall be ordered only after satisfactory review by Architect and Engineer.
- E. The following statement applies to all items reviewed: "Checking is only for general conformance with the design concept of the project and general compliance with the information given in the contract documents. Any action shown is subject to the requirements of the plans and specifications. Contractor

is responsible for dimensions which shall be confirmed at the job site; fabrication processes and techniques of construction; coordination of his work with that of other trades; and the satisfactory performance of his work.”

- F. Maintain a complete set of the most current reviewed submittal and shop drawings on site during construction.
- G. The first submittal shall be comprehensive and complete. Partial submittals will be returned without review.

#### 1.05 REGULATORY REQUIREMENTS

- A. Conform to 2010 California Building Code.
- B. Fire Protection: Conform to 2010 California Fire Code, and California State Fire Marshall Regulations, Title 19, Public Safety.
- C. Plumbing: Conform to 2010 California Plumbing Code.
- D. Mechanical: Conform to 2010 California Mechanical Code.
- E. Electrical: Conform to 2010 California Electrical Code.
- F. Obtain approved inspections from authority having jurisdiction.
- G. Conflicts: Where conflict or variation exists amongst Codes, the most stringent shall govern.

#### 1.06 PROJECT / SITE CONDITIONS

- A. Install work in locations shown on drawings, unless prevented by project conditions.
- B. Prepare drawings showing proposed rearrangement of work to meet project conditions, including changes to work specified in other Sections. Obtain permission of Owner before proceeding.
- C. Piping Locations: Piping locations shown are diagrammatic only. Contractor shall verify locations of all lateral stubs, offsets, etc. required in the field. The actual locations of lines, cleanouts and connections may vary provided that complete systems are installed in compliance with codes.
- D. Construction Observation: In addition to the requirement for obtaining inspections by the local jurisdiction, Contractor shall notify Engineer and commissioning agent at appropriate times during the construction process so that they can visit site to become generally familiar with the progress and quality of Contractor's work and to determine if the work is proceeding in general accordance with the contract documents.
- E. Scaling of Drawings: In no case shall working dimensions be scaled from plans, sections, or details from the working drawings. If no dimension is shown on the



architectural drawings, the prime Contractor shall request in writing that the Architect or the Engineer provide clarification of the specific dimension.

#### 1.07 QUALITY ASSURANCE

- A. Qualification of Manufacturer: Products used in work shall be produced by manufacturers regularly engaged in the manufacture of similar items.
- B. Qualification of Installer: Use adequate number of skilled workmen, thoroughly trained and experienced in the necessary crafts, and completely familiar with the specified requirements contained in the plans and specifications.
- C. Applicable equipment and materials to be listed by Underwriters' Laboratories and manufactured in accordance with ASME, AWWA, or ANSI standards. Power-using equipment shall meet the California energy efficiency standards as defined in the current Title 24 requirements.
- D. Welding procedures and testing shall comply with ANSI Standard B31.1.0 standard code for pressure piping and the American Welding Society – Welding Handbook. Welding shall also comply with Division of the State Architect and structural plan requirements for materials, procedures, qualifications, and inspections.

#### 1.08 DRAWINGS AND SPECIFICATIONS

- A. Drawings and specifications are intended to complement each other. Where a conflict exists between the requirements of the drawings and/or specifications, the contractor shall immediately and before commencing work, request clarification from Engineer.
- B. The Engineer shall interpret the drawings and the specifications, and the Engineer's decision as to the true intent and meaning thereof and the quality, quantity, and the sufficiency of the materials and workmanship furnished there under shall be accepted as final and conclusive.
- C. In case of conflicts not clarified prior to bidding deadline, use the most costly alternative (better quality, greater quantity, or larger size) in preparing the Bid. A clarification will be issued to the successful Bidder as soon as feasible after the Award, and if appropriate a deductive change order will be issued.
- D. All provisions shall be deemed mandatory except as expressly indicated as optional by the word "may" or "option".
- E. Examine and compare the contract drawings and specifications with the drawings and specifications of other trades. Report any discrepancies to the architect. Install and coordinate the work in cooperation with the other trades.

#### 1.09 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

## 2.00 PRODUCTS

### 2.01 PRODUCTS

- A. Maintain uniformity of manufacturer for equipment used in similar applications and sizes.
- B. Provide products and materials that are new, clean, free from defects, damage, and corrosion.
- C. Provide name/data plates on major components with manufacturer's name, model number, serial number, date of manufacturer, capacity data, and electrical characteristics permanently attached in a conspicuous location on the equipment.
- D. Protect materials stored at site and installed from damage. Verify dimensions of equipment and fixtures prior to ordering. A. Install all equipment per the manufacturer's instructions for installing, connecting, and adjusting. A copy of the instructions shall be kept at the equipment during installation and provided to the engineer at his/her request.

## 3.00 EXECUTION

### 3.01 INSTALLATION

- A. Install all equipment per the manufacturer's instructions for installing, connecting, and adjusting. A copy of the instructions shall be kept at the equipment during installation and provided to the engineer at his/her request.
- B. Adjust pipes, ducts, panels, equipment, etc., to accommodate the work to prevent interferences.

1. Right-of-Way: Lines which pitch have the right-of-way over those which do not pitch. Lines whose elevations cannot change have right-of-way over lines whose elevations can be changed.
2. Provide offsets, transitions, and changes in directions of pipes as required to maintain proper head room and pitch on sloping lines. Provide traps, air vents, drains, etc., as required. It is the intent of this paragraph that all cost associated with compliance be borne by the contractor.
3. All equipment shall be firmly anchored to building structural elements.
4. Carefully check space requirements with other trades and existing conditions to insure material, fixtures or equipment can be installed in the spaces allotted.

C. Install all plumbing fixtures and equipment to allow for service.

### 3.02 FIRESTOPPING

- A. Firestop all penetrations of rated elements with approved firestop material such as Hilti FS-1 per manufacturer's plates. Provide plates to project inspector prior to installation.

### 3.03 ACCESS DOORS

- A. Install access door for access to concealed valves, trap primers, water hammer arrestors and other equipment that requires accessibility for service or adjustment. Coordinate with framing contractor for proper location for functionality. Young regulators may be installed at balancing dampers. Restroom shall have stainless steel type access doors.

### 3.04 COMMISSIONING

- A. Provide checklist with each fixture detailing the operational status of all plumbing fixtures and have been adjusted and tested for proper operation. Provide building static water pressure.

### 3.05 SPECIAL TOOLS AND TRAINING

- A. The contractor shall provide to the owner any special tools need to service and access the equipment provided in this contract.
- B. The plumbing shall provide to the owner one hour of training on cleaning and maintenance of the new plumbing equipment including flush valves. Provide demonstration on gasket replacement and adjustment of flush valves.

END OF SECTION



1.00 GENERAL1.01 RELATED DOCUMENTS

- A. Drawings, notes, and general provisions of the Contract, including General and Supplemental Conditions and Division 01 specification sections, apply to this section.

1.02 SUMMARY

- A. Section Includes:
  - 1. Pipe and fittings for domestic water, condensate drains, natural gas, rainwater, waste and vent, and filtered cold water.
  - 2. Escutcheons.
  - 3. Cleanouts.
  - 4. Vandal-proof vent caps.
  - 5. Supply tubes & Angle Stops.
  - 6. Seismic isolation loop

1.03 REFERENCES

- A. ANSI B31.9 - Building Service Piping.
- B. ASME B16.3 - Malleable Iron Threaded Fittings.
- C. ASME B16.22 - Wrought Copper and Bronze Solder-Joint Pressure Fittings.
- D. ASTM A47 - Ferritic Malleable Iron Castings.
- E. ASTM A53 - Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
- F. ASTM A74 - Cast Iron Soil Pipe and Fittings.
- G. ASTM A120 - Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized), Welded and Seamless, for Ordinary Uses.
- H. ASTM B32 - Solder Metal.
- I. ASTM B88 - Seamless Copper Water Tube.
- J. ASTM C564 - Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- K. ASTM D1785 - Poly Vinyl Chloride (PVC) Plastic Pipe, Schedules 40, 80, and 120.
- L. ASTM D2241 - Poly Vinyl Chloride (PVC) Plastic Pipe (SDR-PR).
- M. ASTM D2466 - Poly Vinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40.

- N. ASTM D2564 - Solvent Cements for Poly Vinyl Chloride (PVC) Plastic Pipe and Fittings.
- O. ASTM D2855 - Making Solvent-Cemented Joints with Poly Vinyl Chloride (PVC) Pipe and Fittings.
- P. ASTM D3034 - Poly Vinyl Chloride (PVC) Plastic Sewer Pipe SDR-35.
- Q. CISPI 301 - Cast Iron Soil Pipe and Fittings for Hubless Cast Iron Sanitary Systems.
- R. CISPI 310 - Joints for Hubless Cast Iron Sanitary Systems.
- S. ASTM D2513 - SDR11.5 Polyethylene Gas Pipe.
- T. ASTM D1784 - Low Extractable Polyvinyl Chloride for filtered water.

#### 1.04 SUBMITTALS

- A. Product Data: For the following products:
  - 1. Piping and fittings.
  - 2. Escutcheons.
  - 3. Cleanouts.
  - 4. Vandal-proof vent caps.
  - 5. Supply tubes.
- B. Project Record Documents
  - 1. Submit the following:
  - 2. Record actual locations of valves and piping.
- C. Operation and Maintenance Data
  - 1. Submit the following:
  - 2. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

#### 1.05 REGULATORY REQUIREMENTS

- A. Perform Work in accordance with 2010 California plumbing code.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of the general requirements.
- B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- C. Provide temporary protective coating on cast iron and steel valves.
- D. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

- E. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

## 1.07 ENVIRONMENTAL REQUIREMENTS

- A. Do not install underground piping when bedding is wet or frozen.

## 2.00 PRODUCTS

### 2.01 DOMESTIC WATER PIPING, ABOVE GROUND

- A. Hard Copper Tube: ASTM B88, Type L water tube, drawn temper. U.S. manufactured.
  - 1. Wrought-copper solder-joint fittings: ASME B16.22, wrought-copper pressure fittings, with lead-free solder.
  - 2. Bronze Flanges: ASME B16.24, class 150, with solder-joint ends.
  - 3. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
  - 4. All copper and fittings shall be made in the United States.

### 2.02 DOMESTIC WATER PIPING, BELOW GRADE

- A. Soft Copper Tube: ASTM B88, Type K water tube, annealed temper. U.S. manufactured.
  - 1. Copper solder-joint fitting: ASME B16.22, wrought-copper pressure fittings. No joints under slabs.
  - 2. Non lead bearing solder

### 2.03 CONDENSATE DRAIN PIPING

- A. Hard Copper Tube: ASTM B88, type L water tube, drawn temper. U.S. manufactured.
  - 1. Wrought-copper solder-joint fittings: ASME B16.22, wrought-copper pressure fittings.
  - 2. Non lead bearing solder
  - 3. Provide cleanouts with threaded plugs every 30 feet and at changes of direction.
  - 4. Slope a minimum of 1/8" per foot to drain with no bellies in the pipe slope.

### 2.04 RAINWATER, SANITARY WASTE AND VENT PIPING

- A. Within the building and out 5 feet
  - 1. Hubless cast-iron pipe and fittings: ASTM A888 or CISPI 301 of US manufacture.
  - 2. Standard shielded couplings, stainless steel: CISPI 310, NSF-certified.
  - 3. Heavy-duty couplings, stainless steel: ASTM C564. Use four-band clamps at all rainwater piping and sanitary waste piping greater than 2".
  - 4. All cast-iron pipe and fittings shall be manufactured in the U.S.
  - 5. Minimum slope 1/4" per foot to drain with no bellies in piping.

6. Sink trim shall be cast brass chrome plated commercial quality
- B. Past 5 feet from building
1. PVC SDR 35 with waste fittings.
  2. Minimum slope  $\frac{1}{4}$ " per foot to drain with no bellies in piping.
  3. All PVC waste piping shall be manufactured in the United States
- C. Sewage Lift Station
1. Forced sewer piping shall be 2" DWV copper with cast drain fittings and soldered connections. Use Mission style coupling adapter at connection to sewer main.

## 2.05 ESCUTCHEONS

- A. Escutcheons for gas, condensate, water and waste, and vent piping penetrations.
1. Manufacturers: subject to compliance with requirements, provide products by the following:
    - a. Brasscraft.
    - b. or equal
  2. Description: chrome-plated cast brass with set screws.

## 2.06 CLEANOUTS

- A. Cleanouts for waste piping.
1. Manufacturers: subject to compliance with requirements, provide products by one of the following:
    - a. J.R. Smith
    - b. Zurn.
  2. Description: cast-iron with threaded bronze plug. 18 gage stainless cover with vandal-proof screws for wall cleanout. Polished brass non-slip cover for floor cleanout.

## 2.07 VANDAL-PROOF VENT CAPS

- A. Vandal-proof vent caps
1. Manufacturers: subject to compliance with requirements, provide products by one of the following:
    - a. J.R. Smith
    - b. Zurn.
  2. Description: cast-iron dome secured with recessed Allen Key Set screws.

## 2.08 SUPPLY TUBES AND ANGLE STOPS

- A. Supply tubes:
1. Manufacturers: subject to compliance with requirements, provide products by the following:
    - a. Brasscraft Speedi Plumb Plus.
  2. Description: braided stainless steel with PVC inner hose,  $\frac{1}{2}$ " FIP x  $\frac{3}{8}$ " Comp.
  3. IAMPO Listed



- B. Angle Stops
  - 1. Manufacturers: subject to compliance with requirements, provide products by the following:
    - a. Brass Chrome Plated Loose Key Heavy Pattern ½" FIP inlet and ½" MIP outlet. Compliant with California No-Lead Regulations
      - 1). Chicago Faucet
      - 2). Kohler

## 2.09 ELEVATOR SUMP PIPING

- A. Piping in sump shall be DWV copper with soldered fittings.
- B. Exterior piping shall be Schedule 40 PVC with solvent welded fittings.

## 3.00 EXECUTION

### 3.01 EXAMINATION

- A. Verify that excavations are to required grade, dry, and not over-excavated.

### 3.02 PREPARATION

- A. Ream pipe and tube ends. Remove burrs.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

### 3.03 INSTALLATION

- A. Install in accordance with Manufacturer's instructions.
- B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- C. Route piping in orderly manner and maintain gradient.
- D. Install piping to conserve building space and not interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- G. Provide clearance for installation of insulation and access to valves and fittings.
- H. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors.

- I. Establish elevations of buried piping outside the building to ensure not less than 30 inch of cover. Exception: Localized areas may be 18" deep to accommodate existing conditions.
- J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- K. Provide support for utility meters in accordance with requirements of utility companies.
- L. Prepare pipe, fittings, supports, and accessories not pre-finished, ready for finish painting.
- M. Excavate in accordance with this Section for work of this Section.
- N. Backfill in accordance with this Section for work of this Section.
- O. Install bell and spigot pipe with bell end upstream.
- P. Install valves with stems upright or horizontal, not inverted.
- Q. Underground Alert: Before laying out piping and performing trenching, contractor shall determine locations of existing underground utilities. Contact "Dig Alert / Underground Service Alert of Southern California" - 1-800-422-4133. Contractor shall also contact District's representative to ascertain locations of underground piping and other conditions affecting trenching, and shall perform testing and subsurface exploration as necessary to locate utilities. Do not perform trenching until all utilities have been located and marked.
- R. Trenching: material shall be excavated from trenches and piled adjacent to the trench. Material shall be piled in such a manner that will cause a minimum of inconvenience to public travel. All rock, boulders, and stones shall be removed to provide a minimum clearance of six (6) inches under and around pipes. Excavations shall be kept free of water. Trenches shall be dug to true and smooth bottom grades and in accordance with the lines indicated on drawings and as directed. Trench widths shall not exceed 30 inches or 1.5 times outside diameter of the pipe plus 18 inches whichever is greater. Minimum trench width shall be the outside diameter of pipe installed plus 12 inches. Depth of trenching for water and gas piping shall be such as to give a minimum cover of 18 inches over the top of the pipe. Deeper excavation may be required due to localized breaks in grade, or to install the new piping under existing culverts or other utilities where necessary. Trenching for sewers and drains shall be of sufficient width to permit proper jointing of the pipe and backfilling of material along the sides of the pipe. Trench width at the surface of the ground shall be kept to the minimum amount necessary to install the pipe in a safe manner. Trenches shall be excavated below the barrel of the pipe a sufficient distance to provide for bedding material where the trench bottom is in a material which is unsuitable for foundation or which will make it difficult to obtain uniform bearing for the pipe. Such material shall be removed and a stable foundation provided. This shall include the preparation of the native trench bottom and/or the top of the foundation material to a uniform grade so that the entire length of pipe rests firmly on a suitable

properly compacted material (sand or gravel required). Gravel to be used for foundation purposes shall be of a type and gradation to provide a solid compact bedding in the trench.

- S. Backfill: Contractor shall complete bedding and then backfill to 6 inches over the top of the pipe with sand before starting backfilling operations. Take all precautions necessary to protect the pipe from damage, movement and shifting. Compaction equipment used above the pipe zone shall be of a type that does not injure the pipe. Where original excavated material is unsuitable for trench backfill, backfill gravel shall be placed. Unsuitable material shall be removed to a disposal area. Wherever a trench is excavated in a paved roadway, sidewalk or other area where minor settlements would be detrimental and where native excavated material is not suitable for compaction as backfill, trench shall be backfilled with backfill gravel. Warning tape markers and tracer wires shall be installed during backfill operations. When working in an existing traveled roadway, restoration and compaction shall be achieved as the trench is backfilled so as to maintain traffic. Provide temporary, traffic-bearing steel plates over excavations in public rights-of-way, if backfilling and re-paving cannot be accomplished before end of work period. Trench backfill under roadway shall be mechanically compacted to 95 percent of maximum density except for trenches over 8 feet in depth. In any trench in which 95 percent density cannot be achieved with existing backfill, the top 4 feet shall be replaced with backfill gravel mechanically compacted to 95%. The method of compaction shall be at contractor's option, unless excavation permit requires a specific type. Contractor shall be responsible to provide the proper size and type of compaction equipment and select the proper method of utilizing said equipment to attain the required compaction density. Compaction by water jetting will not be permitted. Where backfill is required to be certified, compliance shall be performed in accordance with the requirements of the governing authority. Allow testing service to inspect and approve each subgrade and fill layer before further fill, backfill or construction work is performed.
- T. Seal all penetrations through exterior walls and fire rated walls with 3M Firestopping materials for fire rating capacity per the architectural plans and UBC requirements.
- U. Test all piping per 2010 California Plumbing Code Requirements

### 3.04 APPLICATION

- A. Install unions downstream of valves and at equipment or apparatus connections.
- B. Install brass male adapters each side of valves in copper piped system. Sweat solder adapters to pipe.
- C. Install gate valves for shut-off and to isolate equipment, part of systems, or vertical risers.

### 3.05 ERECTION TOLERANCES

- A. Establish invert elevations, slopes for drainage to 1/4 inch per foot minimum. Maintain gradients.
- B. Slope water piping and arrange to drain at low points.

3.06 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Prior to starting work, verify system is complete, flushed and clean.
- B. Ensure PH of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
- C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 mg/L residual.
- D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
- E. Maintain disinfectant in system for 24 hours.
- F. If final disinfectant residual tests less than 25 mg/L, repeat treatment.
- G. Flush disinfectant from system until residual equal to that of incoming water or 1.0 mg/L.
- H. Take samples no sooner than 24 hours after flushing, from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.
- I. Prior to placing domestic water system in service for human consumption, the plumbing contractor shall provide promptly to the owner and engineer the written test results.

END OF SECTION

## 1.00 GENERAL

### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.02 SUMMARY

- A. Section Includes:
  - 1. Bronze ball valves.
  - 2. Bronze swing check valves.
  - 3. Brass angle stops.
  - 4. Hydrants.
- B. Related Sections
  - 1. Division 15 plumbing piping Sections for specialty valves applicable to those Sections only.
  - 2. Division 15 Section "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

### 1.03 DEFINITIONS

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. S&Y: Outside screw and yoke.
- F. RS: Rising stem.
- G. SWP: Steam working pressure.

### 1.04 SUBMITTALS

- A. Product Data: For each type of valve indicated.

### 1.05 QUALITY ASSURANCE

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
  - 1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
  - 2. ASME B31.1 for power piping valves.
  - 3. ASME B31.9 for building services piping valves.

- C. NSF Compliance: NSF 61 for valve materials for potable-water service.

## 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Prepare valves for shipping as follows:
  - 1. Protect internal parts against rust and corrosion.
  - 2. Protect threads, flange faces, grooves, and weld ends.
  - 3. Set angle, gate, and globe valves closed to prevent rattling.
  - 4. Set ball and plug valves open to minimize exposure of functional surfaces.
  - 5. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
  - 1. Maintain valve end protection.
  - 2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

## 2.00 PRODUCTS

### 2.01 GENERAL REQUIREMENTS FOR VALVES

- A. Refer to valve schedule articles for applications of valves.
- B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- C. Valve Sizes: Same as upstream piping unless otherwise indicated.
- D. Valve-End Connections:
  - 1. Solder Joint: With sockets according to ASME B16.18.
  - 2. Threaded: With threads according to ASME B1.20.1.
- E. Lead Content: Comply with State of California laws SB1334.

### 2.02 BRONZE BALL VALVES

- A. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Conbraco Industries, Inc.; Apollo Valves.
    - b. NIBCO INC. S-685-80-LF to 2";
  - 2. Description:
    - a. Standard: MSS SP-110.
    - b. SWP Rating: 150 psig.
    - c. CWP Rating: 600 psig.
    - d. Body Design: Two piece.
    - e. Body Material: Bronze.
    - f. Ends: Sweat.
    - g. Seats: PTFE or TFE.
    - h. Stem: Bronze.

- i. Ball: Chrome-plated brass.
  - j. Port: Full.
- B. Three Piece, Full-Port, Bronze Ball Valves with Bronze Trim:
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Conbraco Industries, Inc.; Apollo Valves.
    - b. NIBCO INC. T-595-Y-66-LF to 2”;
  - 2. Description:
    - a. Standard: MSS SP-110.
    - b. SWP Rating: 150 psig.
    - c. CWP Rating: 600 psig.
    - d. Body Design: Two piece.
    - e. Body Material: Bronze.
    - f. Ends: Threaded
    - g. Seats: PTFE or TFE.
    - h. Stem: Bronze.
    - i. Ball: Chrome-plated brass.
    - j. Port: Full.

### 2.03 BRONZE SWING CHECK VALVES

- A. Class 125, Bronze Swing Check Valves with Bronze Disc:
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. NIBCO INC.
    - b. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - 2. Description:
    - a. Standard: MSS SP-80, Type 3.
    - b. CWP Rating: 200 psig.
    - c. Body Design: Horizontal flow.
    - d. Body Material: ASTM B 62, bronze.
    - e. Ends: Threaded.
    - f. Disc: Bronze.
    - g. Crispin Valve.
    - h. DFT Inc.

### 2.04 HYDRANTS

- A. Hydrants
- 1. Manufacturer: subject to compliance with requirements, provide products by the following:
    - a. J.R. Smith.
    - b. Zurn.
    - c. Nibco.
    - d. Watts.

## 3.00 EXECUTION

### 3.01 EXAMINATION

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

### 3.02 VALVE INSTALLATION

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.

### 3.03 ADJUSTING

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

### 3.04 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

- A. If valve applications are not indicated, use the following:
  - 1. Domestic Water Shutoff Service: Ball valves.
  - 2. Throttling Service: Globe valves.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
  - 1. For Copper Tubing, 2-1/2" and Smaller: Soldered ends.

END OF SECTION



1.00 GENERAL1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes the following hangers and supports for plumbing system piping and equipment:
1. Steel pipe hangers and supports.
  2. Trapeze pipe hangers.
  3. Metal framing systems.
  4. Thermal-hanger shield inserts.
  5. Fastener systems.
  6. Pipe stands.
  7. Equipment supports.

1.03 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.04 PERFORMANCE REQUIREMENTS

- A. Equipment supports shall be capable of supporting combined operating weight of supported equipment and connected systems and components.
- B. Design seismic-restraint hangers and supports for piping and equipment per 2007 SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems. Hazard level is "A."
- C. All exterior steel support components shall be hot-dipped galvanized. All welds shall be ground smooth and painted with three coats of zinc-rich paint.

1.05 SUBMITTALS

- A. Product Data: For the following:
1. Steel pipe hangers and supports.
  2. Thermal-hanger shield inserts.
  3. Mechanical fastener systems.
  4. Pipe positioning systems.
  5. Trapeze pipe hangers. Include Product Data for components.
  6. Metal framing systems. Include Product Data for components.
  7. Pipe stands. Include Product Data for components.
  8. Equipment supports.
  9. Welding certificates.

## 1.06 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel." Welding: Qualify procedures and personnel according to the following:
1. AWS D1.1, "Structural Welding Code--Steel."
  2. AWS D1.2, "Structural Welding Code--Aluminum."
  3. AWS D1.4, "Structural Welding Code--Reinforcing Steel."
  4. ASME Boiler and Pressure Vessel Code: Section IX.

## 2.00 PRODUCTS

### 2.01 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

### 2.02 STEEL PIPE HANGERS AND SUPPORTS

- A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.
- B. Manufacturers:
1. B-Line Systems, Inc.; a division of Cooper Industries.
  2. ERICO/Michigan Hanger Co.
  3. Tolco Inc.
  4. Unistrut
  5. Superstrut
- C. Galvanized, Metallic Coatings: Hot dipped.
- D. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

### 2.03 TRAPEZE PIPE HANGERS

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.
- B. Manufacturers:
1. B-Line Systems, Inc.; a division of Cooper Industries.
  2. Unistrut Corp.; Tyco International, Ltd.
  3. Tolco

### 2.04 METAL FRAMING SYSTEMS

- A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.
- B. Manufacturers:
  - 1. B-Line Systems, Inc.; a division of Cooper Industries.
  - 2. ERICO/Michigan Hanger Co.; ERISTRUT Div.
  - 3. Power-Strut Div.; Tyco International, Ltd.
  - 4. Unistrut Corp.; Tyco International, Ltd.
- C. Coatings: Manufacturer's standard finish unless bare metal surfaces are indicated. Exterior components shall be hot-dipped galvanized.
- D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

#### 2.05 THERMAL-HANGER SHIELD INSERTS

- A. Description: 100-psig- minimum, compressive-strength insulation insert encased in sheet metal shield.
- B. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- C. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- D. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.
- E. Provide submittal.

#### 2.06 FASTENER SYSTEMS

- A. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated (interior use) Type 304 stainless steel (exterior use), for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
- B. Anchor must have ICC report. Provide report with submittal and one copy to the inspector. See State Architect Requirements for testing.
  - 1. Manufacturers:
    - a. Hilti, Inc.
    - b. ITW Ramset/Red Head.
    - c. Or equal.
- C. Pre- placed concrete inserts
  - 1. Manufacturers:
    - a. Tolco
    - b. or equal.

#### 2.07 PIPE STAND FABRICATION

- A. Pipe Stands, General: Shop or field-fabricated assemblies made of manufactured corrosion-resistant components to support roof-mounted piping. See plans for details.
- B. All exterior steel supports shall be hot dipped galvanized.
- C. No piping supports shall be mounted directly on roof membrane.

## 2.08 EQUIPMENT SUPPORTS

- A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

## 2.09 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized. All exterior steel supports shall be hot dipped galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
  - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
  - 2. Design Mix: 5000-psi, 28-day compressive strength.

## 3.00 EXECUTION

### 3.01 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use padded hangers for piping that is subject to scratching.
- F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30 .
  - 2. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24, if little or no insulation is required.
  - 3. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.

4. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated stationary pipes, NPS 3/4 to NPS 8.
  5. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
  6. Adjustable Band Hangers (MSS Type 9): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 8.
  7. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of noninsulated stationary pipes, NPS 1/2 to NPS 2.
  8. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 8.
- G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
  2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.
- H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
  2. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
  3. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
  2. Steel bolts with nylon lock nuts and washers
  3. Lagscrews
  4. Simpson SDS Screws
- J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
  2. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- K. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.
- L. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.
- M. Use mechanical-expansion anchors or inserts instead of building attachments where required in concrete construction.

- N. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

### 3.02 HANGER AND SUPPORT INSTALLATION

- A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.
- B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
  - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
  - 2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
- C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.
- D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- E. Fastener System Installation:
  - 1. Install concrete inserts prior to concrete placement per manufacturer's listing.
  - 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- F. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.
- G. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- I. Install lateral bracing with pipe hangers and supports to prevent swaying.
- J. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- K. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

- L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9 (for building services piping) are not exceeded.
- M. Insulated Piping: Comply with the following:
  - 1. Attach clamps and spacers to piping.
    - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    - c. Do not exceed pipe stress limits according to ASME B31.9 for building services piping.
  - 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
    - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
  - 3. Shield Dimensions for Pipe: Not less than the following:
    - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
  - 4. Insert Material: Length at least as long as protective shield.
  - 5. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

### 3.03 EQUIPMENT SUPPORTS

- A. Provide 20 gauge sheet metal backing at needed to support equipment and fixture.

### 3.04 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

### 3.05 ADJUSTING AND PERSONNEL PROTECTION

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

- B. Trim excess length of continuous-thread hanger and support rods to 1/2 inches below nut.
- C. Provide personnel protection at mechanical rooms, equipment areas and any equipment maintenance area from strut and threaded rods ends. Install soft protective materials to prevent skin and skull injuries. Install protection as soon as practicable after installation.

3.06 PAINTING

- A. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION



1.00 GENERAL1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. This Section includes the following plumbing fixtures, equipment, and related components:

1. Faucets for lavatories and sinks.
2. Flushometers.
3. Toilet seats.
4. Protective shielding guards.
5. Fixture supports.
6. Water closets.
7. Lavatories.
8. Sinks.
9. Electric water heaters.
10. Hydrants.
11. Access doors.
12. Roof drains & overflow drains
13. Overflow termination.
14. Floor drains.
15. Floor sinks.
16. Trap primers.
17. Water hammer arrestors.
18. Sewage Pump Stations
19. Elevator Sump Pump
20. Pressure Regulation Station
21. Electric Drinking Fountain

- B. Related requirements:

1. Division 01 Section "Indoor Air Quality (IAQ) Management".
2. Division 10 Section "Toilet Compartments".

1.03 DEFINITIONS

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities.
- C. Cast Polymer: Cast-filled-polymer-plastic material. This material includes cultured-marble and solid-surface materials.
- D. Cultured Marble: Cast-filled-polymer-plastic material with surface coating.
- E. Fitting: Device that controls the flow of water into or out of the plumbing fixture.

Fittings specified in this Section include supplies and stops, faucets and spouts, shower heads and tub spouts, drains and tailpieces, and traps and waste pipes. Piping and general-duty valves are included where indicated.

- F. FRP: Fiberglass-reinforced plastic.
- G. PMMA: Polymethyl methacrylate (acrylic) plastic.
- H. PVC: Polyvinyl chloride plastic.
- I. Solid Surface: Nonporous, homogeneous, cast-polymer-plastic material with heat-, impact-, scratch-, and stain-resistance qualities.

#### 1.04 SUBMITTALS

- A. Product Data: For each type of plumbing fixture indicated. Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports. Indicate materials and finishes, dimensions, construction details, and flow-control rates.
- B. Operation and Maintenance Data: For plumbing fixtures to include in emergency, operation, and maintenance manuals.  
Warranty: Special warranty specified in this Section.

#### 1.05 QUALITY ASSURANCE

- A. Accessible Plumbing Fixture Regulatory Requirements: Accessible plumbing fixtures shall comply with all of the requirements of CBC Section 1115B. Height and locations of all fixtures shall be according to CBC Section 1115.4 and Table 1115B-1. Fixture controls shall comply with CBC Section 1115B.4.4.4 for showers, 1115B.4.3.1 for lavatories, and 1115B.4.1.5 for toilets. Sinks shall not exceed 6-1/2" in depth, CBC Section 1115B.4.7.1
- B. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category through one source from a single manufacturer.
  - 1. Exception: If fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in 2010 CEC, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities" "Americans with Disabilities Act"; for plumbing fixtures for people with disabilities.
- E. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.
- F. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.

- G. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.
- H. Comply with the following applicable standards and other requirements specified for plumbing fixtures:
  - 1. Enameled, Cast-Iron Fixtures: ASME A112.19.1M.
  - 2. Vitreous-China Fixtures: ASME A112.19.2M.
  - 3. Water-Closet, Wall Hung, Flushometer ASSE 1037.
- I. Comply with the following applicable standards and other requirements specified for lavatory and sink faucets:
  - 1. Faucets: ASME A112.18.1.
  - 2. Integral, Atmospheric Vacuum Breakers: ASSE 1001.
  - 3. NSF Potable-Water Materials: NSF 61.
  - 4. Pipe Threads: ASME B1.20.1.
  - 5. Sensor-Actuated Faucets and Electrical Devices: UL 1951.
  - 6. Supply Fittings: ASME A112.18.1.
  - 7. Brass Waste Fittings: ASME A112.18.2.
- J. Comply with the following applicable standards and other requirements specified for bathtub and shower faucets:
  - 1. Faucets: ASME A112.18.1.
  - 2. Hand-Held Showers: ASSE 1014.
  - 3. High-Temperature-Limit Controls for Thermal-Shock-Preventing Devices: ASTM F 445.
  - 4. Hose-Coupling Threads: ASME B1.20.7.
  - 5. Pipe Threads: ASME B1.20.1.
  - 6. Sensor-Actuated Faucets and Electrical Devices: UL 1951.
- K. Comply with the following applicable standards and other requirements specified for miscellaneous fittings:
  - 1. Brass Waste Fittings: ASME A112.18.2.
  - 2. Sensor-Operation Flushometers: ASSE 1037 and UL 1951.
- L. Comply with the following applicable standards and other requirements specified for miscellaneous components:
  - 1. Flexible Water Connectors: ASME A112.18.6.
  - 2. Floor Drains: ASME A112.6.3.
  - 3. Hose-Coupling Threads: ASME B1.20.7.
  - 4. Hot-Water Dispensers: ASSE 1023 and UL 499.
  - 5. Off-Floor Fixture Supports: ASME A112.6.1M.
  - 6. Pipe Threads: ASME B1.20.1.
  - 7. Plastic Toilet Seats: ANSI Z124.5.
  - 8. Supply and Drain Protective Shielding Guards: ICC A117.1.

#### 1.06 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
  - 1. Faucet Cartridges and O-Rings: Provide two repair kits for each type faucet & flushometer except for the mop sink faucet.
  - 2. Flushometer Valve, Repair Kits: Equal to 10 percent of amount of each type installed, but no fewer than 2 of each type.

## 2.00 PRODUCTS

### 2.01 LAVATORY FAUCETS

#### A. Lavatory Faucets:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
  - a. Sloan
  - b. Comply with California AB 1953 non lead requirements.
  - c. Hardwired, 4 inch on center, 0.5 GPM.

#### B. Sink Faucets:

1. Manufacturers: Subject to compliance with requirements, provide products by one the following:
  - a. Chicago Faucet.
  - b. Comply with California AB 1953 non lead requirements.
  - c. 0.5 GPM Flow

### 2.02 FLUSHOMETERS

#### A. Flushometers:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
  - a. Sloan
2. Description: Flushometer for water-closet-type fixture. Include brass body with corrosion-resistant internal components, Hardwired, Dual flush 1.1 gpf Low and 1.6 gpf High, control stop with check valve, vacuum breaker, brass tubing, and polished chrome-plated finish on exposed parts.

### 2.03 TOILET SEATS

#### A. Toilet Seats:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
  - a. Olsonite
2. Description: Extra heavy duty.

### 2.04 PROTECTIVE SHIELDING GUARDS

#### A. Protective Shielding Pipe Covers:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
  - a. TRUEBRO, Inc.
2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

#### B. Protective Shielding Piping Enclosures:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

- a. TRUEBRO, Inc.
2. Description: Manufactured plastic enclosure for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with ADA requirements.

## 2.05 FIXTURE SUPPORTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Smith, Jay R. Mfg. Co.
  2. Zurn Plumbing Products Group; Specification Drainage Operation.
- B. Water-Closet Supports:
  1. Description: Combination carrier designed for accessible or standard mounting height of wall-mounting, water-closet-type fixture. Include single or double, vertical or horizontal, hub-and-spigot or hubless waste fitting as required for piping arrangement; faceplates; couplings with gaskets; feet; and fixture bolts and hardware matching fixture. Include additional extension coupling, faceplate, and feet for installation in wide pipe space. Verify width of wall and submit support that fits in wall width.

## 2.06 WATER CLOSETS

- A. Water Closets:
  1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. Kohler.
  2. Description: Wall-mounting, back-outlet, vitreous-china fixture designed for flushometer valve operation.
    - a. Style: One piece.
      - 1). Bowl Type: Elongated with siphon-jet design.
      - 2). Design Consumption: 1.1 gal./flush Low and 1.6 gal./flush High

## 2.07 LAVATORIES

- A. Lavatories:
  1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. Kohler.
  2. Description: Wall Mount, vitreous-china fixture.
    - a. Type: Wall Mount.
    - b. Faucet Hole Punching: 4-inch (102-mm) centers.
    - c. Color: White.
    - d. With strainers, tailpieces, traps and insulation.

## 2.08 SINKS

- A. Sinks:
  1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. Just Manufacturing.
  2. Description: Counter-mounting or free-standing, stainless-steel sink.
    - a. With strainers, tailpieces, traps and insulation.

## 2.09 ELECTRIC WATER HEATERS

- A. Electric Water Heaters:
  - 1. Manufacturers: subject to compliance with requirements, provide products by the following:
    - a. AO Smith.
  - 2. Description: With Stand and Smitty pan.

## 2.10 HYDRANTS

- A. Exposed hydrant with key and backflow preventer.
- B. Concealed hydrant with key.
- C. Manufacturers: See Fixture Schedule on plans.

## 2.11 ACCESS DOORS

- A. Stainless steel, locking, fire-rated in rated assemblies.
- B. Manufacturers:
  - 1. J.R. Smith.
  - 2. Or equal.
- C. Access door schedule:
  - 1. Restroom shut-off valve – 14" x 14" minimum.
  - 2. Floor drain trap primer and water hammer arrestor – 12" x 12" minimum.

## 2.12 ROOF DRAINS & OVEFLOW DRAINS

- A. Roof drains:
  - 1. Manufacturers: subject to compliance with requirements, provide products by the following:
    - a. J.R. Smith.
    - b. Zurn.
  - 2. Description: cast iron body and dome, with sump receiver and underdeck clamp.
  - 3. Overflow drains shall have 2" dam.

## 2.13 OVERFLOW TERMINATION

- A. Overflow termination.
  - 1. Manufacturers: subject to compliance with requirements, provide products by the following:
    - a. J.R. Smith.
    - b. Zurn.
    - c. Or equal.
  - 2. Cast Bronze

## 2.14 FLOOR DRAINS

- A. Floor Drains:
  - 1. Manufacturers: subject to compliance with requirements, provide products by the following:

- a. J.R. Smith.
- b. Zurn.
2. Description: cast iron body, square non-slip bronze grate, adjustable, with trap primer connection.

## 2.15 FLOOR SINKS

### A. Floor Sinks:

1. Manufacturers: subject to compliance with requirements, provide products by the following:
  - a. J.R. Smith.
  - b. Zurn.
2. Description: enameled cast iron. Half grates.

## 2.16 TRAP PRIMERS

### A. Trap Primers:

1. Manufacturers: subject to compliance with requirements, provide products by the following:
  - a. Mifab.
2. Description: with distribution unit. Behind J.R. Smith 4730-UNB stainless access panel.

## 2.17 WATER HAMMER ARRESTORS

### A. Water Hammer Arrestors:

1. Manufacturers: subject to compliance with requirements, provide products by the following:
  - a. J.R. Smith.
  - b. Zurn.
2. Description: behind J.R. Smith 4730-UNB stainless access panel.

## 2.18 SEWAGE LIFT STATION

### A. Manufacturers: subject to compliance with requirements, provide products by the following:

1. Liberty Pumps
  - a. Lift station Package shall include basin, pump, float assembly, alarm assembly & valves.
  - b. Old Castle Galvanized spring loaded access door.

## 2.19 ELEVATOR PUMP ASSEMBLY

1. Liberty Pumps
  - a. Elevator Sump Pump with alarm system and floats.

## 2.20 ELECTRIC DRINKING FOUNTAIN

### A. Manufacturers: subject to compliance with requirements, provide products by the following:

1. Haws 1119.14 "Hi-Lo" Barrier-Free Wall Mounted Drinking Fountain

### 3.00 EXECUTION

#### 3.01 EXAMINATION

- A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing fixture installation.
- B. Examine cabinets, counters, floors, and walls for suitable conditions where fixtures will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.02 INSTALLATION

- A. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.
- B. Install off-floor supports, affixed to building substrate, for wall-mounting fixtures.
  - 1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
  - 2. Use carrier supports without waste fitting for fixtures with tubular waste piping.
  - 3. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.
- C. Install back-outlet, wall-mounting fixtures onto waste fitting seals and attach to supports.
- D. Install floor-mounting fixtures on closet flanges or other attachments to piping or building substrate.
- E. Install wall-mounting fixtures with tubular waste piping attached to supports.
- F. Install floor-mounting, back-outlet water closets attached to building floor substrate and wall bracket and onto waste fitting seals.
- G. Install counter-mounting fixtures in and attached to casework.
- H. Install fixtures level and plumb according to roughing-in drawings.
- I. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
  - 1. Exception: Use ball, gate, or globe valves if supply stops are not specified with fixture. Valves are specified in Division 15 Section "General-Duty Valves for Plumbing Piping."
- J. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.
- K. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.



- L. Install flushometer valves for accessible water closets with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.
- M. Install tanks for accessible, tank-type water closets with lever handle mounted on wide side of compartment.
- N. Install toilet seats on water closets.
- O. Install trap-seal liquid in dry urinals.
- P. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- Q. Install water-supply flow-control fittings with specified flow rates in fixture supplies at stop valves.
- R. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.
- S. Install traps on fixture outlets.
  - 1. Exception: Omit trap on fixtures with integral traps.
- T. Install escutcheons at piping wall ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Escutcheons are specified in Division 15 Section "Common Work Results for Plumbing."
- U. Set service basins in leveling bed of cement grout. Grout is specified in Division 15 Section "Common Work Results for Plumbing."
- V. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Sealants are specified in Division 07 Section "Joint Sealants."
  - 1. All sealants and adhesives to be field-applied, within the building envelope must comply with VOC limits in Division 01 Section "Indoor Air Quality (IAQ) Management".
- W. Coordinate height of accessible toilet, flushometer, and height of grab bar during rough-in to avoid conflicts at finish.
- X. Install sewage lift station with site-built concrete vault, basin and pump assembly, float assembly with alarm connection to EMS. Verify installation depth as needed for slope from connected drains. Install forced sewer piping. Secure piping to resist pumping forces. Install control panel and connect floats and pump. Install spring assisted steel galvanized access door. Coordinate sump construction with concrete contractor.
- Y. Install elevator sump pump system with floats, pump, piping, wiring to pump panel. Install concrete tank at exterior with alarm float and alarm system.

- Z. Install pressure regulation station with regulators, piping and valves as shown in details on the plans. Set regulators to pressures shown on plans.

### 3.03 CONNECTIONS

- A. Piping installation requirements are specified in other Division 15 Sections.
  - 1. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.
- C. Ground equipment according to Division 16 Section "Grounding and Bonding for Electrical Systems."
- D. Connect wiring according to Division 16 Section "Low-Voltage Electrical Power Conductors and Cables."

### 3.04 FIELD QUALITY CONTROL

- A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.
- B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.
- C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.
- D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.
- E. Install fresh batteries in sensor-operated mechanisms.

### 3.05 ADJUSTING

- A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.
- B. Adjust water pressure at faucets and flushometer valves to produce proper flow and stream.
- C. Replace washers and seals of leaking and dripping faucets and stops.
- D. Install fresh batteries in sensor-operated mechanisms.

### 3.06 CLEANING

- A. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Do the following:
  - 1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
  - 2. Remove sediment and debris from drains.

- B. After completing installation of exposed, factory-finished fixtures, faucets, and fittings, inspect exposed finishes and repair damaged finishes.

3.07 PROTECTION

- A. Provide protective covering for installed fixtures and fittings.
- B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION



1.00 GENERAL1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
1. Insulation Materials:
    - a. Mineral fiber.
- A. Related Sections include the following:
1. Division 01 Section "Indoor Air Quality (IAQ) Management".
  2. Division 15 Section "HVAC Insulation".

1.03 SUBMITTALS

- A. Product Data: For each type of product indicated. Include thermal conductivity, thickness, and jackets (both factory and field applied, if any).

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing and inspecting agency.
1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
  2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.06 COORDINATION

- A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 15 Section "Hangers and Supports for Plumbing Piping and Equipment."

- B. Coordinate clearance requirements with piping Installer for piping insulation application and equipment Installer for equipment insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

## 1.07 SCHEDULING

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

## 2.00 PRODUCTS

### 2.01 INSULATION MATERIALS

- A. Comply with requirements in Part 3 schedule articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Mineral-Fiber, Preformed Pipe Insulation:
  - 1. Products: Subject to compliance with requirements,
    - a. Fibrex Insulations Inc.; Coreplus 1200.
    - b. Johns Manville; Micro-Lok.
    - c. Knauf Insulation; 1000(Pipe Insulation.
    - d. Manson Insulation Inc.; Alley-K.
    - e. Owens Corning; Fiberglas Pipe Insulation.
  - 2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
    - a. RPR Products, Inc.; Insul-Mate.

### 2.02 INDOOR PIPING INSULATION SCHEDULE

- A.. Domestic Hot and Recirculated Hot Water:
  - 1. 2" and Smaller: Insulation shall be the following:
    - a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
    - b. Cover with kraft paper vapor barrier jacket and PVC fitting covers.

### 2.03 INDOOR, FIELD-APPLIED JACKET SCHEDULE

- A. Install jacket over piping; kraft paper vapor barrier with PVC fitting covers.  
Piping, Exposed at Lavatories and Accessible Sinks:
  - 1. Truebro LavGuard.

## 3.00 EXECUTION

### 3.01 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
  - 1. Verify that systems and equipment to be insulated have been tested and are free of defects.
  - 2. Verify that surfaces to be insulated are clean and dry.
  - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

### 3.03 GENERAL INSTALLATION REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment and piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment and pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
  - 1. Install insulation continuously through hangers and around anchor attachments.
  - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
  - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.

4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
    1. All sealants and adhesives to be field-applied, within the building envelope must comply with VOC limits in Division 01 Section "Indoor Air Quality (IAQ) Management".
  - L. Install insulation with factory-applied jackets as follows:
    1. Draw jacket tight and smooth.
    2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
    3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
      - a. For below ambient services, apply vapor-barrier mastic over staples.
    4. Cover joints and seams with tape as recommended by insulation material manufacturer to maintain vapor seal.
    5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
  - M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
  - N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
  - O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

### 3.04 PENETRATIONS

- A. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- B. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
  1. Comply with requirements in Division 07 Section "Penetration Firestopping" for firestopping and fire-resistive joint sealers.

### 3.05 GENERAL PIPE INSULATION INSTALLATION

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
  1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity, unless otherwise indicated.



2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
  3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
  4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
  5. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
  6. All sealants and adhesives to be field-applied, within the building envelope must comply with VOC limits in Division 01 Section "Indoor Air Quality (IAQ) Management".
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

### 3.06 MINERAL-FIBER INSULATION INSTALLATION

- A. Insulation Installation on Straight Pipes and Tubes:
1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
  2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
  3. For insulation with factory-applied jackets on above ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
  4. For insulation with factory-applied jackets on below ambient surfaces, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.
- B. Insulation Installation on Pipe Fittings and Elbows:
1. Install preformed sections of same material as straight segments of pipe insulation when available.
  2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.
- C. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.
5. Edges.

END OF SECTION

## 1.00 GENERAL

### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.02 SUMMARY

- A. Section Includes:
  - 1. Equipment labels.
  - 2. Warning signs and labels.
  - 3. Pipe labels.
  - 4. Stencils.
  - 5. Valve tags.
  - 6. Warning tags.

### 1.03 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

### 1.04 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

## 2.00 PRODUCTS

### 2.01 EQUIPMENT LABELS

- A. Metal Labels for Equipment:
  - 1. Material and Thickness: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
  - 2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

3. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  4. Fasteners: Stainless-steel.
  5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Plastic Labels for Equipment:
1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
  2. Letter Color: Black.
  3. Background Color: White.
  4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
  5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
  6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  7. Fasteners: Stainless-steel
  8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- C. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.
- D. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

## 2.02 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8" inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: Black
- C. Background Color: White
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

- F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information, plus emergency notification instructions.

### 2.03 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to partially cover circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
  - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
  - 2. Lettering Size: At least 1-1/2 inches high.

### 2.04 VALVE TAGS

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.
  - 1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
  - 2. Fasteners: Brass wire-link or beaded chain; or S-hook.
- B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
  - 1. Valve-tag schedule shall be included in operation and maintenance data.

### 2.05 WARNING TAGS

- A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.
  - 1. Size: 3 by 5-1/4 inches minimum.
  - 2. Fasteners: Brass grommet and wire.
  - 3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
  - 4. Color: Yellow background with black lettering.

### 3.00 EXECUTION

#### 3.01 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

#### 3.02 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each water heater and pumps.
- B. Locate equipment labels where accessible and visible.

#### 3.03 PIPE LABEL INSTALLATION

- A. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
  - 1. Near each valve and control device.
  - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
  - 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
  - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
  - 5. Near major equipment items and other points of origination and termination.
  - 6. Spaced at maximum intervals of 25 feet along each run. Reduce intervals to 15 feet in areas of congested piping and equipment.
  - 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- B. Pipe Label Color Schedule:
  - 1. Domestic Water Piping:
    - a. Background Color: White.
    - b. Letter Color: Blue (Cold) Red (Hot).
  - 2. Sanitary Waste and Rainwater Piping:
    - a. Background Color: Black.
    - b. Letter Color: White.

#### 3.04 VALVE-TAG INSTALLATION

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.
- B. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION

## 1.00 GENERAL

### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.02 SUMMARY

- A. This Section includes refrigerant piping used for air-conditioning applications.

### 1.03 PERFORMANCE REQUIREMENTS

- A. Line Test Pressure for Refrigerant R-410A:
  - 1. Suction Lines for Air-Conditioning Applications: 300 psig (2068 kPa).
  - 2. Suction Lines for Heat-Pump Applications: 535 psig (3689 kPa).
  - 3. Hot-Gas and Liquid Lines: 535 psig (3689 kPa).

### 1.04 SUBMITTALS

- A. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop, based on manufacturer's test data, for the following:
  - 1. Piping and fittings.
  - 2. Filter dryers.
  - 3. Strainers.
- B. Shop Drawings: Show layout of refrigerant piping and specialties, including pipe, tube, and fitting sizes, flow capacities, valve arrangements and locations, slopes of horizontal runs, oil traps, double risers, wall and floor penetrations, and equipment connection details. Show interface and spatial relationships between piping and equipment.
  - 1. Shop Drawing Scale:
  - 2. Refrigerant piping indicated on Drawings is schematic only. Size piping and design actual piping layout, including oil traps, double risers, specialties, and pipe and tube sizes to accommodate, as a minimum, equipment provided, elevation difference between compressor and evaporator, and length of piping to ensure proper operation and compliance with warranties of connected equipment.
- C. Welding certificates.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals.

### 1.05 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

- B. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."
- C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

#### 1.06 PRODUCT STORAGE AND HANDLING

- A. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

#### 1.07 COORDINATION

- A. Coordinate size and location of roof curbs, equipment supports, and roof penetrations. These items are specified in Division 07 Section "Roof Accessories."

### 2.00 PRODUCTS

#### 2.01 COPPER TUBE AND FITTINGS

- A. Copper Tube: ASTM B 280, Type ACR.
- B. Wrought-Copper Fittings: ASME B16.22.
- C. Wrought-Copper Unions: ASME B16.22.
- D. Solder Filler Metals: ASTM B 32. Use 95-5 tin antimony or alloy HB solder to join copper socket fittings on copper pipe.
- E. Brazing Filler Metals: AWS A5.8.

#### 2.02 VALVES AND SPECIALTIES

- A. Straight-Type Strainers.
- B. Moisture/Liquid Indicators:
  - 1. Body: Forged brass.
  - 2. Window: Replaceable, clear, fused glass window with indicating element protected by filter screen.
  - 3. Indicator: Color coded to show moisture content in ppm.
  - 4. Minimum Moisture Indicator Sensitivity: Indicate moisture above 60 ppm.
  - 5. End Connections: Socket or flare.
- C. Replaceable-Core Filter Dryers: Comply with ARI 730.
  - 1. Body and Cover: Painted-steel shell with ductile-iron cover, stainless-steel screws, and neoprene gaskets.
  - 2. Filter Media: 10 micron, pleated with integral end rings; stainless-steel support.
  - 3. Desiccant Media: Activated alumina or charcoal.
  - 4. Designed for reverse flow (for heat-pump applications).
  - 5. End Connections: Socket.



- D. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Atofina Chemicals, Inc.
  - 2. DuPont Company; Fluorochemicals Div.
  - 3. Honeywell, Inc.; Genetron Refrigerants.
  - 4. INEOS Fluor Americas LLC.
- E. ASHRAE 34, R-410A: Pentafluoroethane/Difluoromethane.

### 3.00 EXECUTION

#### 3.01 PIPING APPLICATIONS FOR REFRIGERANT R-410A

- A. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type ACR, annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.

#### 3.02 VALVE AND SPECIALTY APPLICATIONS

- A. Install service valves for gage taps at inlet and outlet of hot-gas bypass valves and strainers if they are not an integral part of valves and strainers.
- B. Except as otherwise indicated, install diaphragm packless valves on inlet and outlet side of filter dryers.
- C. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.
- D. Install strainers upstream from and adjacent to the following unless they are furnished as an integral assembly for device being protected:
  - 1. Compressor.
- E. Install filter dryers in liquid line between compressor and thermostatic expansion valve, and in the suction line at the compressor.
- F. Install receivers sized to accommodate pump-down charge.
- G. Install flexible connectors at compressors.

#### 3.03 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.
- B. Install refrigerant piping according to ASHRAE 15 and manufacturer's installation requirements.
- C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping adjacent to machines to allow service and maintenance.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Select system components with pressure rating equal to or greater than system operating pressure.
- J. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
- K. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Division 08 Section "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.
- L. Install refrigerant piping in protective conduit where installed belowground.
- M. Slope refrigerant piping as follows:
  - 1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
  - 2. Install horizontal suction lines with a uniform slope downward to compressor.
  - 3. Install traps and double risers to entrain oil in vertical runs.
  - 4. Liquid lines may be installed level.
- N. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.
- O. Install pipe sleeves at penetrations in exterior walls and floor assemblies.
- P. Seal penetrations through fire and smoke barriers according to Division 07 Section "Penetration Firestopping."
- Q. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.
- R. Install sleeves through floors, walls, or ceilings, sized to permit installation of full-thickness insulation.

- S. Seal pipe penetrations through exterior walls according to Division 07 Section "Joint Sealants" for materials and methods.
- T. Identify refrigerant piping and valves according to Division 15 Section "Identification for HVAC Piping and Equipment."

### 3.04 PIPE JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing or welding, to prevent scale formation.
- D. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
  - 1. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.
- F. Perform tests and inspections and prepare test reports.
- G. Tests and Inspections:
  - 1. Comply with ASME B31.5, Chapter VI.
  - 2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
  - 3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.
    - a. Fill system with nitrogen to the required test pressure.
    - b. System shall maintain test pressure at the manifold gage throughout duration of test.
    - c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
    - d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.

### 3.05 SYSTEM CHARGING

- A. Charge system using the following procedures:
  - 1. Install core in filter dryers after leak test but before evacuation.
  - 2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers (67 Pa). If vacuum holds for 12 hours, system is ready for charging.
  - 3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig (14 kPa).
  - 4. Charge system with a new filter-dryer core in charging line.

3.06 ADJUSTING

- A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.
- B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.
- C. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.
- D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
  - 1. Open shutoff valves in condenser water circuit.
  - 2. Verify that compressor oil level is correct.
  - 3. Open compressor suction and discharge valves.
  - 4. Open refrigerant valves except bypass valves that are used for other purposes.
  - 5. Check open compressor-motor alignment and verify lubrication for motors and bearings.
- E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION

## 1.00 GENERAL

### 1.01 SYSTEM DESCRIPTION

- A. The variable capacity, heat pump heat recovery air conditioning system shall be a Mitsubishi Electric CITY MULTI VRFZ (Variable Refrigerant Flow Zoning). The CITY MULTI VRFZ systems shall be the R2-Series (simultaneous cooling and heating) split system heat pump and the (cool/heat) split system heat pump.
- B. The R2-Series system shall consist of a PURY outdoor unit, BC (Branch Circuit) Controller, multiple indoor units (-E models), and M-NET DDC (Direct Digital Controls). Each indoor unit or group of indoor units shall be capable of operating in any mode independently of other indoor units or groups. System shall be capable of changing mode (cooling to heating, heating to cooling) with no interruption to system operation. Each indoor unit or group of indoor units shall be independently controlled. The sum of connected capacity of all indoor air handlers shall range from 50% to 150% of outdoor rated capacity.
- C. The system shall consist of PURY outdoor unit, multiple indoor units (-E models), and M-NET DDC (Direct Digital Controls). The sum of connected capacity of all indoor air handlers shall range from 50% to 130% of outdoor rated capacity.
- D. Control via contacts on AG 150A controller the supply and exhaust fans start-stop via relays. The system shall also shut-down via condensate pumps safety switch.

### 1.02 QUALITY ASSURANCE

- A. The units shall be listed by Electrical Laboratories (ETL) and bear the ETL label.
- B. All wiring shall be in accordance with the National Electrical Code (N.E.C.).
- C. The units shall be manufactured in a facility registered to ISO 9001 and ISO14001 which is a set of standards applying to environmental protection set by the International Standard Organization (ISO).

### 1.03 DELIVERY, STORAGE AND HANDLING

- A. Unit shall be stored and handled according to the manufacturer's recommendation.

## 2.00 PRODUCTS

### 2.01 R2-SERIES OUTDOOR UNIT

- A. General: The R2-Series PURY outdoor unit shall be used specifically with CITY MULTI VRFZ components. The PURY outdoor units shall be equipped with multiple circuit boards that interface to the M-NET controls system and shall perform all functions necessary for operation. Each outdoor unit module shall be completely factory assembled, piped and wired and run tested at the factory.
  - 1. The model nomenclature and unit requirements are shown below. All units requiring a factory supplied twinning kits shall be piped together in the field, without the need for equalizing line(s). If an alternate manufacturer is selected,

any additional material, cost, and labor to install additional lines shall be incurred by the contractor.

Outdoor Unit Model Nomenclature					
208/230 Volt		Twinning Kit	460 Volt		Twinning Kit
Model Number	Units		Model Number	Units	
PURY-P72THMU	(1) PURY-P72THMU	None	PURY-P72YHMU	(1) PURY-P72YHMU	None
PURY-P96THMU	(1) PURY-P96THMU	None	PURY-P96YHMU	(1) PURY-P96YHMU	None
PURY-P120TJMU	(1) PURY-P120TJMU	None	PURY-P120YHMU	(1) PURY-P120YHMU	None
PURY-P144TSHMU	(2) PURY-P72THMU	CMY-R100VBK	PURY-P144YSHMU	(2) PURY-P72YHMU	CMY-R100VBK
PURY-P168TSHMU	(1) PURY-P96THMU (1) PURY-P72THMU	CMY-R100VBK	PURY-P168YSHMU	(1) PURY-P96YHMU (1) PURY-P72YHMU	CMY-R100VBK
PURY-P192TSHMU	(2) PURY-P96THMU	CMY-R100VBK	PURY-P192YSHMU	(2) PURY-P96YHMU	CMY-R100VBK
PURY-P216TSHMU	(1) PURY-P96THMU (1) PURY-P120THMU	CMY-R100VBK	PURY-P216YSHMU	(1) PURY-P96YHMU (1) PURY-P120YHMU	CMY-R100VBK
PURY-P240TSHMU	(2) PURY-P120THMU	CMY-R100VBK	PURY-P240YSHMU	(2) PURY-P120YHMU	CMY-R100VBK

2. Outdoor unit shall have a sound rating no higher than 60 dB(A) individually or 63 dB(A) twinned. Units shall have a sound rating no higher than 50 dB(A) individually or 53 dB(A) twinned while in night mode operation. If an alternate manufacturer is selected, any additional material, cost, and labor to meet published sound levels shall be incurred by the contractor.
3. Both refrigerant lines from the outdoor unit to the BC (Branch Circuit) Controller (Single or Main) shall be insulated.
4. There shall be no more than 3 branch circuit controllers connected to any one outdoor unit.
5. Outdoor unit shall be able to connect to up to 50 indoor units depending upon model.
6. The outdoor unit shall have an accumulator with refrigerant level sensors and controls.
7. The outdoor unit shall have a high pressure safety switch, over-current protection, crankcase heater and DC bus protection.
8. The outdoor unit shall have the ability to operate with a maximum height difference of 164 feet and have total refrigerant tubing length of 1804-2625 feet. The greatest length is not to exceed 541 feet between outdoor unit and the indoor units without the need for line size changes or traps.
9. The outdoor unit shall be capable of operating in heating mode down to -4°F ambient temperature or cooling mode down to 23°F ambient temperature, without additional low ambient controls. If an alternate manufacturer is selected, any additional material, cost, and labor to meet low ambient operating condition and performance shall be incurred by the contractor.

10. The outdoor unit shall not cease operation in any mode based solely on outdoor ambient temperature.
  11. The outdoor unit shall have a high efficiency oil separator plus additional logic controls to ensure adequate oil volume in the compressor is maintained.
- B. Unit Cabinet:
1. The casing(s) shall be fabricated of galvanized steel, bonderized and finished. Units cabinets shall be able to withstand 960 hours per ASTM B117 criteria for seacoast protected models (-BS models)
- C. Fan:
1. Each outdoor unit module shall be furnished with one direct drive, variable speed propeller type fan. The fan shall be factory set for operation under 0 in. WG external static pressure, but capable of normal operation under a maximum of 0.24 in. WG external static pressure via dipswitch.
  2. All fan motors shall have inherent protection, have permanently lubricated bearings, and be completely variable speed.
  3. All fan motors shall be mounted for quiet operation.
  4. All fans shall be provided with a raised guard to prevent contact with moving parts.
  5. The outdoor unit shall have vertical discharge airflow.
- D. Refrigerant
1. R410A refrigerant shall be required for PURY-P-T/Y(S) JMU-A outdoor unit systems. Provide all needed refrigerant
- E. Coil:
1. The outdoor coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
  2. The coil fins shall have a factory applied corrosion resistant blue-fin finish.
  3. The coil shall be protected with an integral metal guard.
  4. Refrigerant flow from the outdoor unit shall be controlled by means of an inverter driven compressor.
  5. The outdoor coil shall include 4 circuits with two position valves for each circuit, except for the last stage.
- F. Compressor:
1. Each outdoor unit module shall be equipped with one inverter driven scroll hermetic compressor. Non inverter-driven compressors shall not be allowed.
  2. A crankcase heater(s) shall be factory mounted on the compressor(s).
  3. The outdoor unit compressor shall have an inverter to modulate capacity. The capacity shall be completely variable with a turndown of 19%-8% of rated capacity, depending upon unit size.
  4. The compressor will be equipped with an internal thermal overload.
  5. The compressor shall be mounted to avoid the transmission of vibration.
- G. Electrical:
1. The outdoor unit electrical power shall be 208/230 or 460 volts, 3-phase, 60 hertz.
  1. The outdoor unit shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz), 207-253V (230V/60Hz) or 414-506V (460V/60Hz).
  2. The outdoor unit shall be controlled by integral microprocessors.

3. The control circuit between the indoor units, BC Controller and the outdoor unit shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.

## 2.02 BRANCH CIRCUIT (BC) CONTROLLERS FOR R2-SERIES SYSTEMS

- A. General: The BC (Branch Circuit) Controllers shall be specifically used with R410A R2-Series systems. These units shall be equipped with a circuit board that interfaces to the M-NET controls system and shall perform all functions necessary for operation. The unit shall have a galvanized steel finish. The BC Controller shall be completely factory assembled, piped and wired. Each unit shall be run tested at the factory. This unit shall be mounted indoors, with access and service clearance provided for each controller. The sum of connected capacity of all indoor air handlers shall range from 50% to 150% of rated capacity.
- B. BC Unit Cabinet:
  1. The casing shall be fabricated of galvanized steel.
  2. Each cabinet shall house a liquid-gas separator and multiple refrigeration control valves.
  3. The unit shall house two tube-in-tube heat exchangers.
- C. Refrigerant
  1. R410A refrigerant shall be required. Provide all necessary refrigerant.
- D. Refrigerant valves:
  1. The unit shall be furnished with multiple branch circuits which can individually accommodate up to 54,000 BTUH and up to three indoor units. Branches may be twinned to allow more than 54,000 BTUH.
  2. Each branch shall have multiple two-position valves to control refrigerant flow.
  3. Service shut-off valves shall be field-provided/installed for each branch to allow service to any indoor unit without field interruption to overall system operation.
  4. Linear electronic expansion valves shall be used to control the variable refrigerant flow.
- E. Integral Drain Pan:
  1. An integral condensate pan and drain shall be provided.
- F. Electrical:
  1. The unit electrical power shall be 208/230 volts, 1 phase, 60 hertz.
  2. The unit shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253V (230V/60Hz).
  3. The BC Controller shall be controlled by integral microprocessors.
  4. The control circuit between the indoor units and the outdoor unit shall be 24VDC completed using a 2-conductor, twisted pair shielded cable to provide total integration of the system.

## 2.03 PLFY-P\*\*NCMU-E (4-WAY CEILING-RECESSED CASSETTE WITH GRILLE) INDOOR UNIT

- A. General: The PLFY-P\*\*NCMU-E shall be a four-way cassette style indoor unit that recesses into the ceiling with a ceiling grille. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, an emergency operation function and a test run switch. Indoor



unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory.

B. Unit Cabinet:

1. The cabinet shall be a compact 22-7/16" wide x 22-7/16" deep so it will fit within a standard 24" square suspended ceiling grid.
2. The cabinet panel shall have provisions for a field installed filtered outside air intake.
3. Four-way grille shall be fixed to bottom of cabinet allowing two, three or four-way blow.

C. Fan:

1. The indoor fan shall be an assembly with a turbo fan direct driven by a single motor.
2. The indoor fan shall be statically and dynamically balanced to run on a motor with permanently lubricated bearings.
3. The indoor fan shall consist of three (3) speeds, Low, Mid, and High.
4. The indoor unit shall have an adjustable air outlet system offering 4-way airflow, 3-way airflow, or 2-way airflow.
5. The auto air swing vanes shall be capable of automatically swinging up and down for uniform air distribution.

D. Filter:

1. Return air shall be filtered by means of a long-life washable filter.

E. Coil:

1. The indoor coil shall be of nonferrous construction with smooth plate fins on copper tubing.
2. The tubing shall have inner grooves for high efficiency heat exchange.
3. All tube joints shall be brazed with phos-copper or silver alloy.
4. The coils shall be pressure tested at the factory.
5. A condensate pan and drain shall be provided under the coil.
6. The unit shall be provided with an integral condensate lift mechanism that will be able to raise drain water 19-3/4" inches above the condensate pan.
7. Both refrigerant lines to the PLFY indoor units shall be insulated.

F. Electrical:

1. The unit electrical power shall be 208/230 volts, 1-phase, 60 hertz.
2. The system shall be capable of satisfactory operation within voltage limits of 187-228 volts (208V/60Hz) or 207-253 volts (230V/60Hz).

G. Controls:

1. This unit shall use controls provided by Mitsubishi Electric to perform functions necessary to operate the system.

### 3.00 INSTALLATION

- A. Provide shop drawings of refrigerant piping with sizes for review prior to installation.
- B. All equipment and piping shall be secured to the structure.
- C. Installation shall comply with manufacturers installation requirements.
- D. Provide factory start-up.

- E. Test all systems for proper operation and provide a written report that includes cooling heating discharge temperatures at the face of the devices after two minutes of continuous operation.
- F. Provide training to District for the proper operation and maintenance of system including but not limited to filter replacement, parts ordering, & diagnostic tests.
- G. Replace filters after two weeks of operation. Provide one extra set of filters for all units.

#### 4.00 CONTROLS

##### 4.01 OVERVIEW

- A. General: The CITY MULTI Controls Network (CMCN) shall be capable of supporting remote controllers, schedule timers, system controllers, centralized controllers, an integrated web based interface, graphical user workstation, and system integration to Building Management Systems via BACnet® and LonWorks®.

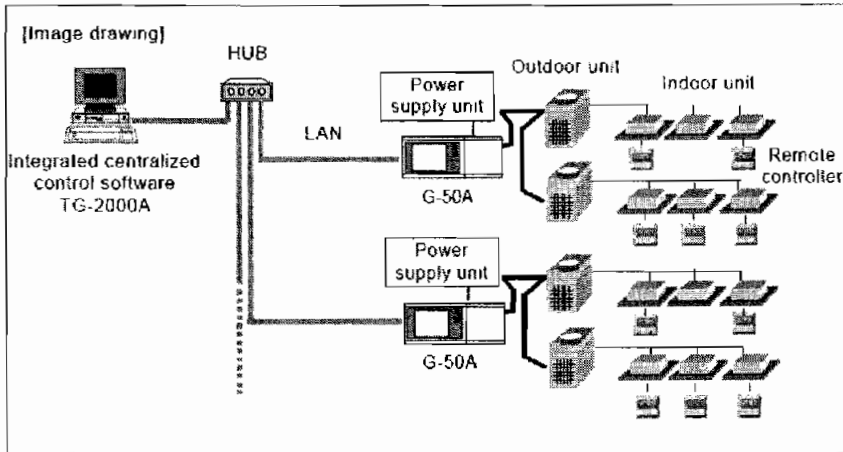
##### 4.02 ELECTRICAL CHARACTERISTICS

- A. General
  - 1. The CMCN shall operate at 24VDC. Controller power and communications shall be via a common non-polar communications bus.
- B. Wiring
  - 1. Control wiring shall be installed in a system daisy chain configuration from indoor unit to ME remote controller to indoor unit, to the BC controller (main and subs, if applicable) and to the outdoor unit. Control wiring to remote controllers shall be run from the indoor unit terminal block to the controller associated with that unit. Control wiring for schedule timers, system controllers, and centralized controllers shall be installed in a daisy chain configuration from outdoor unit to outdoor unit, to system controllers, to the power supply.
  - 2. Control wiring for the Deluxe MA, Simple MA, and Wireless MA remote controllers shall be from the remote controller to the first associated indoor unit (TB-15) then to the remaining associated indoor units (TB-15) in a daisy chain configuration. The AG-150A, G-50A and GB-50A system controller shall be capable of being networked with other AG-150A, G-50A and GB-50A system controllers for web based control.
- C. Wiring type
  - 1. Wiring shall be 2-conductor (16 AWG), twisted shielded pair, stranded wire, as defined by the Design Tool AutoCAD output.
  - 2. Network wiring shall be CAT-5e with RJ-45 connection.

##### 4.03 CITY MULTI CONTROLS NETWORK

- A. The CITY MULTI Controls Network (CMCN) consists of remote controllers, schedule timers, system controllers, centralized controllers, and/or integrated web based interface communicating over a high-speed communication bus. The CITY MULTI Controls Network shall support operation monitoring, scheduling, error email distribution, personal browsers, tenant billing, online maintenance support, and integration with Building Management Systems (BMS) using either LonWorks® or

BACnet® interfaces. The below figure illustrates a sample CMCN System Configuration.



CMCN System Configuration

#### 4.04 CMCN: REMOTE CONTROLLERS

##### A. AG-150A Centralized Controller

The AG-150A Centralized Controller shall be capable of controlling a maximum of 50 indoor units across multiple CITY MULTI outdoor units. The AG-150A Centralized Controller shall be approximately 7-1/2"x12" in size and shall be powered from a Power Supply Unit (PAC-SC51KUA). The AG-150A Centralized Controller shall support operation superseding that of the remote controllers, system configuration, daily/weekly scheduling, monitoring of operation status, and malfunction monitoring. The AG-150A Centralized Controller shall have five basic operation controls which can be applied to an individual indoor unit, a group of indoor units (up to 50 indoor units), or all indoor units (collective batch operation). This basic control set of operation controls for the AG-150A Centralized Controller shall include on/off, operation mode selection (cool, heat, auto (R2-Series only), dry, and fan), temperature setting, fan speed setting, and airflow direction setting. Since the AG-150A provides centralized control it shall be able to enable or disable operation of local remote controllers. In terms of scheduling, the AG-150A Centralized Controller shall allow the user to define both daily and weekly schedules with operations consisting of ON/OFF, mode selection, temperature setting, vane direction, fan speed, and permit/prohibit of remote controllers.

AG-150A (Centralized Controller)			
Item	Description	Operation	Display
ON/OFF	Run and stop operation for a single group	Each Group or Collective	Each Group or Collective
Operation Mode	Switches between Cool/Dry/Auto/Fan/Heat. (Group of Lossnay unit: automatic ventilation/vent-heat/interchange/normal ventilation) Operation modes vary depending on the air conditioner unit. Auto mode is in the CITY MULTI R2-Series only.	Each Group or Collective	Each Group

AG-150A (Centralized Controller)			
Item	Description	Operation	Display
Temperature Setting	Sets the temperature for a single group. Range of temperature setting: Cool/Dry: 67°F-87°F (57°F-87°F for PEFY/PEFY/PFFY-E) Heat: 63°F-83°F (63°F-83°F for PEFY/PEFY/PFFY-E) Auto: 67°F-83°F (63°F-83°F for PEFY/PEFY/PFFY-E) * Range of temperature setting varies depending on the model.	Each Group or Collective	Each Group
Fan Speed Setting	Models with 4 air flow speed settings: Hi/Mid-2/Mid-1/Low Models with 3 air flow speed settings: Hi/Mid/Low Models with 2 air flow speed settings: Hi/Low	Each Group or Collective	Each Group
Air Flow Direction Setting	Air flow direction angles 100%-80%-60%-40%, Swing, *1. Louver cannot be set. Air flow direction settings vary depending on the model.	*1 Each Group or Collective	Each Group
Timer Operation	Start/Stop and Enable/Disable can be set 3 times in one day. For a week's schedule, store three start/stop patterns and one enable/disable pattern. *2 When the timer is set, "Timer Enabled" is shown on the operation setting screen of the LCD.	Each Group or Collective	*2 Each Group
Permit / Prohibit Local Operation	Individually prohibit operation of each local remote control function (Start/Stop, Change operation mode, Set temperature, Reset filter). *3: Centrally Controlled is displayed on the remote controller for prohibited functions.	Each Group or Collective	*3 Each Group
Display Indoor Unit Intake Temp	Measures and displays the intake temperature of the indoor unit when the indoor unit is operating.	N/A	Each Group
Error	When an error is currently occurring on an air conditioner unit, the afflicted unit and the error code are displayed *4 When an error occurs, the LED flashes. The operation monitor screen shows the abnormal unit by flashing it. The error monitor screen shows the abnormal unit address, error code and source of detection. The error log monitor screen shows the time and date, the abnormal unit address, error code and source of detection	N/A	*4 Each Unit or Collective
Test Run	Operates air conditioner units in test run mode.	Each Group	Each Group
Ventilation Equipment	This interlocked system settings can be performed by the master system controller. When setting the interlocked system, use the ventilation switch the free plan LOSSNAY settings between "Hi", "Low" and "Stop". When setting a group of only free plan LOSSNAY units, you can switch between "Normal ventilation", "Interchange ventilation" and "Automatic ventilation".	Each Group	Each Group

AG-150A (Centralized Controller)			
Item	Description	Operation	Display
External Input / Output	By using accessory cables you can set and monitor the following. Input By level: "Batch start/stop", "Batch emergency stop" By pulse: "batch start/stop", "Enable/disable remote controller" Output: "start/stop", "error/Normal" *5: Requires the external I/O cables (PAC-YG10HA-E) sold separately.	*5 Collective	*5 Collective

- B. All AG-150A Centralized Controllers shall be equipped with one RJ-45 Ethernet port to support interconnection with a network PC via a closed/direct Local Area Network (LAN).
- C. The AG-150A Centralized Controller shall be capable of performing initial settings via the 9" high-resolution, backlit, color touch panel on the controller or via a PC using the AG-150A Centralized Controller's initial setting browser.
- D. Optional software functions shall be available so that the building manager can securely log into each AG-150A via the PC's web browser to support operation maintenance diagnostics.

#### 4.05 WEB-BASED USER INTERFACE

Licenses per function, per AG-150A/G-50A/GB-50A shall be required.

- A. PC-Monitoring (SW-Mon)
  - 1. The CMCN shall be capable of monitoring and operating all indoor units from a networked PC's web browser for up to 50 units per AG-150A/G-50A/GB-50A centralized controller.
- B. PC Scheduling (SW-Sch)
  - 1. The CMCN shall be capable of creating customized daily, weekly, and annual schedules from a network PC's web browser for up to 50 units per AG-150A/G-50A/GB-50A. Schedules shall be applied to a single indoor unit, a group of indoor units, or collectively (batch) to all indoor units controlled by the AG-150A/G-50A/GB-50A.
- C. Online Error Email (SW-Email)
  - 1. The CMCN shall be capable of sending detailed alerts to customizable distribution lists based on user defined error types.
- D. Personal Web Browser (SW-Pweb)
  - 1. The CMCN shall be capable of allowing up to 50 individual users to monitor and control user defined zones via a network PC or MAC's web browser.
- E. Online Maintenance Diagnostics (SW-Maint)
  - 1. The CMCN shall be capable of performing maintenance diagnostics via a network PC and AG-150A/G-50A/GB-50A centralized controller using Maintenance Tool Software.

#### 4.06 CMCN: SYSTEM INTEGRATION

The CMCN shall be capable of supporting integration with Building Management Systems (BMS) via our LonWorks® and BACnet® interfaces.

A. LMAP03U: LonWorks® Interface

1. The Mitsubishi Electric HVAC LonWorks® interface, LMAP03U, shall support up to fifty indoor units with a variety of network variables on a per indoor unit basis. Input variables include, but are not limited to, on/off, operation mode, fan speed, prohibit remote controller, and filter sign reset. Output variables include, but are not limited to, model size, alarm state, error code, and error address.

B. PAC-YTG31CDA: BACnet® Interface

1. The Mitsubishi Electric HVAC BACnet® interface, PAC-YG31CDA (SW-BACnet), shall be compliant with BACnet®/IP (ANSI/ASHRAE 135-1995, 135a) and UDP/IP of Ethernet (ANSI/ASHRAE 135-1995, 135b). The BACnet® interface shall require a dedicated network computer and activated BACnet® software function via Mitsubishi Electric HVAC issued license. The BACnet® software license shall be on a per AG-150A/G-50A/GB-50A basis for a maximum of 50 indoor units controlled by one AG-150A/G-50A/GB-50A Centralized Controller. The BACnet® interface shall support a maximum of ten AG-150A/G-50A/GB-50A Centralized Controllers for a maximum of 500 indoor units. Operation and monitoring points include, but are not limited to, on/off, operation mode, fan speed, prohibit remote controller, filter sign reset, alarm state, error code, and error address.

4.07 POWER SUPPLY (PAC-SC50KUA)

The power supply shall supply 12VDC (TB 3) for the G-50 centralized controller and 24VDC (TB 2) voltage for the central control transmission.

4.08 POWER SUPPLY (PAC-SC51KUA)

The power supply shall supply 24VDC (TB 3) for the AG-150 centralized controller and 24VDC (TB 2) voltage for the central control transmission.

4.09 Mr. Slim M-Series and P-Series Control

- A. The CMCN shall have the capability of controlling and monitoring the Mitsubishi Electric Mr. Slim MSY and MSZ units through the use of an adaptor to allow the MSY and MSZ units to communication on the M-Net communication bus.
- B. The CMCN shall have the capability of controlling and monitoring the Mitsubishi Electric Mr. Slim PUY and PUZ units through the use of an adaptor to allow the PUY and PUZ units to communication on the M-Net communication bus.

4.10 INPUT/OUTPUT (IO) BOARDS

A. Digital Input Digital Output (DIDO) Board

1. The DIDO IO board shall be capable of providing On/Off control for non-Mitsubishi equipment via the AG-150A/G-50A/GB-50A Centralized Controller's licensed web browser functions and the TG-2000A software. Each DIDO board shall have two digital inputs and two digital outputs and shall be capable of expanding to a total of six digital inputs and six digital outputs. Each digital output shall be capable of supporting an independent schedule via the AG-150A/G-50A/GB-50A Centralized Controller's licensed web browser functions and the TG-2000A software. Status indication of the On/Off state of the non-Mitsubishi equipment shall be either via the On/Off status of the digital output or by receipt of a digital input to the DIDO board.

2. The DIDO IO board shall be capable of receiving a digital input for interlock settings with the CITY MULTI indoor units or digital outputs on the DIDO board. Based on the digital input status the DIDO board shall be capable of setting the following parameter on the indoor unit On/Off, Mode, and Set Temperature to predefined settings. The DIDO board shall also be capable of interlocking the On/Off state of a digital output on the DIDO board based on a digital input status.
  - a. Start and Stop exhaust and supply air fans via aux contacts. Provide all necessary relays, Contactors, transformers, programming, wire and conduit for a complete system.
  - b. System shall use aux input contact for emergency shut-down because of main condensate failure. Provide all necessary relays, transformers, programming, wire and conduit for a complete system. Connect to safety switches on condensate pumps.

B. Analog Input (AI) Board

1. The AI IO board shall be capable of monitoring temperature or humidity via the AG-150A/G-50A/GB-50A Centralized Controller's licensed web browser functions and the TG-2000A software. Each AI board shall have two analog inputs. Each input shall be capable of receiving a 4/20mA, 0/10 VDC, or 1/5 VDC signal for monitoring temperature or humidity. The AI board shall be capable of monitoring the temperature or humidity input and shall be capable of displaying graphical trending of the temperature or humidity values via the AG-150A/G-50A/GB-50A Centralized Controller's licensed web browser functions and the TG-2000A software. Notification of user adjustable high and low level alarms shall be capable of being emailed to distribution list or outputted via a digital output.
2. The AI IO board shall be capable of setting the following parameters on the indoor unit On/Off, Mode, and Set Temperature to predefined settings based on the input value of the temperature or humidity. The AI board shall also be capable of interlocking the On/Off state of a digital output on the input value of the temperature or humidity.

4.11 TRAINING

- A. Provide four hours of training to District's personnel in the operation of the system. Consult with District's representative to schedule the training. Allow two weeks for scheduling. Training shall include setpoint adjustment, trending, schedule adjustment, and error messaging.

4.12 AUXILIARY DEVICE CONTROL

- A. Control via contacts on AG 150A controller the supply and exhaust fan start-stop via motor starter with HOA switches. Coordinate location of starters with electrical. All wiring shall be in conduit with #14 THHN wire.

The system shall also shut-down via condensate pumps safety switch.

END OF SECTION





## 1.00 GENERAL

### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.02 SUMMARY

- A. Section Includes:
1. Single-wall rectangular ducts and fittings.
  2. Single-wall round and flat-oval ducts and fittings.
  3. Sheet metal materials.
  4. Sealants and gaskets.
  5. Hangers and supports.
- B. Related Sections:
1. Division 01 Section "Indoor Air Quality (IAQ) Management".
  2. Division 09 Section "Interior Painting".
  3. Division 15 Section "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
  4. Division 15 Section "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

### 1.03 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."
1. Seismic Hazard Level A: Seismic force to weight ratio, 0.48.
- B. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1-2004.

### 1.04 SUBMITTALS

- A. Product Data: For each type of the following products:
1. Ductwork materials
  2. Sealants and gaskets.
- B. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
  2. Suspended ceiling components.

3. Structural members to which duct will be attached.
4. Penetrations of smoke barriers and fire-rated construction.

## 1.05 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
- B. Welding Qualifications: Qualify procedures and personnel according to the following:
  1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
  2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum," for aluminum supports.
  3. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.
- C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1-2004, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."
- D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1-2004, Section 6.4.4 - "HVAC System Construction and Insulation."

## 2.00 PRODUCTS

### 2.01 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

## 2.02 SINGLE-WALL ROUND AND FLAT-OVAL DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Lindab Inc.
    - b. McGill AirFlow LLC.
    - c. SEMCO Incorporated.
    - d. Sheet Metal Connectors, Inc.
    - e. Spiral Manufacturing Co., Inc.
    - f. Omni Duct Systems.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Transverse Joints - Round Duct," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
1. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Seams - Round Duct and Fittings," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.
  2. Fabricate flat-oval ducts larger than 72 inches in width (major dimension) with butt-welded longitudinal seams.
- D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

## 2.03 SHEET METAL MATERIALS

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
1. Galvanized Coating Designation: G60
  2. Finishes for Surfaces Exposed to View: Mill phosphatized.
  3. Welded Connections

- C. Water-Based Joint and Seam Sealant:
  - 1. Application Method: Brush on.
  - 2. Solids Content: Minimum 65 percent.
  - 3. Shore A Hardness: Minimum 20.
  - 4. Water resistant.
  - 5. Mold and mildew resistant.
  - 6. All sealants and adhesives to be field-applied, within the building envelope must comply with VOC limits in Division 01 Section "Indoor Air Quality (IAQ) Management".
  - 7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
  - 8. Service: Indoor or outdoor.
  - 9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- D. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
- E. Hanger Rods for Corrosive Environments: Electro-galvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
- F. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct."
- G. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
- H. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.
- I. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
- J. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- K. Trapeze and Riser Supports:
  - 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
  - 2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
  - 3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

## 2.04 SEISMIC-RESTRAINT DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide a product by one of the following:
  - 1. Cooper B-Line, Inc.; a division of Cooper Industries.
  - 2. Ductmate Industries, Inc.
  - 3. Hilti Corp.

4. Kinetics Noise Control.
5. Loos & Co.; Cableware Division.
6. Mason Industries.
7. TOLCO; a brand of NIBCO INC.
8. Unistrut Corporation; Tyco International, Ltd.

### 3.00 EXECUTION

#### 3.01 DUCT INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round and flat-oval ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 15 Section "Air Duct Accessories" for fire and smoke dampers.
- L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials.

#### 3.02 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":
  1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
  2. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
  3. Conditioned Space, Exhaust Ducts: Seal Class B.
  4. Conditioned Space, Return-Air Ducts: Seal Class C.
  5. All sealants and adhesives to be field-applied, within the building envelope must comply with VOC limits in Division 01 Section "Indoor Air Quality (IAQ) Management".

### 3.03 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Hangers and Supports."
- B. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- C. Hangers Exposed to View: Threaded rod and angle or channel supports.
- D. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- E. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

### 3.04 SEISMIC-RESTRAINT-DEVICE INSTALLATION

- A. Install ducts with hangers and braces designed to support the duct and to restrain against seismic forces required by applicable building codes. Comply with SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."
- B. Select seismic-restraint devices with capacities adequate to carry present and future static and seismic loads.
- C. Install cables so they do not bend across edges of adjacent equipment or building structure.

- D. Install cable restraints on ducts that are suspended with vibration isolators.

### 3.05 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Division 15 Section "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

### 3.06 PAINTING

- A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Division 09 painting Sections.

### 3.07 START UP

- A. Air Balance: Comply with requirements in Division 15 Section "Testing, Adjusting, and Balancing for HVAC."

### 3.08 DUCT SCHEDULE

- A. Fabricate ducts with galvanized sheet steel except as otherwise indicated and as follows:
- B. Supply Ducts:
  - 1. Ducts Connected to Constant-Volume Fans:
    - a. Pressure Class: Positive 2-inch wg.
    - b. Minimum SMACNA Seal Class: B.
    - c. SMACNA Leakage Class for Rectangular: 24.
    - d. SMACNA Leakage Class for Round and Flat Oval: 12.
  - 2. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
    - a. Pressure Class: Negative 2-inch wg.
    - b. Minimum SMACNA Seal Class: A if negative pressure, and A if positive pressure.
    - c. SMACNA Leakage Class for Rectangular: 12.
    - d. SMACNA Leakage Class for Round and Flat Oval: 12.
- C. Elbow Configuration:
  - 1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Elbows."
    - a. Velocity 1000 fpm or Lower:
      - 1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
      - 2) Mitered Type RE 4 without vanes.
  - 2. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-3, "Round Duct Elbows."
    - a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards -

Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.

- 1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
  - 2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
- b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
  - c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam or Welded.
- D. Branch Configuration:
1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-6, "Branch Connections."
    - a. Rectangular Main to Rectangular Branch: 45-degree entry.
    - b. Rectangular Main to Round Branch: Spin in.
  2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees."
    - a. Velocity 1000 fpm or less 45-degree lateral.

END OF SECTION



1.00 GENERAL1.01 SECTION INCLUDES

- A. Make-up Air Fan
- B. Ceiling-Mounted Exhaust Fans.

1.02 RELATED WORK

- A. Section 15074 - Vibration Isolation.
- B. Section 15890 - Ductwork.
- C. Section 15910 - Ductwork Accessories
- D. Division 26 - Equipment Wiring.

1.03 REFERENCES

- A. AFBMA 9 - Load Ratings and Fatigue Life for Ball Bearings.
- B. AFBMA 11 - Load Ratings and Fatigue Life for Roller Bearings.
- C. AMCA 99 - Standards Handbook.
- D. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes
- E. AMCA 300 - Test Code for Sound Rating Air Moving Devices.
- F. AMCA 301 - Method of Calculating Fan Sound Ratings from Laboratory Test Data.
- G. NEMA MG1 - Motors and Generators.
- H. NFPA 70 - National Electrical Code.
- I. SMACNA - HVAC Duct Construction Standards - Metal and Flexible.

1.04 SUBMITTALS

- A. Submit under provisions of Division 01.
- B. Product Data: Provide data on centrifugal fans and accessories including fan curves with specified operating point clearly plotted, sound power levels for both fan inlet and outlet at rated capacity, and electrical characteristics and connection requirements.
- C. Manufacturer's Installation Instructions.

1.05 OPERATION AND MAINTENANCE DATA

- A. Submit under provisions of Division 01.
- B. Maintenance Data: Include instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

#### 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, protect and handle products to site under provisions of Division 01.
- B. Protect motors, shafts, and bearings from weather and construction dust.

#### 1.07 ENVIRONMENTAL REQUIREMENTS

- A. Do not operate fans for any purpose until ductwork is clean, filters in place, bearings lubricated, and fan has been test run under observation.

#### 1.08 EXTRA MATERIALS

- A. Furnish under provisions of Division 01.

### 2.00 PRODUCTS

#### 2.01 MANUFACTURERS

- A. See equipment schedule on plans.

#### 2.02 GENERAL

- A. Performance Ratings: Conform to AMCA 210 and bear the AMCA Certified Rating Seal.
- B. Sound Ratings: AMCA 301, tested to AMCA 300, and bear AMCA Certified Sound Rating Seal.
- C. Fabrication: Conform to AMCA 99.
- D. Performance Base: Sea level conditions.
- E. Temperature Limit: Maximum 600 degrees F (315 degrees C).
- F. Static and Dynamic Balance: Eliminate vibration or noise transmission to occupied areas.

#### 2.03 FANS

- A. Manufacturer
  - 1. Greenheck
  - 2. Penn-Barry

### 3.00 EXECUTION

3.01 INSTALLATION

- A. Install in accordance with Manufacturer's instructions.
- B. Install flexible connections specified in Section 15820 between fan inlet and discharge ductwork. Ensure metal bands of connectors are parallel with minimum one inch (25 mm) flex between ductwork and fan while running.
- C. Provide backdraft dampers at inlet of exhaust fans and as indicated.
- D. Install MAU-1 on strut rack and brace to resist seismic induced motion.

3.02 SCHEDULE

- A. See EQUIPMENT SCHEDULE on plans.

3.03 COMMISSIONING

- A. See Section 15950 for commissioning requirements.

END OF SECTION



## 1.00 GENERAL

### 1.01 GENERAL REQUIREMENTS

- A. The contract documents shall apply in their entirety to the work specified herein.
- B. Submittals: Submit shop drawings and manufacturer's data in accordance with this section and Division 01.
- C. Maintenance and Operation Manuals: Provide 2 copies of manufacturer's operation and maintenance manual to owner in accordance with Division 01 - Submittals. Include: Shop drawings, wiring diagrams, network architecture and manufacturers owner's manuals.

### 1.02 SYSTEM DESCRIPTION

- A. This document contains the specification, input/output summaries for the Building Automation and Control System (BACS). The system architecture shall an EIA-485 BACnet controller network. Operator Workstations may be connected to the controller network via direct EIA-232, modem, or Ethernet local area network connections through a microprocessor based communication device. See section 15624 for Mitsubishi system control requirements. Integrate Mitsubishi System into ALC campus system.
- B. District currently is operating a Campus wide Automated Logic Control (ALC) System. No substitution is allowed.

### 1.03 SCOPE OF WORK

- A. General: Furnish and install all necessary hardware, software, wiring and computing equipment as defined in this specification.
- B. System Requirements
  1. All material and equipment used shall be standard components, regularly manufactured and available and not custom designed especially for this project. All systems and components, except site specific software, shall have previously been thoroughly tested and proven in actual use prior to installation on this project.
  2. The system architecture shall be fully modular permitting the expansion of application software, system peripherals, and field hardware.
  3. The DDC system upon completion of the installation and prior to acceptance of the project shall perform all operating functions as detailed in these specifications.
- C. System hardware shall include all necessary controllers, control transformers, relays, wiring and all other devices and equipment required to provide a complete and operating system.
- D. Include all programming and building graphics to control the lighting systems shown on the plans. Included in the programming shall be alarm limits and system trending.

## 1.04 SUBMITTALS, DOCUMENTATION AND ACCEPTANCE

### A. Submittals

1. Shop Drawings. A minimum of three copies of shop drawings shall be submitted and shall consist of a complete list of equipment and materials, including manufacturers catalog sheets and installation instructions. Shop drawings shall also contain complete wiring and routing, ID numbers of devices and any other details required to demonstrate that the system will function properly. Drawings shall show proposed layout and installation of all equipment and the relationship to other parts of the work.
2. Programming.
3. Block diagram.
4. Equipment.

### B. Project Specific Manuals.

### C. Acceptance Test and Acceptance.

## 2.00 PRODUCTS

### 2.01 HARDWARE

#### A. SYSTEM COMPONENTS –The Contractor shall provide the following:

1. All controllers necessary to perform standard HVAC operations.
2. All relays, conduit, transformers, conduit, j-boxes, switches, indicating devices, and transducers required providing a complete and functional control system.
3. All control enclosures shall be manufactured by Hoffman and listed for the intended service.

### 2.02 CONTROLS MANUFACTURERS

#### A. Automated Logic Controls. No substitution allowed. District standard.

### 2.03 SOFTWARE MANUFACTURERS

#### A. Automated Logic Controls. No substitution allowed. District standard.

#### B. Install the most recent version of program. Upgrade existing campus programming as needed to be compatible with new software version.

## 3.00 EXECUTION

### 3.01 EXECUTION

- #### A.
- Provide all necessary programming to fully optimize the operation of the building's Lighting systems and to integrate Mitsubishi HVAC system. Provide fully commented programming and notes to District. Provide submittal of control block diagram for District's and Architect's review and approval. Include in bid two revisions of programming for control optimization. Minor changes & additions to the programming shall be included in controls contractors bid. Integrate programming and graphics into existing system. Coordinate any system shutdowns with owner. Graphics and programming shall be integrated into the

existing alc campus programming.

- B. Provide (4) four hours of training to owner's representative after system is fully functional.
  - 1. Provide system manual to owner.
  - 2. Provide documentation of complete system testing.
- C. Install all necessary equipment including but not limited to; controllers, computer interface, programming, surge protectors, wiring, cables, connectors, conduit, relays etc. required to provide a complete working energy management system.
- D. Label all control components per Division 16 requirements. All boxes with controller shall have an accurate laminated control diagram fixed to the inside cover.
- E. Minimum conduit size shall be 1/2".
- F. Provide for two sets of minor programming changes to any and all systems to optimize system after continuous operation is observed in both heating and cooling seasons respectively.

### 3.02 SEQUENCE OF OPERATION

The new building automation system (bas) shall control all lighting and mechanical equipment, except where noted. The bas shall be Automated Logic Corp. (ALC) controls system. The system shall control, monitor and generate alarms as specified herein. The system program shall maintain trending information on all system functions, unless otherwise specified. Each piece of mechanical equipment shall be controlled by a unitary control module (module), unless otherwise specified. Graphics shall display all set-points, enable, and sensor readings.

### 3.02 TESTING

- A. All systems shall be commissioned per ASHRAE Guideline 0-2005 requirements. This testing shall be done after all programming and graphics have been completed and installed on the owner's computer system.
- B. Reports shall be provided that details each element, including but not limited to sensors, vav boxes, controllers, pumps, and actuators verified performance.
- C. After the reports are provided and reviewed, the engineer and owner shall witness test with controls contractor the operation of the system.

END OF SECTION





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1.00 GENERAL1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Special Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
1. Manual volume dampers.
  2. Combination fire and smoke dampers.
  3. Flange connectors.
  4. Remote damper operators.
  5. Duct-mounted access doors.
  6. Flexible connectors.
  7. Duct accessory hardware.
  8. Supply air filter
- B. Related Sections:
1. Division 15 Section "Metal Ducts".

1.03 SUBMITTAL

- A. Product Data: For each type of product indicated.
1. For duct silencers, include pressure drop and dynamic insertion loss data. Include breakout noise calculations for high transmission loss casings.

1.04 QUALITY ASSURANCE

Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems." Comply with AMCA 500-D testing for damper rating.

2.00 PRODUCTS2.01 MATERIALS

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653.
1. Galvanized Coating Designation: G60 (Z180) and G90 (Z275).
  2. Exposed-Surface Finish: Mill phosphatized.
  3. Stainless-Steel Sheets: Comply with ASTM A 480, Type 304, and having a No. 2 finish for concealed ducts and exposed ducts.
  4. Aluminum Sheets: Comply with ASTM B 209, Alloy 3003, Temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.
  5. Extruded Aluminum: Comply with ASTM B 221, Alloy 6063, Temper T6.

6. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
7. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

## 2.02 MANUAL VOLUME DAMPERS

- A. Standard, Steel, Manual Volume Dampers:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Air Balance Inc.; a division of Mestek, Inc.
    - b. McGill AirFlow LLC.
    - c. METALAIRE, Inc.
    - d. Nailor Industries Inc.
    - e. Pottorff; a division of PCI Industries, Inc.
    - f. Ruskin Company.
  2. Standard leakage rating.
  3. Suitable for horizontal or vertical applications.
  4. Frames:
    - a. Hat-shaped, galvanized-steel channels, 0.064-inch minimum thickness.
    - b. Mitered and welded corners.
    - c. Flanges for attaching to walls and flangeless frames for installing in ducts.
  5. Blades.
    - a. Single blade for ducts up to 24".
    - b. Galvanized-steel, 0.064 inch thick.
  6. Blade Axles: Galvanized steel.
  7. Bearings:
    - a. Oil-impregnated bronze.
    - b. Dampers in ducts with pressure classes of 3-inch wg (750 Pa) or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
  8. Tie Bars and Brackets: Galvanized steel.

## 2.03 FLANGE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  1. Ductmate Industries, Inc.
- B. Description: Add-on, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.
- C. Material: Galvanized steel for galvanized steel ducts.
- D. Material: Stainless steel for stainless steel ducts.
- E. Gage and Shape: Match connecting ductwork.

## 2.04 REMOTE DAMPER OPERATORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Pottorff; a division of PCI Industries, Inc.
  - 2. Young Regulator Company.
- B. Description: Cable system designed for remote manual damper adjustment.
- C. Tubing: Brass.
- D. Cable: Stainless steel.
- E. Wall-Box Mounting: Recessed, 2 inches deep.
- F. Wall-Box Cover-Plate Material: Steel.

#### 2.05 DUCT-MOUNTED ACCESS DOORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Ductmate Industries, Inc.
  - 2. Greenheck Fan Corporation.
  - 3. McGill AirFlow LLC.
  - 4. Nailor Industries Inc.
  - 5. Pottorff; a division of PCI Industries, Inc.
  - 6. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 2-10, "Duct Access Doors and Panels," and 2-11, "Access Panels - Round Duct."
  - 1. Door:
    - a. Double wall, rectangular.
    - b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
    - c. Vision panel.
    - d. Hinges and Latches: 1-by-1-inch butt or piano hinge and cam latches.
    - e. Fabricate doors airtight and suitable for duct pressure class.
  - 2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
  - 3. Number of Hinges and Locks:
    - a. Access Doors Less Than 12 Inches Square: No hinges and two sash locks.
    - b. Access Doors up to 18 Inches Square: Two hinges and two sash locks.

#### 2.06 FLEXIBLE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Ductmate Industries, Inc.
  - 2. Duro Dyne Inc.
  - 3. Ventfabrics, Inc.
  - 4. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
- B. Materials: Flame-retardant or noncombustible fabrics.

- C. Coatings and Adhesives: Comply with UL 181, Class 1.
- D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to 2 strips of 2-3/4-inch wide, 0.028-inch thick, galvanized sheet steel or 0.032-inch thick aluminum sheets. Provide metal compatible with connected ducts.
- E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
  - 1. Minimum Weight: 26 oz./sq. yd..
  - 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
  - 3. Service Temperature: Minus 40 to plus 200 deg F.
  - 4. Service Temperature: Minus 50 to plus 250 deg F.

## 2.07 DUCT ACCESSORY HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.

## 2.08 SUPPLY AIR FILTER

- A. Filter for supply air shall be 2" pleated Farr 30 30 or equal
- B. Fabricate filter frame with 20 gauge sheet metal
- C. Access door for filter changing shall be Ductmate or equal.

## 3.00 EXECUTION

### 3.01 INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and stainless-steel accessories in stainless-steel ducts.
- C. Install backdraft dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.
- D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
  - 1. Install steel volume dampers in steel ducts.
  - 2. Install aluminum volume dampers in aluminum ducts.
- E. Set dampers to fully open position before testing, adjusting, and balancing.
- F. Install test holes at fan inlets and outlets and elsewhere as indicated.

- G. Unless otherwise prevented by physical conditions, install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
  - 1. Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links. Access doors for access to fire or smoke dampers having fusible links shall be pressure relief access doors and shall be outward operation for access doors installed upstream from dampers and inward operation for access doors installed downstream from dampers.
- H. Install access doors with swing against duct static pressure.
- I. Access Door Sizes:
  - 1. One-Hand or Inspection Access: 8 by 5 inches (200 by 125 mm).
- J. Label access doors according to Division 15 Section "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.
- K. Install flexible connectors to connect ducts to equipment.
- L. Fabricate filter frame at supply air fan. Frame shall be sealed to minimize bypass. Reinforce ducting and install access door with latch for filter changing.

### 3.02 FIELD QUALITY CONTROL

- A. Tests and Inspections:
  - 1. Operate dampers to verify full range of movement.
  - 2. Inspect locations of access doors and verify that purpose of access door can be performed.  
Operate remote damper operators to verify full range of movement of operator and damper.

END OF SECTION



1.00 GENERAL1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
  - 1. Rectangular and square ceiling diffusers.
  - 2. Perforated diffusers.
- B. Related Sections:
  - 1. Division 15 Section "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.

1.03 SUBMITTALS

- A. Product Data: For each type of product indicated, include the following:
  - 1. Data Sheet: Indicate materials of construction, finish, and mounting and performance data including throw and drop, static-pressure drop, and noise ratings.
  - 2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.
- B. Samples for Initial Selection: For diffusers, registers, and grilles with factory-applied color finishes.
- C. Samples for Verification: For diffusers, registers, and grilles, in manufacturer's standard sizes to verify color selected.
- D. Source quality-control reports.

2.00 PRODUCTS – SEE SCHEDULE ON PLANS3.00 EXECUTION3.01 EXAMINATION

- A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions effecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install diffusers, registers, and grilles level and plumb.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

END OF SECTION



1.00 GENERAL1.01 GENERAL REQUIREMENTS

- A. The contract documents shall apply in their entirety to the work specified herein.
- B. Submittals: Submit shop drawings and manufacturer's data in accordance with this section.
- C. Maintenance and Operation Manuals: Provide 2 copies of manufacturer's operation and maintenance manual to District.
  - 1. Include: Shop drawings, wiring diagrams, network architecture and manufacturers' District's manuals.

1.02 SYSTEM DESCRIPTION

- A. This document contains the specification, input/output summaries for the Building Automation and Control System (BACS). The system architecture shall be an EIA-485 BACnet controller network. Operator Workstations may be connected to the controller network via direct EIA-232, modem, or Ethernet local area network connections through a microprocessor-based communication device.
- B. Owner currently is operating a Campus-wide Automated Logic Control System. No substitution is allowed.

1.03 SCOPE OF WORK

- A. General: Furnish and install all necessary hardware, software, wiring and computing equipment as defined in this specification.
- B. System Requirements:
  - 1. All materials and equipment used shall be standard components, regularly manufactured and available and not custom designed especially for this project. All systems and components, except site specific software, shall have previously been thoroughly tested and proven in actual use prior to installation on this project.
  - 2. The system architecture shall be fully modular permitting the expansion of application software, system peripherals, and field hardware.
  - 3. The DDC system upon completion of the installation and prior to acceptance of the project shall perform all operation functions as detailed in these specifications.
- C. System hardware shall include all necessary controllers, thermostats, control transformers, relays, wiring and all other devices and equipment required to provide a complete and operating system.
- D. Include all programming and building graphics to control the exterior lighting and monitor the elevator sump alarms and IT room.

1.04 SUBMITTALS, DOCUMENTATION AND ACCEPTANCE

- A. Submittals:
  - 1. Shop drawings. A minimum of three copies of shop drawings shall be submitted and shall consist of a complete list of equipment and materials, including manufacturers catalog sheets and installation instructions. Shop drawings shall also contain complete wiring and routing, ID numbers of devices and any other details required to demonstrate that the system will function properly. Drawings shall show proposed layout and installation of all equipment and the relationship to other parts of the work.
  - 2. Programming.
  - 3. Block diagram.
  - 4. Equipment.
- B. Project Specific Manuals.
- C. Acceptance Test and Acceptance.

## 2.00 PRODUCTS

### 2.01 HARDWARE

- A. Network Computer
  - 1. District has existing computer with Automated Logic Programming installed.
- B. System Components – The Contractor shall provide the following:
  - 1. All thermostats and controllers necessary to perform standard HVAC operations.
  - 2. All relays, conduit, transformers, conduit, j-boxes, switches, indicating devices, and transducers required providing a complete and functional control system.
  - 3. All control enclosures shall be manufactured by Hoffman and listed for the intended service.

### 2.02 CONTROLS MANUFACTURER

- A. Manufacturer: Subject to compliance with requirements, provide products by the following:
  - 1. Automated Logic Controls.

### 2.03 SOFTWARE MANUFACTURER

- A. Manufacturer: Subject to compliance with requirements, provide products by the following:
  - 1. Automated Logic Controls. No substitution allowed.
- B. Install the most recent version of program. Upgrade existing campus programming as needed to be compatible with new software version.

## 3.00 EXECUTION

### 3.01 EXECUTION

- A. Provide all necessary programming to fully optimize the operation of the building's HVAC systems. Provide fully commented programming and notes to District. Provide submittal of control block diagram for Owner's and Engineers review and approval. Integrate programming and graphics into existing system. Coordinate any system shutdowns with District.
- B. Provide 1 hour of training to District's representative after system is fully functional.
  - 1. Provide system manual to District.
  - 2. Provide documentation of complete system testing.
- C. Install all necessary equipment including but not limited to: controllers, thermostats, computer interface, programming, surge protectors, wiring, cables, connectors, conduit, relays, etc. required to provide a complete working energy management system.
- D. Label all control components per Division 16 requirements. All boxes with controller shall have an accurate laminated control diagram fixed to the inside cover.
- E. Minimum conduit size shall be 3/4 inch.
- F. Provide for 2 sets of minor programming changes to any and all systems to optimize system after continuous operation is observed in both heating and cooling seasons respectively.

### 3.02 SEQUENCE OF OPERATION

- A. The new Building Automation System (bas) shall control outdoor lighting and monitor the elevator sump alarms and the temperature of the IT and electrical rooms. The system shall control, monitor and generate alarms as specified herein. The system program shall maintain trending information on all system functions, unless otherwise specified.

### 3.03 TESTING

- A. All control functions shall be tested for performance. This testing shall be done after all programming and graphics have been completed and installed on the District's computer system.
- B. Reports shall be provided that details each element, including but not limited to sensors, vav boxes, controllers, and its verified performance.
- C. After the reports are provided and reviewed, the Engineer and District shall witness test (with Controls Contractor) the operation of the system.

END OF SECTION



## 1.00 GENERAL

### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, including General Commissioning Requirements, apply to this Section.
- B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.
- C. Related Sections:
  - 1. Division 01 Section "General Commissioning Requirements" for general commissioning process requirements.

### 1.02 SUMMARY

- A. The purpose of this Section is to define Contractor responsibilities in the commissioning process, which are being directed by the Contractor.
- B. Commissioning requires the participation of the Contractor to ensure that all systems are operating in a manner consistent with the Contract Documents. General Commissioning requirements and coordination are detailed in Division 01. Division 15 shall be familiar with all parts of Division 01 and the Commissioning Plan issued by the CA and shall execute all Commissioning responsibilities assigned to them in the Contract Documents and include the cost of Commissioning in the Contract price.

### 1.03 DEFINITIONS

- A. Commissioning: A systematic process confirming that building systems have been installed, properly started, and consistently operated in strict accordance with the Contract Documents, that all systems are complete and functioning in accordance with the Contract Documents at Substantial Completion, and that Contractor has provided Owner adequate system documentation and training. Commissioning includes deferred and/or seasonal tests as approved by District.
- B. Commissioning Plan: Document prepared by Contractor and approved by District that provides the structure, schedule, and coordination plan for the Commissioning process from the construction phase through the warranty period. The Commissioning Plan must satisfy the District's test requirements.
- C. Commissioning Team: Working group made up of representative(s) from the Commissioning Authority (CA), Architect/Engineer (AE), Contractor, District's Test, Adjust, and Balance (TAB) Firm, Building Automation System (BAS) provider, specialty manufacturers and suppliers, and Owner. Contractor will provide ad-hoc representation of Subcontractors on the Commissioning Team as required for implementation of the Commissioning Plan.
- D. Deferred Tests: Functional Performance or Integrated System Tests performed after Substantial Completion due to partial occupancy, partial equipment

acceptance, seasonal requirements, design, or other Site conditions that prohibit the test from being performed prior to Substantial Completion.

- E. Deficiency: Condition of a component, piece of equipment or system that is not in compliance with Contract Documents.
- F. Factory Testing: Testing of equipment at the factory, by factory personnel with an Owner's representative present if deemed necessary by District
- G. Functional Performance Test Procedures: Commissioning protocols and detailed test procedures and instructions in tabular and script-type format that fully describe system configuration and steps required to determine if the system is performing and functioning properly. CA prepares these procedures to document Functional Performance Tests.
- H. Functional Performance Test (FPT): Test of dynamic function and operation of equipment and systems executed by Contractor and directed by the CA. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, life safety conditions, power failure, etc. Systems are run through all specified sequences of operation. Components are verified to be responding in accordance with Contract Documents. Functional Performance Tests are executed after start-ups and Pre-functional Checklists are complete.
- I. HVAC&R: Heating, Ventilating, Air Conditioning, and Refrigeration.
- J. Integrated System Test: Test of dynamic function and operation of multiple systems. Integrated System Tests are tested under various modes, such as fire alarm and emergency situations, life safety conditions, power failure, etc. Systems are integrally operated through all specified sequences of operation. Components are verified to be responding in accordance with Contract Documents. Integrated System Tests are executed after Functional Performance Tests are complete and prior to Substantial Completion. Integrated System Tests provide verification that the integrated systems will properly function according to the Contract Documents.
- K. Integrated System Test Procedures: Commissioning protocols and detailed test procedures and instructions in tabular and script-type format that fully describe system configurations and steps required to determine if the interacting systems are performing and functioning properly. CA prepares these procedures to document Integrated System Tests.
- L. Pre-functional Checklist: A list of static inspections and material or component tests that verify proper installation of equipment (e.g., belt tension, oil levels, labels affixed, gages in place, sensors calibrated, etc.). The word Pre-functional refers to before Functional tests. Pre-functional Checklists must include the manufacturer's Start-up checklist(s). Contractor shall sign Pre-functional Checklists as complete and submit with the Request for Start-up/Functional Performance Test Form.
- M. Start-up: The activities where equipment is initially energized, tested, and operated. Start-up is completed prior to Functional Performance Tests.

- N. Systems, Subsystems, Equipment, and Components: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, equipment, and components.

#### 1.04 CONTRACTOR'S RESPONSIBILITIES

- A. Develop start-up procedures and forms to be filled out during start-up.
- B. Perform commissioning tests as directed by the CA and included herein.
- C. Attend construction phase controls coordination meeting.
- D. Attend testing, adjusting, and balancing review and coordination meeting.
- E. Participate in HVAC&R systems, assemblies, equipment, and component maintenance orientation and inspection.
- F. Provide information for final commissioning documentation.
- G. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

#### 1.05 COMMISSIONING DOCUMENTATION

- A. Provide the following information to the CA for inclusion in the commissioning plan and the final commissioning report:
  - 1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
  - 2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
  - 3. Process and schedule for completing construction checklists and manufacturer's prestart and startup checklists for HVAC&R systems, assemblies, equipment, and components to be verified and tested.
  - 4. Certificate of completion certifying that installation, prestart checks, and startup procedures have been completed.
  - 5. Certificate of readiness certifying that HVAC&R systems, subsystems, equipment, and associated controls are ready for testing.
  - 6. Test and inspection reports and certificates.
  - 7. Corrective action documents.
  - 8. Verification of testing, adjusting, and balancing reports.

#### 1.06 SUBMITTALS

- A. Certificates of readiness.
- B. Certificates of completion of installation, prestart, and startup activities.

#### 2.00 PRODUCTS

##### 2.01 GENERAL

- A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

## 2.02 TEST EQUIPMENT

- A. Provide all specialized tools, test equipment and instruments required to execute Start-up, checkout, and testing of equipment.
- B. All specialized tools, test equipment, and instruments required to execute Start-up, checkout, and testing of equipment shall be of sufficient quality and accuracy to test and/or measure system performance within specified tolerances. A testing laboratory must have calibrated test equipment within the previous twelve (12) months. Calibration shall be NIST traceable. Contractor must calibrate test equipment and instruments according to manufacturer's recommended intervals and whenever the test equipment is dropped or damaged. Calibration tags must be affixed to the test equipment or certificates readily available.

## 3.00 EXECUTION

### 3.01 TESTING PREPARATION

- A. Certify that HVAC&R systems, subsystems, and equipment have been installed, calibrated, and started and are operating according to the Contract Documents.
- B. Certify that HVAC&R instrumentation and control systems have been completed and calibrated, that they are operating according to the Contract Documents, and that pretest set points have been recorded.
- C. Certify that testing, adjusting, and balancing procedures have been completed and that testing, adjusting, and balancing reports have been submitted, discrepancies corrected, and corrective work approved.
- D. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal shutdown, normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
- E. Inspect and verify the position of each device and interlock identified on checklists.
- F. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.
- G. Testing Instrumentation: Install measuring instruments and logging devices to record test data.

### 3.02 TESTING AND BALANCING VERIFICATION

- A. Prior to performance of testing and balancing Work, provide copies of reports, sample forms, checklists, and certificates to the CA.
- B. Notify the CA at least 10 days in advance of testing and balancing Work, and provide access for the CA to witness testing and balancing Work.



- C. Provide technicians, instrumentation, and tools to verify testing and balancing of HVAC&R systems.
  - 1. The testing and balancing Contractor shall use the same instruments (by model and serial number) that were used when original data were collected.
  - 2. Failure of an item includes, other than sound, a deviation of more than 10 percent. Failure of more than 10 percent of selected items shall result in rejection of final testing, adjusting, and balancing report. For sound pressure readings, a deviation of 3 dB shall result in rejection of final testing. Variations in background noise must be considered.
  - 3. Remedy the deficiency and notify the Engineer so verification of failed portions can be performed.

### 3.03 GENERAL TESTING REQUIREMENTS

- A. Provide technicians, instrumentation, and tools to perform commissioning test.
- B. Scope of HVAC&R testing shall include entire HVAC&R installation, from central equipment for heat generation and refrigeration through distribution systems to each conditioned space. Testing shall include measuring capacities and effectiveness of operational and control functions.
- C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions, and verify proper response of building automation system controllers and sensors.
- D. The HVAC&R Contractor, testing and balancing Contractor, and HVAC&R Instrumentation and Control Contractor shall prepare detailed testing plans, procedures, and checklists for HVAC&R systems, subsystems, and equipment.
- E. Tests will be performed using design conditions whenever possible.
- F. The CA may direct that set points be altered when simulating conditions is not practical.
- G. The CA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.
- H. If tests cannot be completed because of a deficiency outside the scope of the HVAC&R system, document the deficiency and report it to the District and CA. After deficiencies are resolved, reschedule tests.
- I. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

### 3.04 HVAC&R SYSTEMS, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

- A. HVAC&R Instrumentation and Control System Testing: Field testing plans and testing requirements are specified in Division 15 Sections "Instrumentation and Control for HVAC".

END OF SECTION



1.00 GENERAL1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
  - 1. Balancing Air Systems:
  - 2. Constant volume air systems.

1.03 DEFINITIONS

- A. AABC: Associated Air Balance Council.
- B. NEBB: National Environmental Balancing Bureau.
- C. TAB: Testing, adjusting, and balancing.
- D. TABB: Testing, Adjusting, and Balancing Bureau.
- E. TAB Specialist: An entity engaged to perform TAB Work.

1.04 SUBMITTALS

- A. Certified TAB reports.
- B. Sample report forms.
- C. Instrument calibration reports, to include the following:
  - 1. Instrument type and make.
  - 2. Serial number.
  - 3. Application.
  - 4. Dates of use.
  - 5. Dates of calibration.

1.05 QUALITY ASSURANCE

- A. TAB Contractor Qualifications: Engage a TAB entity certified by AABC, NEBB, or TABB.
  - 1. TAB Field Supervisor: Employee of the TAB contractor and certified by AABC, NEBB or TABB.
  - 2. TAB Technician: Employee of the TAB contractor and who is certified by AABC, NEBB or TABB as a TAB technician.
- B. TAB Conference: Meet with Engineer on approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Require the participation of the TAB field supervisor and technicians. Provide seven days' advance notice of scheduled meeting time and location.

1. Agenda Items:
  - a. The Contract Documents examination report.
  - b. The TAB plan.
  - c. Coordination and cooperation of trades and subcontractors.
  - d. Coordination of documentation and communication flow.
- C. Certify TAB field data reports and perform the following:
  1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
  2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.
- D. TAB Report Forms: Use standard TAB contractor's forms approved by Engineer.
- E. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."

#### 1.06 COORDINATION

- A. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.
- B. Verify all systems are in proper working order prior to beginning air balance.

#### 2.00 PRODUCTS (Not Applicable)

#### 3.00 EXECUTION

##### 3.01 EXAMINATION

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.
- B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- F. Examine test reports specified in individual system and equipment Sections.
- G. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

- H. Examine terminal units and verify that they are accessible and their controls are connected and functioning.
- I. Examine system pumps to ensure absence of entrained air in the suction piping.
- J. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

### 3.02 PREPARATION

- A. Prepare a TAB plan that includes strategies and step-by-step procedures.
- B. Complete system-readiness checks and prepare reports. Verify the following:
  - 1. Permanent electrical-power wiring is complete.
  - 2. Automatic temperature-control systems are operational.
  - 3. Equipment and duct access doors are securely closed.
  - 4. Balance, dampers are open.
  - 5. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
  - 6. Windows and doors can be closed so indicated conditions for system operations can be met.

### 3.03 GENERAL PROCEDURES FOR TESTING AND BALANCING

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance", ASHRAE 111, NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems", or SMACNA's "HVAC Systems – Testing, Adjusting, and Balancing" and in this Section.
  - 1. Comply with requirements in ASHRAE 62.1-2004, Section 7.2.2, "Air Balancing."
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
  - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
  - 2. After testing and balancing, install test ports and duct access doors that comply with requirements in Division 15 Section "Air Duct Accessories."
  - 3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Division 15 Section "HVAC Insulation."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

### 3.04 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

- B. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- D. Perform traverse at make-up air system to determine air quantity.
- E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- F. Verify that motor starters are equipped with properly sized thermal protection.
- G. Check dampers for proper position to achieve desired airflow path.
- H. Check for airflow blockages.
- I. Check condensate drains for proper connections and functioning.
- J. Check for proper sealing of air-handling-unit components.
- K. Verify that air duct system is sealed as specified in Division 15 Section "Metal Ducts."

### 3.05 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
  - 1. Measure total airflow.
    - a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.
  - 2. Measure fan static pressures as follows to determine actual static pressure:
    - a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
    - b. Measure static pressure directly at the fan outlet or through the flexible connection.
    - c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
  - 3. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
  - 4. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
  - 5. Obtain approval from Engineer for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in Division 15 Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.

- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.
  - 1. Measure airflow of submain and branch ducts.
    - a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
  - 2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
  - 3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.
- C. Measure air outlets and inlets without making adjustments.
  - 1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.
- D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.
  - 1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
  - 2. Adjust patterns of adjustable outlets for proper distribution without drafts.

### 3.06 TOLERANCES

- A. Set HVAC system's air flow rates and water flow rates within the following tolerances:
  - 1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
  - 2. Air Outlets and Inlets: Plus or minus 10 percent.

### 3.07 REPORTING

- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.
- B. Status Reports: Prepare weekly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

### 3.08 FINAL REPORT

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
  2. Include a list of instruments used for procedures, along with proof of calibration.
  3. Comply with submittal requirements in Section 013300.
- B. Final Report Contents: In addition to certified field-report data, include the following:
1. Pump curves.
  2. Fan curves.
  3. Manufacturers' test data.
  4. Field test reports prepared by system and equipment installers.
  5. Other information relative to equipment performance; do not include Shop Drawings and product data.
- C. General Report Data: In addition to form titles and entries, include the following data:
1. Title page.
  2. Name and address of the TAB contractor.
  3. Project name.
  4. Project location.
  5. Architect's name and address.
  6. Engineer's name and address.
  7. Contractor's name and address.
  8. Report date.
  9. Signature of TAB supervisor who certifies the report.
  10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
  11. Summary of contents including the following:
    - a. Indicated versus final performance.
    - b. Notable characteristics of systems.
    - c. Description of system operation sequence if it varies from the Contract Documents.
  12. Nomenclature sheets for each item of equipment.
  13. Data for terminal units, including manufacturer's name, type, size, and fittings.
  14. Notes to explain why certain final data in the body of reports vary from indicated values.
  15. Test conditions for fans and pump performance forms including the following:
    - a. Settings for outdoor-, return-, and exhaust-air dampers.
    - b. Conditions of filters.
    - c. Cooling coil, wet- and dry-bulb conditions.
    - d. Face and bypass damper settings at coils.
    - e. Fan drive settings including settings and percentage of maximum pitch diameter.
    - f. Inlet vane settings for variable-air-volume systems.
    - g. Settings for supply-air, static-pressure controller.
    - h. Other system operating conditions that affect performance.
- D. Fan Test Reports: For supply, return, and exhaust fans, include the following:
1. Fan Data:
    - a. System identification.
    - b. Location.



- c. Make and type.
  - d. Model number and size.
  - e. Manufacturer's serial number.
  - f. Arrangement and class.
  - g. Sheave make, size in inches, and bore.
  - h. Center-to-center dimensions of sheave, and amount of adjustments in inches.
2. Motor Data:
- a. Motor make, and frame type and size.
  - b. Horsepower and rpm.
  - c. Volts, phase, and hertz.
  - d. Full-load amperage and service factor.
  - e. Sheave make, size in inches, and bore.
  - f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
  - g. Number, make, and size of belts.
3. Test Data (Indicated and Actual Values):
- a. Total airflow rate in cfm.
  - b. Total system static pressure in inches wg.
  - c. Fan rpm.
  - d. Discharge static pressure in inches wg.
  - e. Suction static pressure in inches wg.
- E. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:
1. Report Data:
- a. System and air-handling-unit number.
  - b. Location and zone.
  - c. Traverse air temperature in deg F.
  - d. Duct static pressure in inches wg.
  - e. Duct size in inches.
  - f. Duct area in sq. ft..
  - g. Indicated air flow rate in cfm.
  - h. Indicated velocity in fpm.
  - i. Actual air flow rate in cfm.
  - j. Actual average velocity in fpm.
  - k. Barometric pressure in psig.
- F. Air-Terminal-Device Reports:
1. Unit Data:
- a. Fan Speed
  - b. Air Velocity at outlet.
  - c. Temperature at outlet during cooling and heating
  - d. Area served.
  - e. Make.
  - f. Type and model number.
- G. Instrument Calibration Reports:
1. Report Data:
- a. Instrument type and make.
  - b. Serial number.
  - c. Application.
  - d. Dates of use.
  - e. Dates of calibration.

### 3.09 INSPECTIONS

- A. Initial Inspection:
1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
  2. Check the following for each system:
    - a. Measure airflow of at least 10 percent of air outlets.
    - b. Measure water flow of at least 5 percent of terminals.
    - c. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
    - d. Verify that balancing devices are marked with final balance position.
    - e. Note deviations from the Contract Documents in the final report.
- B. Final Inspection:
1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Engineer.
  2. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of Engineer.
  3. Engineer shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
  4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
  5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.
- C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:
1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
- D. Prepare test and inspection reports.

END OF SECTION

## 1.00 - GENERAL

The general contract provisions of Section 1000 apply to this section and take precedent over this section in case of conflict.

### 1.01 GENERAL PROVISIONS

This division supplements the applicable requirements of other divisions.

### 1.02 DEFINITIONS

For the purposes of Division 16000, the following definitions apply:

1. Provide: Furnish and install.
2. Indicated: As shown on the drawings or specified herein.
3. Circuit Designation: Panel designation and circuit number, i.e., LA-13.
4. Approved equal: Approved by the engineer of record as equal in his sole determination.

### 1.03 SCOPE OF WORK

- A. The Specifications for Work of Division 16000 include, but are not limited to the following sections:

16000–General Provisions  
16030–Tests and Identification  
16050–Basic Electrical Materials and Methods  
16060–Minor Electrical Demolition for Remodeling  
16080–Technical Services Division Start-Up Service  
16111–Conduits  
16112–Plug-In Strips  
16114–Cable Trays  
16115–Wireways  
16118–Duct Bank  
16120–Conductors  
16122–Medium Voltage Cables  
16130–Electrical Boxes  
16133–Terminal Cabinets  
16140–Wiring Devices  
16142–Nameplates and Warning Signs  
16163–Distribution Panelboards  
16164–Branch Circuit Panelboards  
16170–Disconnects  
16190–Support Devices  
16270–Substations Transformers Dry-Type  
16322–480V-Volt Main Switchgear  
16340–Compact Compartmentalized Medium Voltage Metal-Enclosed Load  
Interrupter  
16420–Switchboards  
16450–Grounding  
16461–Dry Type Transformer  
16480–Motor Starting Equipment and Wiring

16510–Lighting Fixtures  
16620–Emergency Generator  
16621–Automatic Transfer Switch  
16710–Communications general Requirements  
16711–Communications Rooms and Spaces  
16715–Communications Backbone Cabling  
16716–Communications Horizontal Cabling  
16721–Fire Alarm System  
16727–Security Access System  
16745–Networking & Data Communications  
16750–Cabling and Distribution System  
16901–General Control Devices  
16920–Motor Control

- B. Work Included: All labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this division, complete, as shown on the drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
1. Examine all divisions for related work required to be included as work under this division.
  2. General provisions for electrical work.
  3. Site observation including existing conditions.
- C. Related Work Specified Elsewhere but included in the scope of work:
1. Motors and their installation.
  2. Control wiring and conduit for heating, ventilating and air conditioning.
- D. Work Not In Contract (N.I.C.):
1. Telephone instruments.
- E. Coordination
1. The following supplements are additional General Requirements pertaining to work of this Division. Provisions of Division 1 - General Requirements shall remain in effect.
    - a) Coordinate work of various sections of Division 16 and 17.
    - b) Coordinate work of this Division 16 with work of Divisions 2 through 15.

#### 1.04 REFERENCE STANDARDS

- A. American National Standards Institute (ANSI).
- B. Association of Edison Illuminating Companies (AEIC).
- C. Electrical Testing Laboratories (ETL).
- D. Illuminating Engineering Society (IES).
- E. Institute of Electrical and Electronic Engineers (IEEE).
- F. Insulated Cable Engineers Association (ICEA).
- G. National Electrical Manufacturers Association (NEMA).

- H. National Fire Protection Association (NFPA).
- I. Underwriters Laboratories, Inc. (UL).
- J. California State Fire Marshal (CSFM).
- K. California Energy Commission (CEC) Title 24.

#### 1.05 QUALITY ASSURANCE

- A. Regulations: All the electrical equipment and materials, including their installations, shall conform to the following applicable latest codes and standards:
  - 1. California Electric Code, Latest Adopted Edition (NEC), unless a more current version has been adopted.
  - 2. Local and State Fire Marshal.
  - 3. Occupational Safety and Health Act (OSHA).
  - 4. Requirements of the Serving Utility Company.
  - 5. Local Codes and Ordinances.
  - 6. Requirements of the Office of the California State Architect (OSA).
  - 7. California Administrative Code, Title 8, Chapter 4, Industrial Safety Orders.
  - 8. California Administrative Code, Title 24.
  - 9. County of Los Angeles Codes and Regulations.
- B. Variances: In instances where two or more codes are at variance, the most restrictive requirement shall apply. In instances where plans and specifications are at variance or conflict the most restrictive requirement shall apply. Contractor shall be responsible for all his associated work and materials and also the work and materials of related or affected trades.
- C. Contractor's Expense: Obtain and pay for all required bonds, insurance, licenses, and pay for all taxes, fees and utility charges required for the electrical work.
- D. Testing and Adjustment:
  - 1. Perform all necessary tests required to ascertain that the electrical system has been properly installed, that the power supply to each item of equipment is correct, and that the system is free of grounds, ground faults, and open circuits, that all motors are rotating in the proper directions, and such other tests and adjustments as may be required for the proper completion and operation of the electrical system. Contractor shall provide a copy of all test reports to prove these tests have been performed.
  - 2. If, during the course of testing, it is found that system imbalance is in excess of 20%, rearrange single-pole branch circuit in lighting and receptacle panels to bring system balance to within 20% on all phases. Record all such changes on the typewritten panelboard schedule and submit a summary of changes to the Engineer on the record drawings.

#### 1.06 SUBMITTALS

- A. Procedure: In accord with Section 01300 / 01340.

- B. Shop drawings: Detailed shop drawings for the following equipment:
1. Plug-in busways.
  2. Distribution panelboards.
  3. Branch circuit panelboards.
  4. Circuit breaker load center.
  5. Cable trays and accessories.
  6. Uninterruptable power supplies.
  7. Switchboards.
  8. Ground fault protection.
  9. Ground fault detection and alarm.
  10. Parking light poles.
  11. Emergency generators.
  12. Fire alarm system.
  13. Motor control centers.
  14. Contactors and cabinet.
  15. Low voltage cabling riser diagram
- C. Product data: Detailed manufacturer's data for:
1. Cable tray.
  2. Cabinets.
  3. Concrete pull boxes.
  4. Disconnects.
  5. Auto-transfer switches.
  6. Transformers.
  7. Lighting fixtures and associated equipment including control.
  8. Generators.
  9. Electric door strikes.
- D. Test results for the following:
1. Generator systems.
  2. Fire alarm system.
  3. Circuit breakers.
  4. Grounding systems.
  5. Cables.
- E. Include sufficient information to indicate complete compliance with Contract Documents. Include illustrations, catalog cuts, installation instructions, drawings, and certifications. On each sheet show manufacturer's name or trademark.
- F. Operating, maintenance, and instruction data for:
1. Auto-transfer switches.
  2. Power supplies.
  3. Switchboards.
  4. Ground fault protection.
  5. Emergency generators.
- G. Instruction materials:
1. Provide at the time of personnel instruction period three bound copies of instruction manuals for the systems as listed in Subparagraph 1.04.A.4.f.
  2. Include the following (minimum) information in each copy of instruction manual:
    - a. Manufacturers' names and addresses including phone numbers.

- b. Serial numbers of items furnished.
- c. Catalog cuts, exploded views and brochures, complete with technical and performance data for all equipment, marked to indicate actual items furnished and intended use.
- d. Recommended spare parts.

1.07 OWNER'S PERSONNEL INSTRUCTIONS

Prior to completion of the contract, and at the District's convenience, instruct verbally and demonstrate to the District's personnel, the operation of the systems as listed under operating, maintenance, and instructional data and/or emergency generator, automatic transfer switch and fire alarm annunciator panel.

1.08 CLEANING

- A. Clean exterior surfaces and interiors of equipment and remove all dirt, cement, plaster and other debris. Protect interior of equipment from dirt during construction and clean thoroughly before energizing.
- B. Clean out cracks, corners and surfaces on equipment to be painted. Remove grease and oil spots so that paint may be applied without further preparation.

1.09 PROJECT RECORD DOCUMENTS - Prepare the following and submit to the engineer before final acceptance:

- A. Mark Project Record Documents daily to indicate all changes made in the field.
  - 1. In addition to general requirements of Project Record Drawings, indicate on drawings, changes of equipment locations and ratings, trip sizes, and settings on circuit breakers, alterations in raceway runs and sizes, changes in wire sizes, circuit designations, installation details, one-line diagrams, control diagrams and schedules.
- B. Use green to indicate deletions and red to indicate additions.
  - 1. Use the same symbols and follow the same drafting procedures used on the Contract Drawings.
- C. Locate dimensionally off of contract drawings all underground conduit stubbed-out for future use, underground feeder conduits, and feeder pull box locations using building lines by indicating on the Project Record Drawings.
- D. At the completion of underground conduit installation provide underground conduit record documents to owner's representative.
- E. Two copies, in binder form, of all test results as required by these specifications – 16030.
- F. Two copies of local and/or state code enforcing authorities final inspection certificates.
- G. Two copies, in binder form, of electrical equipment cut sheets, manufacturer's installation instructions, warranty certificates, and product literature for all products utilized on project.

1.10 SERVICE INTERRUPTIONS AND UTILITY

- A. Coordinate with the District the interruption of services necessary to accomplish the work.
- B. Coordinate with the utility company all work associated with power and communications distribution systems and service entrance equipment.
- C. Electrical contractor shall supply temporary power for all trades.

1.11 MINIMUM SPECIFICATION REQUIREMENTS (ALL WORK OF DIVISION 16000)

As a minimum Specification requirement, all materials and methods shall comply with applicable governing codes.

1.12 PENETRATION SEALING

Seal penetration through exterior walls and fire rated walls, floors, ceilings, and roofs with 3M Firestopping materials of fire rating capacity rated per architectural plans and UBC or prevailing building code requirements.

1.13 PLACING EQUIPMENT IN SERVICE

Do not energize or place electrical equipment in service until all interested parties have been duly notified and are present or have waived their rights to be present. Where equipment to be placed in service involves service or connection from another contractor of the owner, notify the District in writing when the equipment will be ready for final testing/connection and schedule to the owner's satisfaction of this service connection. Notify the owner two weeks in advance of the date the various items of equipment will be complete.

1.14 DISTRICT-FURNISHED ITEMS

Pick up District'-furnished items and handle, deliver, install, and make all final connections.

- 1. Assume responsibility for the items when consigned at the storage facility or in the field in accord with requirements of the Contract Documents.

1.15 ELECTRIC ITEM LOCATION

Electrical drawings are generally diagrammatic. Verify equipment sizes with shop drawings and manufacturers' data and coordinate location layout with other trades. Notify District and engineer of any changes of location requirements prior to installation and obtain engineer's written acceptance for all changes/revisions.

1.16 DEMOLITION

- A. Scope: Provide and perform demolition, preparatory and miscellaneous work as indicated and specified, complete.
- B. Principle Items of Work:
  - 1. Demolition and removal of existing electrical conduit, wiring and equipment required to complete the project.
  - 2. Preparation of the existing building to receive or connect the new work.



3. Miscellaneous demolition, cutting, alteration, and repair work in and around the existing building necessary for the completion of the entire project.
  4. Disconnecting and reconnection of electrical equipment as required by the construction modifications.
- C. Existing Conditions: Make a detailed survey of the existing conditions pertaining to the work. Check the locations of all existing structures, equipment and wiring (branch circuiting and controls). Provide at bid time any exclusions for existing conditions work.
- D. Salvage and Disposal: All removed material other than items to be reused shall be returned to the owner or disposed of in accordance with instructions from the owner's representative. Disposal shall be done in accordance with EPA and governing body requirements and regulations. Contractor shall pay all fees and charges for disposal.

#### 1.17 ELECTRICAL WORKMANSHIP REQUIREMENTS

- A. It is required that all electrical construction of this Contract be performed by journeyman electricians. All journeyman electricians shall have a minimum of 4 years of apprenticeship training and hold a valid Certificate of Completion from an apprenticeship training course approved by the State of California Department of Industrial Relations, Division of Apprenticeship Standards. This is intended to mean that a person who does not hold a valid Certificate of Completion from an apprenticeship training course approved by the State of California Department of Industrial Relations, Division of Apprenticeship Standards will not be permitted to do electrical work of any kind that involves new construction, nor make repairs, alterations, additions, or changes of any kind to any existing system of electrical wiring, apparatus, equipment, light, heat, or power.
- B. Contractor may employ electrical helpers or apprentices on any job of electrical construction, new or existing, when the work of such helpers or apprentices is performed under direct and constant personal supervision of a journeyman electrician holding a valid Certificate of Completion from an apprenticeship training course approved by the State of California Department of Industrial Relations, Division of Apprenticeship Standards.
1. Each journeyman electrician will be permitted to be responsible for quality of workmanship for a maximum of eight helpers or apprentices during any same time period, provided the nature of work is such that good supervision can be maintained and quality of workmanship achieved is the best, as expected by District and as implied by the latest edition of the California Electrical Code (National Electrical Code with State of California amendments).
  2. Before each journeyman electrician commences work, deliver to Owner at project site a photocopy of journeyman's valid Certificate of Completion from an apprenticeship training course approved by the State of California Department of Industrial Relations, Division of Apprenticeship Standards.
- C. All electrical systems shall be installed in a neat and workmanlike manner per National Electrical Code requirements and ANSI approved NEIS National Electrical Installation Standards.

#### 1.18 DESIGN CHANGES AFTER AWARD OF BID

When a change in the quantity or size of conductors is made, the conduit size will remain in accordance with that indicated in the original contract drawings rather than the drawing symbol conduit table. When code permits, provide conductor insulation 'THWN' where required to maintain conduit fill conformance with the National Electrical Code.

#### 1.20 MATERIAL AND EQUIPMENT SUBSTITUTION

- A. Where two or more trade names or manufacturers are mentioned, selection shall be made from the group listed for use in the base bid. The order in which names are listed is not intended to be any indication of preference.
- B. Where a single manufacturer, product or trade name is stated, that manufacturer, product or trade name shall be used in the base bid. The use of other manufacturers, products or trade names will be considered by the engineer of record (unless that product is indicated for no substitution) only if submitted as alternate items at the time of bidding, with evidence of equality and a statement of net price difference as compared to the specified item. After approval by the engineer of record, the architect and owner reserve the right to review such submittals and to determine the acceptability for use.
- C. Equipment other than that specified will be accepted only when written approval is given by the engineer of record and architect, in accordance with Division 1.
- D. The contractor shall be held responsible for all physical changes in piping, equipment, etc. resulting from equipment substitution and likewise bear any increased cost of other trades in making said substitution. Approval by the architect of equipment other than that specified does not relieve this contractor of this responsibility.

#### 1.21 REQUESTS FOR INFORMATION

The contractor shall submit all requests for information (RFI's) typewritten on the attached form.

END OF SECTION

**REQUEST FOR INFORMATION**

RFI # \_\_\_\_\_

To: \_\_\_\_\_ Company: \_\_\_\_\_

Copy to: \_\_\_\_\_ Date Sent \_\_\_\_\_

Project Name: \_\_\_\_\_ Project # \_\_\_\_\_

Sheet Number: \_\_\_\_\_ Bulletin \_\_\_\_\_ Delta Number: \_\_\_\_\_ Date: \_\_\_\_\_

Spec. Section \_\_\_\_\_ Sheet Details: \_\_\_\_\_

**REQUEST FOR INFORMATION:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**CONTRACTOR'S RECOMMENDATION:**

\_\_\_\_\_  
\_\_\_\_\_

Requested by: \_\_\_\_\_ Company: \_\_\_\_\_

The above information is requested on or before: \_\_\_\_\_

Cost Impact:  Yes  No  Possible Time Impact:  Yes  No  Possible

Response:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Response by:

Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_



1.00 GENERAL1.01 SECTION INCLUDES

Tests and identification.

1.02 SUBMITTALS

- A. In accord with Section 16000.
- B. All test values.

1.03 DEFINITION

Circuit designation: This term is construed to mean panel designation and circuit number; i.e., LA-13.

1.04 TESTS AND ADJUSTMENTS

- A. Prior to energizing, test all systems. Test to ensure systems are:
  - 1. Free from short circuits and grounds.
  - 2. Free from mechanical and electrical defects.
- B. Circuit breakers (main and feeder circuits that are adjustable only): Testing and adjustments of circuit breakers shall be made by District -approved independent testing firm. Testing firm shall meet the criteria for full membership of the International Electrical Testing Association (NETA).
  - 1. Visual and mechanical inspection:
    - a. Compare nameplate data with Drawings and Specifications.
    - b. Inspect circuit breaker for correct mounting.
    - c. Operate circuit breakers to ensure smooth operation.
    - d. Inspect case for cracks or other defects.
    - e. Verify tightness of accessible bolted connections and/or cable connections by calibrated torque-wrench method in accord with manufacturer's published data.
    - f. Inspect mechanism contacts and arc chutes in unsealed units.
  - 2. Electrical tests:
    - a. Perform a contact-resistance test.
    - b. Perform an insulation-resistance test at 1000 volts dc from pole-to-pole and from each pole-to-ground with breaker closed and across open contacts of each phase.
    - c. Perform adjustments for final settings in accord with coordination study supplied by District.
    - d. Perform long-time delay time-current characteristic tests by passing 300% rated current through each pole separately with ground fault functions defeated.
    - e. Determine short-time pickup and delay by primary current injection.
    - f. Determine ground-fault pickup and time delay by primary current injection. This test shall be done after short time and instantaneous testing are complete.
    - g. Determine instantaneous pickup current by primary injection using

- run-up or pulse method.
    - h. Verify correct operation of any auxiliary features such as trip and pickup indicators, zone interlocking, electrical close and trip operation, trip-free, and anti-pump function.
  - 3. Test values:
    - a. Record all test values "as-found" and "as-left" conditions and provide certified copies to District.
    - b. Compare microhm or millivolt drop values to adjacent poles and similar breakers. Investigate deviations of more than 25%. Investigate any value exceeding manufacturer's recommendations.
    - c. Insulation resistance shall not be less than 100 megohms.
    - d. Trip characteristic of breakers shall fall within manufacturer's published time-current characteristic tolerance band, including adjustment factors. Circuit breakers not within tolerance band shall be tagged defective.
- C. Adjust all installation and equipment for their intended use and rating as defined in manufacturer's specifications and test procedures.
  - 1. Contractor recognizes and understands that the show and character lighting, electronic control equipment, special effects, etc., must have a minimum 4-week adjustment period, occurring after installation and verification of said equipment, for each area or facility. Contractor shall provide appropriate personnel (i.e., electricians, carpenters, laborers) as necessary to support Owner during this adjustment period. Adjustment is defined as orientation of adjustable lighting fixtures, installation of color filters to any lighting fixtures requiring same, location adjustment 6 ft., control system setting including programming of control functions, system debugging (i.e., cross-wiring). Contractor shall assume day and night activities during the adjustment period.
- D. Adjust transformer taps under full load operating conditions, to provide nominal operating voltages at the loads.
- E. Hi-Pot test procedures:
  - 1. Test 25 pair, 10 pair, or 4 pair, multi-conductor cables installed in conduit, in the following manner and in presence of Owner:
    - a. Special District -furnished equipment: Hi-Pot Cable Tester & Adapters Model 500.
    - b. Perform visual inspection to verify:
      - (1) Proper cable identification tags are installed.
      - (2) Connector is installed properly and screws and clamps properly tightened.
      - (3) Elco connector is keyed correctly.
    - c. Continuity and Hi-Pot:
      - (1) Using the Hi-Pot cable tester and all necessary adapters:
        - (a) Set tester on 1500 VDC, S.C. (short continuity), 50 pos.
        - (b) Hook up cable to "Y" adapter if testing a cable in a conduit or tray.
        - (c) Attach turnaround Elco test plug to opposite end of cable to be tested.
        - (d) Attach ground lead of tester to center metal hold-

down screw of Elco connector.

- (e) Push reset button until tester dial points to zero. Release reset button.
  - (f) Press start button. Tester will step through all pairs and stop at bottom half of dial. This is because when using the turn-around plug, tester is checking 2-pair runs.
- d. Error indication:
- (1) No-error dial will make 1/2 revolution and stop. Press reset button. Tester will step to top position.
  - (2) Fault lights "short" or "open" dial will stop at a pin location indicated on face plate of dial. See chart on side of unit to give correct pin assignments. Press start buttons. Tester will step on through. If another "short" or "open" is found, tester will halt again.
- e. Fault correction:
- (1) When a fault is indicated, remove both connector shells of cable under test and check indicated pins.
  - (2) Repair fault using procedure steps as specified in Section 16121, paragraph "Repairing damaged pin-wire assembly."
- f. Marking of accepted cable:
- (1) Record acceptance of all cables on inspection copy of cable schedule provided by District's representative, and submit in accord with Section 16010.
  - (2) Place inspection stamp of District or dot sticker with initials on either white cable tag indicating cable assembly, or on connector shell.

F. Ground systems:

- 1. Visual and mechanical inspection: Verify ground system is in compliance with Drawings and Specifications.
- 2. Electrical tests:
  - a. Perform fall-of-potential test or alternative in accord with IEEE 81 on the main ground electrode or system.
  - b. Perform point-to-point tests to determine resistance between main ground system and all major electrical equipment frames, system neutral, and/or derived neutral points.
- 3. Test values:
  - a. Resistance between main ground electrode and ground shall be no greater than 10 ohms. Additional rods shall be installed and bonded to grounding system and driven to a depth of 50 ft. or refusal, whichever comes first.
  - b. Investigate point-to-point resistance values which exceed 0.5 ohm.
  - c. Record all test values and provide certified copies to District.

G. Cables:

- 1. Make insulation resistance tests on all power cables, using a self-contained instrument such as the direct-indicating ohmmeter of the generator type, or "megger" such as manufactured by J.G. Biddle Company, or Owner-approved equivalent. Insulation resistance values shall be at least 75% of shop test records.
  - a. Apply the following test voltages for 1 minute, except where

specified otherwise herein, in accord with procedure recommended by manufacturer of test equipment and as specified herein.

Rated Circuit Voltage	Megger Voltage (DC)	Minimum Megger Reading
600 volts	500 volts	600 kilohms
1000 volts	500 volts	1 megohm
15,000 volts	1000 volts	15 megohms

2. Record all test values and provide certified copies to District.
3. Replace cables not meeting specified resistance values.

H. Medium-voltage, 15 Kv cables:

1. Visual and mechanical inspection before testing cables:
  - a. Compare cable data with drawings and specifications.
  - b. Inspect exposed sections of cables for physical damage.
  - c. Inspect that shield grounding, cable support, and terminations are disconnected from any apparatus. Cables shall be positioned to minimize surface leakage current and corona.
  - d. Verify that visible cable bends meet manufacturer's minimum allowable bending radius.
  - e. Inspect for adequate fireproofing in common cable areas.
  - f. Visually inspect splice jacket and insulation condition.
2. Electrical tests:
  - a. Perform a shield-continuity test on each power cable by ohmmeter method.
  - b. Perform an insulation-resistance test utilizing a megohmmeter with a voltage output of at least 2500 volts. Individually test each conductor with all other conductors and shields grounded. Test duration shall be 1 minute.
  - c. Perform a DC high-potential test on all cables. Adhere to all precautions and limits as specified in applicable NEMA/ICEA Standard for the specific cable. Perform tests in accord with ANSI/IEEE 400. Test procedure shall be as follows, and the results for each cable test shall be recorded as specified herein. Test voltage shall be 50 Kv but shall not exceed 80% of cable manufacturer's factory test value or the maximum test voltage of 55 Kv.
    - (1) Ensure that input voltage to the test set is regulated.
    - (2) Current-sensing circuits in test equipment shall measure only the leakage current associated with the cable under test and shall not include internal leakage of test equipment.
    - (3) Record wet- and dry-bulb temperatures or relative humidity and temperature.
    - (4) Test each section of cable individually.
    - (5) Individually test each conductor with all other conductors grounded. Ground all shields.
    - (6) Terminations shall be adequately corona-suppressed by guard ring, field reduction sphere, or other suitable methods as necessary.
    - (7) Ensure that maximum test voltage does not exceed limits



for terminators specified in IEEE 48 or manufacturer's specifications.

- (8) Apply a DC high-potential test in at least five equal increments until maximum test voltage is reached. No increment shall exceed voltage rating of cable. Record DC leakage current at each step after a constant stabilization time consistent with system charging current.
- (9) Raise conductor to specified maximum test voltage and hold for 15 minutes on shielded cable. Record readings of leakage current at 30 seconds and 1 minute, and at 1 minute intervals thereafter.
- (10) Gradually reduce conductor test potential to zero and measure residual voltage at discrete intervals.
- (11) Apply ground for a time period of at least 30 minutes and adequate to drain all insulation stored charge.

3. Test values:

- a. Shielding shall exhibit continuity. Investigate resistance values in excess of 10 ohms per 1000 ft. of cable.
- b. Investigate any failed high-potential test.
- c. Record all test values and report of repairs made and provide certified copies to District.

I. Miscellaneous tests:

1. Wiring: check all control circuits for continuity and conformance with wiring diagrams furnished by District and manufacturers.
2. Polarity tests: Make continuity and polarity tests on all current and potential transformers to determine whether polarity is as indicated on drawings, and the circuit is continuous.
3. Phasing tests: Identify phases of all switchgear and power cables by stenciling switchgear and tagging cables with approved tags, so that phases can be identified for connecting to proper phase sequence.

## 1.05 LABELING AND IDENTIFICATION

- A. Provide engraved plastic nameplates on all electrical distribution equipment shown on single-line diagram, and on control panels, dimmer panels, terminal cabinets, and separately mounted circuit breakers, disconnects, and starters.
- B. Provide equipment and circuit designation on nameplates with minimum letter and plate sizes as indicated.
- C. Provide engraved plastic nameplates with 1/4 in. minimum height letters indicating:
  1. Circuit designation at branch overcurrent devices in distribution panelboards, switchboards, and motor control centers.
  2. Circuit designation of panel, equipment-controlled or device-controlled on disconnect switches and on circuit breakers, starters, and controls which are individually enclosed.
  3. Voltage rating and circuit designation of all outlets larger than 120V, 20A rating and more than 2 poles.
  4. Designation of control and terminal cabinets including CUTC, as indicated.
  5. Designation of each contactor and relay in control cabinets.

6. Designate area controlled for each dimmer in dimmer cabinet or rack.
  7. Circuit designation at all ground fault detectors and ground fault test receptacles.
  8. Equipment designation on front of switchboards, distribution panelboards, branch circuit panelboards, and load centers.
- D. Secure nameplates with at least two rivets. Cementing and adhesive installation is not acceptable.
- E. Provide two copies of a typewritten directory for each branch circuit panelboard, showing each circuit and its use. Attach one copy to panelboard door and deliver the other copy to District.
- F. Provide caution label on branch circuit panelboards with integral control compartments. Caution label shall be red with white letters reading "CAUTION, EXTERNAL CONTROL VOLTAGE CIRCUIT WITHIN THIS PANEL."
- G. Conductor identification:
1. Feeders: Identify with the corresponding circuit designation at over-current device and load ends, at all splices, and in pull boxes.
  2. Branch circuits: Identify with corresponding circuit designation at overcurrent device and at all splices.
  3. Control wires: Identify with indicated number and or letter designation at all terminal points and connections, including manufacturer pre-wired control sections and cabinets.
  4. Alarm and detection wires: Identify with indicated wire and mnemonics numbers at all connections, terminal points, and coiled conductors within cabinets for future termination by District.
  5. For identification of conductors, use heat shrinkable white marking sleeves such as Brady Permasleeve with type written identification.

END OF SECTION

1.00 - GENERAL

1.01 **DESCRIPTION:** Division 1 applies to this Section. This Section contains general requirements for the Sections in Division 16.

Related Work Not in Division 16: Refer to individual Division 16 Sections.

1.02 QUALITY ASSURANCE:

- A. **Codes:** Entire installation shall comply with requirements of authorities having jurisdiction.
- B. **Permits:** Contractor shall pay for all permits required by work under this Division.
- C. **Inspections:** Contractor shall arrange for all inspections and correct non-complying installations.

1.03 SUBMITTALS: Refer to Division 1 for procedures.

- A. **Material and Equipment:** Prior to start of work, 6 copies of a list of all materials and equipment covered by Division 16 shall be submitted for approval. Contractor shall allow ample time for checking and processing and shall assume responsibility for delays incurred due to rejected items. No installation of material concerned shall be made until such written approval has been obtained. Approval of materials and equipment shall in no way obviate compliance with the Contract Documents. Each item proposed shall be referenced to the applicable Section, Page, and Paragraph of Division 16. For each item proposed, give name of manufacturer, trade name, catalog data, and performance data.
- B. **Equipment Layout Drawings:** Submit "Equipment Layout Drawings" for each equipment room or area containing equipment items furnished under this Division. Layout Drawings shall consist of plan view of room, to scale, showing projected outlines of all equipment, complete with dotted line indication of all required clearances including all those needed for removal or service. Location of all conduit and pull boxes shall be indicated.
- C. **Service Manuals:** Refer to Section 01700. Indexed Service Manuals shall be submitted which shall include test reports, service instructions, and renewal parts lists of all equipment.
  - 1. **Submission and Information:** Service Manuals shall be submitted for approval at least 30 days before final inspection. The following information together with any pertinent data, shall be included in Service Manual:
    - a. Renewal part numbers of all replaceable items.
    - b. Manufacturer's cuts and rating data.
    - c. Serial numbers of all principal pieces of equipment.
    - d. Supplier's name, address, and phone number.
    - e. Final settings for all breakers, relays, and control devices (See Section 16321 or 16322 as applicable).
  - 2. **Copies:** Four (4) copies of approved Service Manual shall be delivered on or before date required.

- D. Record Drawings: Prepare and submit in accordance with requirements of Section 01700. Contractor shall make notations, neat and legible, daily as the work proceeds. Drawings shall be available for inspection at all times and kept at the job site. All buried conduit and/or indicated future connections outside any building shall be located both by depth and by accurate measurement from a permanently established landmark such as a building or structure.
- E. Seismic Calculation: Refer to Article 3.01 herein.
- F. Spare Parts: Conform to Section 01700. Deliver following spare parts to Owner and obtain receipts. Submit at same time as Operating Instructions:
  - 1. Spare fuses; 1 set for each combination fuse breaker.
  - 2. Spare pilot light lamps of each type used on project, in quantity of 10%, but not less than 2%.
  - 3. Overload heater elements; 2 sets for each size used on project.
- G. Special Tools: If any part of the equipment furnished under Division 16 requires a special tool for assembly, adjustment, resetting, or maintenance thereof and such tool is not readily available on the commercial tool market, it shall be furnished with the equipment as a standard accessory and delivered to the District as specified in Section 01700.
- H. Maintenance Paint: One (1) can of touch-up paint shall be delivered to District for each different color factory finish which is to be the final finished surfaces of the product.

#### 1.04 DRAWINGS:

- A. Diagrammatic Drawings: For purposes of clarity and legibility, drawings are essentially diagrammatic although size and location of equipment is drawn to scale wherever possible, Contractor shall make use of data in all the Contract Documents and verify information at building site.
- B. Routing of Conduit and Piping: The drawings indicate required size and termination of conduits and raceways. It is not intent to indicate all necessary offsets and it shall be the responsibility under this Division to install conduit in such a manner as to conform to structure, avoid obstructions, preserve headroom, keep openings and passageways clear, and make all equipment requiring inspection, maintenance and repair accessible without extra cost to the District.
- C. Coordination with Other Trades: Check with other Divisions of the Specifications so that no interference shall occur and in order that elevations may be established for the work. Installed work which interferes with the work of other trades shall be removed and rerouted at the discretion of the Architect.

#### 1.05 DAMAGE AND REPAIRS:

- A. Emergency Repairs: District reserves the right to make temporary repairs as necessary to keep equipment in operating condition without voiding Contractor's warranty or relieving Contractor of his responsibility during warranty period.
- B. Responsibility for Damage: Contractor shall be responsible for damage to

grounds, buildings, or equipment due to work furnished or installed under this Division 16.

#### 1.06 PROTECTION, CARE, AND CLEANING:

- A. Protection: Provide adequate protection for finished parts of materials and equipment against physical damage from any cause during progress of work and until final completion. Sensitive electrical equipment shall not be installed until major construction is completed.
- B. Care: During entire construction, properly cap all lines and equipment to prevent entrance of sand and dirt. Protect equipment against moisture, plaster, cement, paint or work of other trades by covering with polyethylene sheets.
- C. Cleaning: After installation is completed, clean all systems as follows in addition to requirements specified in Section 01700:
  - 1. Field Painted Items: Clean exterior of conduits, raceways, piping and equipment exposed in completed structure; removing all rust, plaster, cement and dirt by wire brushing. Remove grease oil and similar materials by wiping with clean rags and suitable solvents.
  - 2. Factory Finished Items: Remove grease and oil on all factory finished items such as cabinets and controllers, and leave surfaces clean and polished.
- D. Connection: Prior to energizing, check all electrical connection hardware and torque where necessary.

#### 2.00 - PRODUCTS

- 2.01 PRODUCTS: Products and materials shall be as specified in the pertinent Sections of Division 16.
- 2.02 MATERIALS AND EQUIPMENT: Wherever possible, all materials and equipment used in installation of this work shall be of same manufacturer throughout for each class of material or equipment. Materials shall be new and bear UL label, wherever subject to such approval. Comply with ANSI, IEEE and NEMA standards, where applicable.

#### 3.00 - EXECUTION

- 3.01 SEISMIC REQUIREMENTS: Electrical equipment for emergency systems shall be braced to withstand the lateral forces that result from earthquakes. Under Work of Division 16, submit seismic calculations stamped and signed by a registered California structural engineer confirming size, number, and location of required anchoring hardware. Electrical equipment vendors shall furnish weights together with dimensions and the center of gravity location for all emergency electrical equipment for this purpose.
- 3.02 GENERAL LATERAL BRACING REQUIREMENTS: As shown on Drawings. Additional bracing requirements shall conform to specific requirements shown on Drawings or in other Sections of Division 16. Anchorages for equipment subject to thermal expansion and movement shall conform to manufacturer's recommendation and intent of general bracing requirements. When general and specific bracing requirements enumerated above are in conflict with referenced standards, the most stringent requirements shall govern.

- 3.03 EXCAVATION AND BACKFILL: Perform all excavation and back fill required to install Work of Division 16, both inside and outside. Perform all excavation and backfilling in accordance with Division 2.
- A. Excavation: Bury conduits outside building to a depth of not less than 24" (or as required by Code) below finish grade, unless noted otherwise.
  - B. Backfilling: Do not backfill until after final inspection and approval of conduit installation by all legally constituted authorities and recording of the buried items on the Record Drawings.
- 3.04 CUTTING AND PATCHING:
- A. Cutting of Existing Structural Work: Holes in existing slabs and concrete walls shall be cored to the minimum size required. The Contractor shall submit Drawings showing dimensioned sizes and locations for all such holes to Architect for approval before cutting. Where required for conduit installation, slabs on grade shall be saw-cut to minimum required width; submit cutting Drawings to the Architect for approval before cutting.
  - B. Patching: Holes or chases shall be patched to match adjacent surfaces.
- 3.05 CONCRETE WORK: Concrete construction required for the Work of Division 16 shall be provided under the Work of Division 16.
- 3.06 PAINTING: Finish painting of electrical equipment will be as specified in Division 9, unless equipment is herein specified to be furnished with factory applied finish coats. Equipment to be field painted shall be furnished with a factory applied prime coat.
- A. Touch-Up: If factory finish on any equipment furnished under Division 16 is damaged in shipment or during construction of building, the equipment shall be refinished by Contractor to satisfaction of Architect.
  - B. Concealed Equipment: Uncoated cast-iron or steel that will be concealed, or will not be accessible when installations are completed, shall be given one heavy coat of black asphaltum before installation.
- 3.07 OPERATING INSTRUCTIONS: Contractor to provide services of an experienced Engineer to instruct Owner in operation of entire installation. Instructional period shall be during normal work day hours. This instruction period may be simultaneous with compliance tests.
- 3.08 COMPLIANCE TESTS: Conduct such tests of all portions of installation as may be necessary to ensure full compliance with the Drawings and Specifications. Tests shall be made in the presence of the District. Costs of test shall be borne by Contractor and Contractor shall provide all instruments, equipment, labor and materials to complete all the tests. Tests may be required on any item between installation of Work and the end of 1 year warranty period. Should these tests develop any defective materials, poor workmanship or variance with requirements of Specifications, Contractor shall make any changes necessary and remedy any defects at his expense.
- A. All Feeders: Measure and record as follows:
    - 1. 600 volt conductors shall be tested with 500 volt megger to ground on each

phase. megger to be on test for one minute before any readings are taken. The minimum values on all feeders shall be 100,000 OHMS.

2. Copies of the certified test readings shall be transmitted to District

3.09 SYSTEM ACCEPTANCE:

- A. Final Review: The Contractor shall request a final review prior to system acceptance after:
  1. Completion of installation of all systems required under the Contract Documents.
  2. Submission and acceptance of operating and maintenance data.
  3. Completion of identification program.
- B. Acceptance: Is contingent on:
  1. Completion of final review and correction of all deficiencies.
  2. Satisfactory completion of acceptance tests demonstrating compliance with all performance and technical requirements of Contract Documents.
  3. Satisfactory completion of training program and submission of manuals and Drawings required by Contract Documents.

3.10 PRELIMINARY OPERATION: The District reserves the right to operate portions of the electrical system on a preliminary basis without voiding the warranty or relieving the Contractor of his responsibilities.

3.11 CLEAN-UP: Conform to Section 01700. Upon completion and at other times during progress or Work, when required, remove all surplus materials, rubbish, and debris resulting from Work of Division 16.

END OF SECTION





1.00 GENERAL1.01 SECTION INCLUDES

Electrical demolition.

2.00 PRODUCTS2.01 MATERIALS AND EQUIPMENT

Materials and equipment for patching and extending work: As specified in individual Sections.

3.00 EXECUTION3.01 EXAMINATION

- A. Verify field measurements and circuiting arrangements are as shown on drawings.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition drawings are based on casual field observation and existing record documents. Report discrepancies to District and Architect/Engineer before disturbing existing installation.
- D. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION

- A. Disconnect and make safe all electrical systems in walls, floors, and ceilings scheduled for removal.
- B. Coordinate utility service outages with Utility Company and District's representative.
- C. Provide temporary wiring and connections to maintain required existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
- D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Obtain permission from District at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area when outage affects business operation.
- E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Notify Owner and local fire service at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

- F. Existing Telephone System: Maintain existing system in service until new system is complete and ready for service and new system is accepted. Disable system only to make switchovers and connections. Notify District and Telephone Utility Company at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.
- G. Existing Security System: Maintain existing system in service until new system is complete and ready for service and new system is accepted. Disable system only to make switchovers and connections. Obtain permission from the District and security company at least 72 hours before partially or completely disabling system. Minimize outage duration. Make temporary connections to maintain service in areas adjacent to work area.

### 3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK

- A. Demolish and extend existing electrical work under provisions of this Section.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Remove abandoned wiring to source of supply and re-label devices as spares.
- D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets which are not removed.
- F. Disconnect and remove abandoned panelboards and distribution equipment.
- G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- H. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
- I. Disconnect and remove abandoned conduit.
- J. Repair adjacent construction and finishes damaged during demolition and extension work.
- K. Maintain access to existing electrical installations which remain active. Modify installation or provide access panel as appropriate.
- L. Extend existing installations using materials and methods compatible with existing electrical installations, and in compliance with new project specifications.
- M. Modify existing as-built drawings to note changes.

### 3.04 CLEANING AND REPAIR

- A. Clean and repair existing materials and equipment which remain or are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.
- C. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts, and broken electrical parts.

3.05 INSTALLATION

- A. Install relocated materials and as required by this section and District's representative.

END OF SECTION



## 1.00 GENERAL

### 1.01 OVERVIEW

- A. As part of this project, start-up services will be performed on the electrical distribution and control equipment as specified. This specification is intended as a part of the electrical portion of this project.
- B. The start-up service company must follow job site electrical safety requirements, installation standards and electrical testing standards per NEMA<sup>®</sup>, ASTM<sup>®</sup>, IEEE<sup>®</sup>, ANSI<sup>®</sup> C2, OSHA<sup>®</sup>, ANSI/NFPA<sup>®</sup> 70, ANSI/NFPA 70B, NFPA 70E, ANSI/NFPA 78, and ANSI/NFPA 101 guidelines.
- C. Documentation of all procedures performed shall be provided. Four bond copies shall be provided and forwarded to the engineer. Written documentation must contain recorded test values of all electrical tests performed per the individual product specification.
- D. Individual product start-up procedures must be submitted and on file with start-up service company office 10 days prior to the specified bid date.
- E. Start up of panelboards, lighting transformers, safety switches, enclosed circuit breakers, and lighting contactors will not be part of this specification.
- F. Start-up service scheduling must be available through a 24-hour, toll-free national dispatch system.
- G. The start-up service company shall be present during energization of the primary distribution equipment. Job site and equipment access must be provided by the electrical contractor. De-energization of equipment, when required for testing, must be available within 15 minutes of the start-up service company arrival at the job site.
- H. The contractor shall supply a power source, specified by the start-up service company, for on-site test equipment.
- I. Start-up service shall be performed by authorized employee(s) of the equipment manufacturer.

## 2.00 – PRODUCT

### 2.01 INSPECTION AND TEST PROCEDURES

- A. Switchgear and Switchboard Assemblies
  - 1. Visual and Mechanical Inspection
    - a. Equipment nameplate data shall be documented.
    - b. Verify the presence of all the manufacturers intended documentation.
    - c. Inspect physical, electrical, and mechanical condition of switchboard/switchgear and all components.
    - d. Confirm correct application of lubricants at manufacturer's

- e. Verify that fuse and/or circuit breaker sizes and types correspond to drawings and coordination study.
  - f. Verify drawings for correct revision and date in accordance with customer and supplier records.
  - g. Verify that current and potential transformer ratios correspond to drawings.
  - h. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench.
  - i. Confirm correct operation and sequencing of electrical and mechanical interlock systems.
  - j. Verify correct barrier and shutter installation and operation.
  - k. Inspect all mechanical indicating devices for correct operation.
  - l. Verify that filters are in place and/or vents are clear.
  - m. Test operation, alignment, and penetration of instrument transformer withdrawal disconnects.
  - n. Electrical Test
  - o. Perform insulation-resistance tests on each bus section, phase-to-phase and phase-to-ground.
  - p. Perform secondary current injection tests on the entire current circuit in each section.
  - q. Perform control wiring performance test.
  - r. Determine accuracy of all {analog} meters.
  - s. Perform phasing check on double-ended switchgear to insure correct bus phasing from each source.
  - t. Verify correct function of control transfer relays located in the switchgear with multiple power sources.
  - u. Verify operation of switchgear/switchboard heaters.
4. Test Value
- a. Bolt torque levels are checked in accordance with U.S. Standards or manufacturer's specifications.
  - b. Insulation resistance testing is to be performed in accordance with the following guidelines:

Minimum Voltage Rating Test Voltage

250 V 500 Vdc  
 6000 V 1000 Vdc  
 5000 V 2500 Vdc  
 39000 V 5000 Vdc

- c. Overpotential testing will not proceed until insulation resistance testing is completed.
- d. Overpotential test voltages are applied in accordance with the following guidelines\*.

Test Voltage kV	Rated kVac	dc
5	14.3	20.2
15	27.0	37.5
25	45.0	+
35	60.0	+

Final test voltages will be applied for one (1) minute.

\* Derived from ANSI/IEEE C37.20.2 and C37.20.3.

+ Consult manufacturer

D. Circuit Breakers-Power

1. Visual and Mechanical Inspection
  - a. Document equipment nameplate data on test report.
  - b. Verify equipment nameplate ratings are in accordance with the customer's drawings and specifications.
  - c. Inspect physical and mechanical condition.
  - d. Confirm correct application of lubricants at manufacturer's recommended locations.
  - e. Inspect anchorage, alignment, and grounding.
  - f. Inspect arc chutes.
  - g. Verify that all maintenance devices are available for servicing and operating the circuit breaker.
  - h. Perform all mechanical operator and contact alignment tests on both the circuit breaker and its operating mechanism.
  - i. Verify tightness of accessible bolted bus connections by calibrated torque-wrench method.
  - j. Check cell fit and element alignment.
  - k. Check racking mechanism.
  - l. Verify that the circuit breaker is equipped with the correct rating plugs and current sensors.
  - m. Verify that the circuit breaker has the specified trip unit, LI, LIS, LISG, etc.
  - n. Verify that the circuit breaker has the specified accessories, auxiliary contacts, cell switches, shunt trip devices, undervoltage release, and etc.
  - o. Verify that the ground fault system has been wired in accordance with the specified wiring diagram and that the sensor grounds are either present or not present as specified.
  - p. Verify that the secondary control plug/connections are in accordance with the wiring diagram and specifications.
2. Electrical Tests
  - a. Perform a contact-resistance test in accordance with manufacturer's recommended procedure.
  - b. Perform an insulation-resistance test at 1000 Vdc from pole-to-pole and from each pole-to-ground with circuit breaker closed and across open contacts of each phase.
  - c. Make adjustments for the final settings in accordance with the coordination study supplied by owner.
  - d. Determine the following using secondary current injection:
    - Minimum pickup current by
    - Long-time delay
    - Short-time pickup and delay
    - Ground-fault pickup and delay
    - Instantaneous pickup value
  - e. Activate auxiliary protective devices such as undervoltage relays, to insure operation of shunt trip devices.
  - f. Check the operation of electrically operated circuit breakers in their cubicles.
  - g. Verify correct operation of any auxiliary features such as trip and pickup indicator, electrical close and trip operation, trip-free, and anti-pump function.

- h. Check electric charging mechanism, if applicable.
- E. Circuit Breakers-Low Voltage Molded Case/Insulated Case.
1. Visual and Mechanical Inspection
    - a. Document equipment nameplate data on test report.
    - b. Verify equipment nameplate ratings are in accordance with the customer's drawings and specifications.
    - c. Inspect circuit breaker for correct mounting.
    - d. Operate circuit breaker to insure smooth operation.
    - e. Inspect case for cracks or other defects.
    - f. Verify tightness of accessible bolted connections and/or cable connections by calibrated torque-wrench method.
    - g. Verify that trip units, shunt trip coils, auxiliary contacts and all other accessories are in accordance with the job specifications.
  2. Electrical Tests
    - a. Perform a contact-resistance test in accordance with manufacturer's recommended procedure.
    - b. Perform an insulation-resistance test at 1000 Vdc from pole-to-pole and from each pole-to-ground with circuit breaker closed and across open contacts of each phase.
    - c. Perform adjustments for final settings in accordance with coordination study supplied by owner, if available.
    - d. Verify correct operation of any auxiliary features such as trip and pickup indicators, electrical close and trip operation, trip-free, and anti-pump function.
    - e. Verify the calibration of all functions of the trip unit by means of secondary injection.
  4. Visual and Mechanical Inspection
    - a. Document equipment nameplate data on test report.
    - b. Verify equipment nameplate ratings are in accordance with the customer's drawings and specifications.
    - c. Inspect physical and mechanical condition.
    - d. Confirm correct application of lubricants at manufacturer's recommended locations.
    - e. Verify appropriate anchorage and required area clearances.
    - f. Verify appropriate equipment grounding.
    - g. Verify correct blade alignment, blade penetration, travel stops, and mechanical operation.
    - h. Verify and record fuse sizes and types are in accordance with drawings and short-circuit and coordination studies, if available.
    - i. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method.
    - j. Check all interlocking systems for correct operation and sequencing, and key distribution, if applicable.
    - k. Verify correct phase barrier materials and installation.
    - l. Inspect all indicating and control devices for correct operation.
  5. Electrical Tests
    - a. Perform insulation-resistance tests on each pole, phase-to-phase and phase-to-ground with switch closed and across each open pole for one minute.
    - b. Switches equipped with solenoid trip, blown main fuse detector,



etc, test each feature for proper operation To test blown fuse detector, activate it and confirm by attempting to close the circuit breaker without reset.

- c. Square D/Schneider Electric BP switches:
- d. Perform Blade Contact Resistance Test with the device de-energized, operate the device closed and open several times using either manual or electrical means. Apply a minimum current of 100 A dc through the closed contacts. Measure the contact resistance of each pole and compare with the following values:

<u>BP Switch Rating</u>	<u>Resistance (Maximum)</u>
800 A	13 Micro-Ohms
1200 A	13 Micro-Ohms
1600 A	11 Micro-Ohms
2000 A	8 Micro-Ohms
2500 A	7 Micro-Ohms
3000 A	6 Micro-Ohms
4000 A	7 Micro-Ohms

- I. Analog Metering
    - 1. Visual and Mechanical Inspection
      - a. Document equipment nameplate data on test report.
      - b. Verify equipment nameplate ratings are in accordance with the customer's drawings and specifications.
      - c. Inspect physical and mechanical condition.
      - d. Verify tightness of electrical connections.
      - e. Inspect cover gasket, cover glass, condition of spiral spring, disc clearance, contacts, and case-shorting contacts, as applicable.
      - f. Verify mechanically for freedom of movement, correct travel and alignment, and tightness of mounting hardware.
    - 2. Electrical Tests
      - a. Check calibration of meters at all cardinal points.
      - b. Electrically confirm that current transformer and voltage transformer secondary circuits are intact.
    - 3. Optional Tests
      - a. Calibrate watt-hour meters according to manufacturer's published data.
      - b. Verify all instrument multipliers.
  - 2. Electrical Tests
    - a. Measure insulation resistance of each busway, phase-to-phase and phase-to-ground for one minute.
  - 3. Optional Tests
    - a. Perform contact-resistance test on each connection point of non-insulated busway. On insulated busway, perform contact resistance of assembled busway sections and compare values with adjacent phases on insulated busway.
    - b. Perform a power frequency test (High Pot) on each busway, phase-to-ground
- K. Cables: Low-Voltage, 600 V Maximum
    - 1. Visual and Mechanical Inspection

- a. Verify cable sizing and insulation temperature rating in accordance with customer's drawings.
  - b. Inspect exposed sections of cables for physical damage and correct connection in accordance with single-line diagrams.
  - c. Verify tightness of accessible bolted connections by calibrated torque wrench.
  - d. Inspect compression-applied connectors for correct cable match and indentation.
  - e. Verify cable color-coding with applicable engineer's specifications.
2. Electrical Tests
- a. Test cables and leads for continuity to ensure correct cable connection and phasing rotation.
  - b. Perform an insulation resistance test on each conductor between one conductor and ground with the other conductors grounded.
  - c. Each 480 V feeder cable shall be tested with the cable connected to the racked-in but open circuit breaker at the equipment. Connection at the other end of each of these cables shall be as follows:
    - Cables to motor control centers shall be connected to the bus with the switches or circuit breakers in the starters open.
    - Cables to motors and other equipment shall be connected to the motors and equipment with feeder switches open.

M. Drives: AC

- 1. Visual and Mechanical Inspection
  - a. Document equipment nameplate data on test report.
  - b. Verify equipment nameplate ratings are in accordance with the customer's drawings and specifications.
  - c. Inspect controller for physical and mechanical condition.
  - d. Inspect for proper grounding.
  - e. Check customer cables, power wiring, and control wiring to insure correct installation.
  - f. Check for proper heaters used in ISO/bypass unit.
  - g. Check transformer taps for proper connection.
  - h. Check all terminal wiring.
  - i. Verify motor and drive sizing.
- 2. Electrical Test
  - a. Verify the proper selection and operation of the electrical test equipment and record the date of the last calibration date and the date due re-calibration.
  - b. Verify input voltages.
  - c. Verify all transformer output voltages.
  - d. Test all pilot devices, e.g., lights, speed pots, meters.
  - e. Check D.I.P. switches for proper setup.
  - f. Calibrate max speed.
  - g. Setup acceleration and deceleration potentiometers to application.
  - h. Setup hand minimum speed.
  - i. Calibrate all meters.
  - j. Align drive to customer's automatic control signal.
  - k. Verify proper connection of alarm, smoke detectors, and remote devices.

- l. Check for proper motor rotation.
- m. Setup all option cards.
- n. Operate drive at all allowable speed and load conditions.
- o. Confirm ISO/bypass unit operation.

N. Grounding Systems

- 1. Visual and Mechanical Inspection
  - a. Verify ground system is in compliance with drawings and specifications.
- 2. Electrical Tests
  - a. Verify the proper selection and operation of the electrical test equipment and record the date of the last calibration date and the date due re-calibration.
  - b. Perform fall-of-potential test or alternative in accordance with IEEE Standard 81-1991 on the main grounding electrode or system.
  - c. Perform point-to-point tests to determine the resistance between the main grounding system and all major electrical equipment frames, system neutral, and/or derived neutral points.

O. Ground-Fault Protection Systems

- 1. Visual and Mechanical Inspection
  - a. Document equipment nameplate data on test report.
  - b. Verify equipment nameplate ratings are in accordance with the customer's drawings and specifications.
  - c. Visually inspect the components for damage and errors in polarity or conductor routing.
  - d. Verify that ground connection is made ahead of neutral disconnect link and on the line side of any ground fault sensor.
  - e. Verify that neutral sensors are connected with correct polarity on both primary and secondary.
  - f. Verify that all phase conductors and the neutral pass through the sensor in the same direction for zero sequence systems.
  - g. Verify that grounding conductors do not pass through zero sequence sensors.
  - h. Verify that the grounded conductor usually neutral. is bonded to ground in accordance with the power system specifications.
  - i. Verify tightness of all electrical connections including control circuits.
  - j. Verify correct operation of all functions of the self-test panel.
  - k. Verify that the control power transformer has adequate capacity for the system.
  - l. Set pickup and time-delay settings in accordance with the settings provided in the District's specifications.
- 2. Electrical Tests
  - a. Perform the following pickup tests using primary injection.
    - Verify that the relay does not operate at 90% of the pickup setting.
    - Verify pickup is less than 125% of setting or 1200 A, whichever is smaller.
  - b. For summation type systems utilizing phase and neutral current transformers, verify correct polarities by applying current to each phase-neutral current transformer pair.

- c. Relay should operate when current direction is the same relative to polarity marks in the two current transformers.
  - d. Relay should not operate when current direction is opposite relative to polarity marks in the two current transformers.
  - e. Measure time delay of the relay at 150% or greater of pickup. Verify operability of I<sup>2</sup>t function, if being used, of ground fault trip device.
  - f. Verify reduced control voltage tripping capability: 55% for ac systems and 80% for dc systems.
  - g. Verify blocking capability of zone interlock systems.
3. Optional Tests
- a. Measure insulation resistance of the control wiring at 500 Vdc for one minute.

P. Instrument Transformers

- 1. Visual and Mechanical Inspection
  - a. Document equipment nameplate data on test report.
  - b. Verify equipment nameplate ratings are in accordance with the customer's drawings and specifications.
  - c. Inspect physical and mechanical condition.
  - d. Verify correct connection of transformers with system requirements.
  - e. Verify that adequate clearances exist between primary and secondary circuit wiring.
  - f. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method.
  - g. Verify that all required grounding and shorting connections provide contact.
  - h. Verify that all shorting blocks are in the correct position, either grounding or open, as required.
  - i. Verify correct operation of transformer withdrawal mechanism and grounding operation.
  - j. Verify correct primary and secondary fuse sizes for potential transformers.
- 2. Electrical Tests - Current Transformers
  - a. Perform insulation-resistance test of the current transformer and wiring-to-ground at 500 Vdc.
  - b. Perform a polarity test of each current transformer.
  - c. Perform a ratio-verification test using the voltage or current method in accordance with ANSI C5XVIII.1.
- 4. Electrical Tests - Voltage Transformers
  - a. Perform insulation-resistance tests winding-to-winding and each winding-to-ground.
  - b. Perform a polarity test on each transformer to verify the polarity marks or H1-X1 relationship as applicable.

Q. Motor Control Centers: Low and Medium Voltage

- 1. Visual and Mechanical Inspection
  - a. Document equipment nameplate data on test report.
  - b. Verify equipment nameplate ratings are in accordance with the customer's drawings and specifications.
  - c. Inspect physical, electrical, and mechanical condition.
  - d. Confirm correct application of lubricants at manufacturer's

- recommended locations.
  - e. Verify appropriate anchorage, required area clearances, physical damage, and correct alignment and cleanliness.
  - f. Verify that fuse and/or circuit breaker sizes and types correspond to drawings and coordination study, if available, as well as to the circuit breaker's address for microprocessor-communication packages.
  - g. Verify that current and potential transformer ratios correspond to drawings.
  - h. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method.
  - i. Confirm correct operation and sequencing of electrical and mechanical interlock systems.
  - j. Attempt closure on locked-open devices. Attempt to open locked-closed devices.
  - k. Make key exchange with devices operated in off-normal positions.
  - l. Inspect insulators for evidence of physical damage or contaminated surfaces.
  - m. Verify correct barrier and shutter installation and operation.
  - n. Exercise all active components.
  - o. Verify that filters are in place and/or vents are clear.
  - p. Test operation, alignment, and penetration of instrument transformer withdrawal disconnects, current carrying and grounding.
  - q. Inspect control power transformers.
  - r. Inspect physical damage, cracked insulation, broken leads, tightness of connections, defective wiring and overall general condition.
  - s. Verify that primary and secondary fuse ratings or circuit breakers match drawings.
2. Electrical Tests
- a. Perform insulation-resistance tests on each bus section, phase-to-phase and phase-to-ground at the minimum dc Test voltage appropriate for the equipment.
  - b. Perform control wiring performance test.
  - c. Verify operation of motor control center (MCC) heaters.
  - d. Determine accuracy of all meters.

R. Motor Starters: Low-Voltage

- 1. Visual and Mechanical Inspection
  - a. Document equipment nameplate data on test report.
  - b. Verify equipment nameplate ratings are in accordance with the customer's drawings and specifications. This to include: contactor, fuses, overloads, circuit breakers, overload relay heaters power factor correction capacitors and control power transformer.
  - c. Inspect physical and mechanical condition.
  - d. Motor-Running Protection
    - Compare overload element rating with motor full-load current rating to verify correct sizing.
    - If power-factor correction capacitors are connected on the load side of the overload protection, include the effect of the

- capacitive reactance in determining appropriate overload element size.
  - If fuses provide motor-running protection, verify correct rating considering motor characteristics and power-factor correction capacitors, if applicable.
  - e. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method.
2. Electrical Tests
- a. Verify the proper selection and operation of the electrical test equipment and record the date of the last calibration date and the date due re-calibration.
  - b. Measure insulation resistance of each combination starter, phase-to-phase and phase-to-ground, with the starter contacts closed and the protective device open.
  - c. Perform operational tests by initiating control devices.

components.

U. Protective Relays

1. Visual and Mechanical Inspection
- a. Document equipment nameplate data on test report.
  - b. Verify equipment nameplate ratings are in accordance with the customer's drawings and specifications.
  - c. Inspect relays and cases for physical damage. If appropriate, remove shipping restraint material. Relay inspections and testing shall be performed in strict compliance with the manufacturer instructions.
  - d. Tighten case connections.
  - e. Inspect cover for correct gasket seal.
  - f. Clean cover glass.
  - g. Inspect shorting hardware, connection paddles, and/or knife switches. Remove any foreign material from the case.
  - h. Verify target reset.
  - i. Inspect relay for foreign material, particularly in disc slots of the damping and electromagnets.
  - j. Verify disk clearance. Inspect disk and contacts for freedom of movement and correct travel.
  - k. Inspect spiral spring convolutions. Verify tightness of mounting hardware and connections.
  - l. Mechanically test the operation of relays.
  - m. Set relays in accordance with coordination study supplied by District' if available.
2. Electrical Tests
- a. Perform insulation-resistance test on each circuit-to-frame. Determine from the manufacturer's instructions the allowable procedures for this test for solid-state and microprocessor-based relays.
  - b. Inspect targets and indicators.
  - c. Determine pickup and dropout of electromechanical targets.
  - d. Verify operation of all light-emitting diode indicators.
  - f. Set contrast for liquid-crystal display readouts.
  - g. Control Verification

- Verify that each of the relay contacts performs its intended function in the control scheme including circuit breaker trip tests, close inhibit tests, 86 lockout tests, and alarm functions.
  - 3. Optional Tests
    - System Test: After the equipment is initially energized, measure magnitude and phase angle of all inputs and compare to expected values.
- W. Surge Arresters: Low-Voltage Surge Protection Devices
  - 1. Visual and Mechanical Inspection
    - a. Document equipment nameplate data on test report.
    - b. Verify equipment nameplate ratings are in accordance with the customer's drawings and specifications.
    - c. Inspect physical and mechanical condition.
    - d. Inspect for correct mounting and adequate clearances.
    - e. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method.
    - f. Verify that the ground lead on each device is individually attached to a ground bus or ground electrode.
- X. Surge Arresters: Medium and High Voltage Surge Protection Devices
  - 1. Visual and Mechanical Inspection
    - a. Document equipment nameplate data on test report.
    - b. Verify equipment nameplate ratings are in accordance with the customer's drawings and specifications.
    - c. Inspect physical and mechanical condition.
    - d. Inspect for correct mounting and adequate clearances.
    - e. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method.
    - f. Verify that the ground lead on each device is individually attached to a ground bus or ground electrode.
    - g. Verify that stroke counter, if present, is correctly mounted and electrically connected.
- Y. Switchgear Assemblies: Low Voltage & Medium Voltage
  - 1. Visual and Mechanical Inspection
    - a. Document equipment nameplate data.
    - b. Verify the presence of all the manufacturers intended documentation.
    - c. Inspect physical, electrical, and mechanical condition of switchboard/switchgear and all components.
    - d. Confirm correct application of lubricants at manufacturer's recommended locations.
    - e. Verify that fuse and/or circuit breaker sizes and types correspond to drawings and coordination study.
    - f. Verify drawings for correct revision and date in accordance with customer and supplier records.
    - g. Verify that current and potential transformer ratios correspond to drawings.
    - h. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench.
    - i. Confirm correct operation and sequencing of electrical and mechanical interlock systems.
    - j. Verify correct barrier and shutter installation and operation.

- k. Inspect all mechanical indicating devices for correct operation.
  - l. Verify that filters are in place and/or vents are clear.
  - m. Test operation, alignment, and penetration of instrument transformer withdrawal disconnects.
2. Electrical Tests
- a. Perform insulation-resistance tests on each bus section, phase-to-phase and phase-to-ground.
  - b. Perform secondary current injection tests on the entire current circuit in each section.
  - c. Perform control wiring performance test.
  - d. Determine accuracy of all {analog} meters.
  - e. Perform phasing check on double-ended switchgear to insure correct bus phasing from each source.
  - f. Verify correct function of control transfer relays located in switchgear with multiple power sources.
  - g. Verify operation of switchgear/switchboard heaters.
3. Optional Tests
- a. Perform tests on all instrument transformers.
  - b. Perform insulation-resistance tests at 100 Vdc on all control wiring.
  - c. Perform ground-resistance tests.
  - d. Perform a power frequency test (High Pot) on each bus section, each phase to ground.
  - e. Perform current tests by primary injection.
  - f. Perform electrical performance test on control power transformer circuits.
  - g. Perform electrical performance tests on potential transformer circuits.
- Z. Transformers:  
Dry Type – Small  
(167 kVA Single-Phase, 500 kVA Three-Phase, and Smaller)
- 1. Visual and Mechanical Inspection
    - a. Document equipment nameplate data on test report.
    - b. Verify Transformer nameplate ratings in accordance with customer drawings and specifications.
    - c. Inspect physical and mechanical condition.
    - d. Verify that resilient mounts are free and that any shipping brackets have been removed.
  - 2. Electrical Tests
    - a. Perform insulation-resistance test from winding-to-winding and each winding-to-ground.
    - b. Calculate polarization index.
    - c. Verify that winding turns-ratio measurements and polarities are in accordance with nameplate.
    - d. Verify that as-left tap connections are as specified.
- AA. Transformers:  
Dry-Type: All Voltages - Large  
(Greater than 167 kVA Single-Phase and 500 kVA Three-Phase)
- 1. Visual and Mechanical Inspection
    - a. Document equipment nameplate data on test report.
    - b. Verify transformer nameplate ratings in accordance with customer



- drawings and specifications.
- c. Inspect physical and mechanical condition.
- d. Verify that control and alarm settings on temperature indicators are as specified.
- e. Verify that cooling fans operate correctly and that fan motors have correct overcurrent protection.
- f. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method.
- g. Verify that shipping brackets or fixtures have been removed.
- h. Insure that resilient mounts are free.
- i. Verify that winding core, frame, and enclosure groundings are correct.
- j. Verify that as-left tap connections are as specified.
- 2. Electrical Tests
  - a. Perform insulation-resistance tests winding-to-winding and each winding-to-ground.
  - b. Calculate polarization index.
  - c. Perform a turns-ratio test on all tap connections. Verify that winding polarities are in accordance with nameplate.
  - d. Verify that core is solidly grounded.
- 3. Optional Tests
  - a. For 5 kV and above, perform power-factor or dissipation-factor (excitation-current) tests.
  - b. Measure the resistance of each winding at each tap connection.

BB. Transformers:

Liquid-Filled: All Voltages

- 1. Visual and Mechanical Inspection
  - a. Document equipment nameplate data on test report.
  - b. Verify transformer nameplate ratings in accordance with customer drawings and specifications.
  - c. Inspect physical and mechanical condition.
  - d. Inspect impact recorder prior to unloading, if applicable.
  - e. Verify that alarm, control, and trip settings on temperature indicators are as specified.
  - f. Verify that cooling fans and pumps operate correctly and that fan and pump motors have correct overcurrent protection.
  - g. Verify operation of all alarm, control, and trip circuits from temperature and level indicators, pressure relief device, and fault pressure relay.
  - h. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench.
  - i. Verify correct liquid level in all tanks and bushings.
  - j. Verify that positive pressure is maintained on nitrogen-blanketed transformers.
  - k. Verify correct equipment grounding.
- 2. Test load tap-changer.
- 3. Electrical Tests
  - a. Perform insulation-resistance tests, winding-to-winding and each winding-to-ground.
  - b. Calculate polarization index.
  - c. Perform a turns-ratio test on all no-load tap-changer positions and

all load tap-changer positions. Verify that tap setting is as specified. Verify that winding polarities are in accordance with nameplate.

4. Optional Tests
  - a. Perform insulation power-factor/dissipation-factor tests on all windings and correct to 20 °C.
  - b. Perform power-factor/dissipation-factor tests (or hot collar watts-loss tests) on bushings and correct for 20 °C.
  - c. Perform excitation-current tests.
  - d. Measure resistance of each high-voltage winding in each no-load tap-changer position. Measure resistance of each low-voltage winding in each load tap-changer position, if applicable.
  - e. Remove a sample of insulating liquid in accordance with ASTM D-923 and be test for the following:
    - Dielectric breakdown voltage: ASTM D-877 and/or ASTM D-1816.
    - Acid neutralization number: ASTM D-974.
    - Specific gravity: ASTM D-1298.
    - Interfacial tension: ASTM D-971 or ASTM D-2285.
    - Color: ASTM D-1500.
    - Visual Condition: ASTM D-1524.
    - Parts per million water: ASTM D-1533. Required on 25 kV or higher voltages and on all silicone-filled units.
    - Measure dissipation factor or power factor in accordance with ASTM D-924.
  - f. Remove a sample of insulating liquid in accordance with ASTM D-3613 and perform dissolved gas analysis (DGA) in accordance with ANSI/IEEE C5XVI4 or ASTM D-3612.

END OF SECTION

## 1.00 GENERAL

The general provisions of Section 1000 apply to this section.

### 1.01 WORK INCLUDED

Conduits; including:

1. Rigid steel conduit.
2. Intermediate metal conduit (IMC).
3. Electrical metallic tubing (EMT).
4. Rigid aluminum conduit.
5. Polyvinyl chloride conduit (PVC).
6. Flexible metal conduit.
7. Liquid-tight flexible metal conduit.

### 1.02 DEFINITION

Conduit: This term shall be construed to mean conduit and conduit fittings; and tubing and tubing fittings.

### 1.03 RELATED WORK SPECIFIED ELSEWHERE

Support material: Section 16190.

## 2.00 PRODUCTS

### 2.01 MATERIAL AND FABRICATION - ALL MATERIALS SHALL BE MANUFACTURED IN THE USA.

- A. Rigid Steel Conduit: Hot-dipped galvanized or sherardized including the threads, manufactured in accordance with ANSI C80.1 and UL6.
1. Threaded, hot-dipped galvanized or sherardized fittings manufactured in accordance with ANSI C80.4.
- B. Intermediate Metal Conduit: Hot-dipped galvanized including the threads, manufactured in accordance with LIL 1242.
- C. Electrical Metallic Tubing: Manufactured in accordance with ANSI C80.3 and UL 797.
1. Provide compression fittings in walls, ceiling spaces or exposed construction areas.
  2. Provide compression (water tight) fittings in damp areas or areas exposed to weather.
- D. Rigid Aluminum Conduit: Manufactured in accordance with ANSI C80.5.
1. Threaded fittings, manufactured in accordance with ANSI C80.4.
- E. Polyvinyl Chloride Conduit: Schedule 40 and schedule 80, manufactured in accordance with ANSI C33.91, UL 651, and Nema TC-2.
1. Cemented type fittings of the same manufacturer as the conduit.
- F. Polyvinyl Chloride Conduit: Type EB, heavy wall, manufactured in accordance with

ANSI C33.91, UL651, and Nema TC-8.

1. Cemented fittings of the same manufacturer as the conduit.
- G. Flexible Metal Conduit: Hot-dipped galvanized steel, manufacturer in accordance with UL 1.
1. Squeeze type, malleable iron, cadmium plated, straight and angle connectors for all sizes and twist-in connectors for 1/2-inch and 3/4-inch flexible metal conduit.
- H. Liquid-Tight Flexible Conduit: Hot-dipped galvanized with liquid-tight vinyl jacket.
1. Liquid-tight fittings.

### 3.00 EXECUTION

#### 3.01 USE

- A. EMT for all exposed and concealed work except as indicated in Paragraphs B, C, D, E, F, and G.
- B. Rigid steel, IMC, or rigid aluminum conduit in areas where exposed conduit could be subject to physical damage or where conduit is exposed and conductor phase to ground voltage exceeds 300 volts.
- C. Rigid aluminum conduit may be used for all feeder runs exposed or concealed in stud walls and spaces above suspended ceilings.
- D. PVC Conduit:
1. Schedule 40 for runs below grade in direct contact with earth.
  2. Schedule 40 in concrete floors, walls or roofs.
- E. Flexible Conduit (steel only permitted):
1. For connection to equipment subject to vibration, maximum length 18 inches. In wet locations use liquid-tight flexible conduit.
  2. For connection to lighting fixtures above suspended ceilings. Lengths limited to 72 inches.
  3. Install ground conductors in all flexible conduits.
- F. Where 3/4-inch conduit runs are concealed in walls or ceilings and these runs are through wood studs and wood joists, flexible steel conduit may be used up to a maximum length of 6'0".
- G. All risers shall be PVC coated RGS with bushings.
- H. In concrete or below grade use conduit not smaller than 1 inch. Maximum size in concrete slab: 1 inch. Run larger sizes under slab.
- I. Use long sweep elbows with minimum radius 10 times nominal conduit diameter for all telephone and communication runs.
- J. No MC cable shall be permitted.

#### 3.02 INSTALLATION

- A. Provide conduit support and bracing in accordance with the latest published

- SMACNA guidelines.
- B. Perform excavating, trenching, backfilling, and compacting as specified in Division 2.
  - C. Minimum cover for runs below finished grade outside buildings: 24 inches except where noted or required by the serving utility. Minimum cover for conduit in concrete floors, walls or roof: 1/3 thickness of slab. Minimum cover under building slabs is 12-inches.
  - D. Minimum separation from uninsulated hot water pipes, steam pipes, heater flues or vents: 6 inches. Avoid running conduit directly under water lines.
  - E. Protect inside of conduit from dirt and rubbish during construction by capping all openings with plastic caps intended for the purpose.
  - F. Provide conduit bodies for exposed conduit runs at junctions, bends or offsets where required. Do not use elbows or bends around outside corners of beams, walls or equipment. Make conduit body covers accessible.
  - G. Make conduit field cuts square with saw and ream out to full size. Shoulder conduits in couplings.
  - H. Run a minimum of one 3/4-inch empty conduit for every three single pole spare circuit breakers, spaces or fraction thereof and not less than two 3/4-inch conduits from every flush mounted panel to an accessible space above the ceiling and below the floor.
  - I. Make conduit projections from covered areas to areas exposed to the weather watertight by proper flashing. Extend flashing a minimum of 6 inches in all directions from conduit.
  - J. Where conduit is to remain empty, install polypropylene or nylon pull-line 3/16" minimum diameter from end to end with tag at each end designating opposite terminations.
  - K. Run conduit parallel and at right angle to building lines, when visible in finished construction.
  - L. Cap conduits indicated to be stubbed-out underground using glued-on PVC caps intended for this purpose.
  - M. Install a coupling flush with the floor on all conduits stubbed up through floors on grade.
  - N. Make no bends with a radius less than 12 times the diameter of the cable it contains nor more than 90 degrees. Make field bends with tools designed for conduit bending. Heating of metallic conduit to facilitate bending is not permitted.
  - O. Where conduit installed in concrete or masonry extends across building construction joints, provide expansion fittings as manufactured by O.Z.; Crouse-Hinds; Appleton; or equal, with approved ground straps and clamps.
  - P. Concrete Wall or Slab Penetrations: All core drilling, sleeves, blockouts or other penetrations must be approved by the Structural Engineer prior to installation.
    - 1. Space sleeves and core drills to insure a minimum dimension of 3 times the

nominal trade diameter of the largest adjacent conduit between sleeves or core drills.

2. Use blockouts for concentrations of conduits in a confined area.
- Q. Do not penetrate walls with flexible conduit where subject to physical damage. Use recessed box with extension ring for transition from interior to exterior of wall.
- R. All homeruns shown shall be run to the panel indicated independently of all other homeruns. Provide pull points so as not to exceed total bends of 360 degrees between them unless otherwise indicated.
- S. At switchboards, manholes and floor standing distribution panelboards, provide insulated throat bushings or bell ends on all non-metallic conduit entries and bushings on all metallic conduit entries.
- T. Provide bushings on all conduit terminations sized 1" and larger.
- U. Provide weatherproof boxes and connectors for all exposed parking structure raceways and boxes.
- V. Provide bell ends on all conduits into pullboxes and manholes, seal all conduits after conductors are pulled.
- W. Cap all unused conduits with end cap. Do not tape.

END OF SECTION

## 1.00 - GENERAL

### 1.01 REFERENCE STANDARDS

Underwriter's Laboratories (U.L.) 5-85 Surface Metal Raceways.

## 2.00 - PRODUCTS

2.01 GENERAL: Provide types as indicated below, with grounding type devices in plug-in strips, and spacings as shown on the drawings. Provide accessories required for a complete installation.

- A. Finish: Gray on plug-in strips and visible accessories unless indicated otherwise.
- B. Finish: Tan on plug-in strips and visible accessories unless indicated otherwise.
- C. Finish: Factory applied prime coat on plug-in strips and visible accessories unless indicated otherwise.
- D. Finish: Stainless steel type 302 with #3 finish for plug-in strips and visible accessories.

2.02 TYPE B: Field assembled 15 amp, 125 volt, 3 wire grounding, single receptacle with spacing and circuitry as shown on drawings. Wiremold Co. 2100 Series with 2127GA receptacle.

2.03 TYPE C: Field assembled 20 amp, 125 volt, 3 wire grounding, single receptacle with spacing and circuitry as shown on drawings. Wiremold Co. 2100 Series with 2127GA receptacle.

2.04 TYPE K: Field assembled 20 amp, 125 volt duplex receptacles and coverplates with spacing and circuitry as shown on drawings. Install in raceway divided into compartments for simultaneous high and low potential usage. Wiremold Co. G4000 Series; Walker Parkersburg 3400 Series.

2.05 ACCEPTABLE MANUFACTURERS: Wiremold, Walker.

## 3.00 - EXECUTION

3.01 INSPECTION: Examine surfaces to receive plug-in strips to make certain they are straight, true, and dry. Report discrepancies and proceed when corrected.

3.02 INSTALLATION: Install plug-in strips level, centered in spaces and at heights indicated on drawings.

- A. Coordinate final finishing of plug-in strips with trades involved. Manufacturer's special devices shall not be painted.
- B. Install a #12 AWG green grounding conductor in field assembled plug-in strips and bond it at the service end to the concealed raceway system, or to the ground bus of the panel board serving the plug-in strip. Install a larger grounding conductor if required by the National Electrical Code.

- C. Comply with the manufacturer's maximum wiring capacity recommendations.
- D. Excluding special devices, wire adjacent devices of field assembled plug-in strips to alternate circuits unless indicated otherwise.
- E. Install special devices at locations indicated. If manufacturer's oversize box is used to mount special devices, mount box straddling plug-in strip, if designed for the purpose. If manufacturer's box and plug-in strip used are not compatible, mount box above plug-in strip and nipple from box to plug-in strip with surface raceway and fittings suitable for the purpose.
- F. When plug-in strips have two compartments, one for high and one for low potential wiring, install the high potential wiring in the upper compartment unless indicated otherwise.

END OF SECTION



**1.00 - GENERAL****1.01 SECTION INCLUDES**

Cable tray; steel, complete with fittings and hangers.

**1.02 SUBMITTALS**

Submit in accord with Section 16010.

**1.03 REFERENCE SPECIFICATIONS AND STANDARDS**

NEMA VE-1-1991.

**1.04 SUBMITTALS FOR CLOSEOUT**

Project Record Documents: Record actual routing of cable tray and locations of supports.

**1.05 REGULATORY REQUIREMENTS**

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

**1.06 PRE-INSTALLATION MEETING**

- A. Coordination and Meetings: Pre-installation meeting.
- B. Convene one week prior to commencing work of this section.

**1.07 FIELD MEASUREMENTS**

- A. Verify that field measurements are as indicated on shop drawings.

**2.00 - PRODUCTS****2.01 ACCEPTABLE MANUFACTURERS**

- A. Tray:
  - 1. B-Line
  - 2. P-W Western, Inc.
  - 3. T.J. Cope.

**2.02 MATERIAL AND FABRICATION**

- A. Ladder type with 6 in. rung spacing, full 3 in. inside depth or as indicated, width as indicated.
- B. Straight sections and flanges of one piece construction. Fittings shall have same load carrying ability as straight sections.

- C. Struts to have rounded edges and be folded down.
- D. Tray and fittings to comply with NEMA Standards for Class 12 trays.
- E. Provide full depth barrier strip in all trays for isolation of all high level audio cable from all other cables. High level audio cables include all speaker wire, cables from the high level cross connect cabinet to all sound break-out boxes and to all amplifier racks. Barrier strips shall be deleted from all "tee" and 4-way sections to facilitate cable cross-overs from one tray to another.
- F. Provide covers where indicated.

### 2.03 WARNING SIGNS

- A. Engraved Nameplates: 2 inch black letters on yellow laminated plastic nameplate, engraved with the following wording:  
WARNING! DO NOT USE CABLE TRAY AS WALKWAY, LADDER, OR SUPPORT. USE ONLY AS MECHANICAL SUPPORT FOR CABLES AND TUBING!

### 3.00 - EXECUTION

#### 3.01 INSTALLATION

- A. Provide 3/8 in. hanger rods and trapeze hangers or wall type mounting brackets at maximum 6 ft. intervals.
- B. Section 01400 - Quality Control: Manufacturer=s instructions.
- C. Install metallic cable tray in accordance with NEMA VE 1.
- D. Support trays in accordance with Section 16190. Provide supports at each connection point, at the end of each run, and at other points to maintain spacing between supports of 6 feet maximum.
- E. Use expansion connectors where required.
- F. Provide firestopping under provisions of Section 07270 to sustain ratings when passing cable tray through fire-rated elements.
- G. Ground and bond cable tray under provisions of Section 16450.
  - 1. Provide continuity between tray components.
  - 2. Use anti-oxidant compound to prepare aluminum contact surfaces before assembly.
  - 3. Provide 2 AWG bare copper equipment grounding conductor through entire length of tray; bond to each component.
  - 4. Connections to tray may be made using mechanical connectors.
- H. Install warning signs at 50 feet centers along cable tray, located to be visible.

END OF SECTION

1.00 - GENERAL1.01 WORK INCLUDED

Wireways, sheet metal troughs with screw-on removable covers.

2.00 - PRODUCTS2.01 ACCEPTABLE MANUFACTURERS

- A. Hoffman Engineering Co.
- B. General Electric Co.
- C. Square D Co.

2.02 MATERIAL AND FABRICATION

- A. Use sheet steel wireways with screw-on covers and corrosion resistant hardware. For dry locations coat with rust inhibitor and finish with gray baked enamel. For wet locations use hot-dipped galvanized material finished with gray baked enamel, provide gaskets for covers as required. Provide (permanent engraved (3/4" letters) labels on all covers to signify voltage, communications or telephone.

3.00 - EXECUTION3.01 INSTALLATION

Wireways shall be securely fastened to the mounting surface. Use expansion type anchors, in concrete. Suspended wireways shall be supported 4 feet on centers.

END OF SECTION



**1.00 - GENERAL****1.01 SECTION INCLUDES**

- A. Metal conduit.
- B. Duct.
- C. Manholes.

**1.02 RELATED SECTIONS**

- A. Section 02222 - Excavation.
- B. Section 02223 - Backfilling.
- C. Section 02225 - Trenching.
- D. Section 03100 - Concrete Formwork.
- E. Section 03200 - Concrete Reinforcement.
- F. Section 03300 - Cast-In-Place Concrete.
- G. Section 07122 - Fluid Applied Waterproofing
- H. Section 15430 - Plumbing Specialties.

**1.03 UNIT PRICE - MEASUREMENT AND PAYMENT**

- A. Ductbank:
  - 1. Basis of Measurement: By the lineal foot, for each configuration.
  - 2. Basis of Payment: Includes purchase, delivery, and installation of duct, fittings, supports, and accessories, and for trenching, concrete encasement, and backfill.
- B. Manhole:
  - 1. Basis of Measurement: Per unit.
  - 2. Basis of Payment: Includes purchase, delivery, and installation of manhole.

**1.04 REFERENCES**

- A. Section 01400 - Quality Control: Requirements for references and standards.
- B. ANSI C80.1 - Rigid Steel Conduit, Zinc-Coated.
- C. ASTM A48 - Gray Iron Castings.
- D. ASTM C857 - Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
- E. ASTM C858 - Underground Precast Concrete Utility Structures.
- F. ASTM C891 - Installation of Underground Precast Utility Structures.
- G. ASTM C1037 - Inspection of Underground Precast Utility Structures.
- H. IEEE C2 - National Electrical Safety Code.

- I. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
- J. NEMA TC 2 - Electrical Plastic Tubing (EPT) and Conduit (EPC-40 and EPC-80).
- K. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.
- L. NEMA TC 6 - PVC and ABS Plastic Utilities Duct for Underground Installation.
- M. NEMA TC 9 - Fittings for ABS and PVC Plastic Utilities Duct for Underground Installation.
- N. NEMA TC 10 - PVC and ABS Plastic Communications Duct and Fittings for Underground Installation.
- O. NEMA TC 14 - Filament-Wound Reinforced Thermosetting Resin Conduit and Fittings.
- P. NFPA 70 - National Electrical Code.
- Q. UL 651A - Type EB and A PVC Conduit and HDPE Conduit.

1.05 SUBMITTALS FOR REVIEW

- A. Sections 01300 / 01340 - Submittals: Procedures for submittals.
- B. Product Data: Provide for metallic conduit or nonmetallic conduit, all manhole accessories, fittings and supports.
- C. Shop Drawings: Indicate dimensions, reinforcement, size and locations of openings, and accessory locations for precast manholes.

1.06 SUBMITTALS FOR INFORMATION

- A. Sections 01300 / 01340 - Submittals: Submittals for information.
- B. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

1.07 SUBMITTALS FOR CLOSEOUT

Project Record Documents: Record actual routing and elevations of underground conduit and duct, and locations and sizes of manholes.

1.08 QUALIFICATIONS

Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience, and with service facilities within 100 miles of the project location.

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Moorpark College Parking Structure VCCCD Project No. 19125  
IPD Architecture/Engineering/Consulting

Duct Bank  
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miles of Project.

#### 1.09 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70 and IEEE C2.
- B. Products: Listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

#### 1.10 FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated.
- B. Verify routing and termination locations of duct bank prior to excavation for rough-in.
- C. Verify locations of manholes prior to excavating for installation.
- D. Duct bank routing is shown in approximate locations unless dimensions are indicated. Route as required to complete duct system.
- E. Manhole locations are shown in approximate locations unless dimensions are indicated. Locate as required to complete ductbank system.

#### 2.00 - PRODUCTS

##### 2.01 RIGID STEEL CONDUIT

- A. Rigid Steel Conduit: ANSI C80.1.
- B. Fittings: NEMA FB 1, steel.

##### 2.02 PLASTIC CONDUIT

- A. Rigid Plastic Conduit: NEMA TC 2, Schedule 40 and 80 PVC, with fittings and conduit bodies to NEMA TC 3.
- B. Rigid Plastic Underground Conduit: UL 651A, Type A PVC, High-density polyethylene, Schedule 40.

##### 2.03 PLASTIC DUCT

- A. Plastic Utilities Duct: NEMA TC 6; ABS Type DB.
- B. Plastic Utility Duct Fittings: NEMA TC 9.
- C. Plastic Communications Duct and Fittings: NEMA TC 10, Type DB.

##### 2.04 PRECAST CONCRETE MANHOLES

- A. Description: Precast manhole designed in accordance with ASTM C858, comprising modular, interlocking sections complete with accessories.
- B. Loading: ASTM C857, Class A-16, A-12, A-8 or A-0.3 as required.
- C. Shape: Square or Rectangular with truncated corners and as indicated.
- D. Riser Casting: 12 inch, with manhole step cast into frame.
- E. Frames and Covers: ASTM A48; Class 30B gray cast iron, 30 inch size, machine finished with flat bearing surfaces. Provide cover marked electric or telephone as appropriate.
- F. Duct Entry Provisions: Window knockouts.
- G. Duct Entry Locations: As indicated.
- H. Duct Entry Size: As indicated.
- I. Cable Pulling Irons: Use galvanized rod and hardware. Locate opposite each duct entry. Provide watertight seal.
- J. Cable Rack Inserts: Minimum load rating of 800 pounds (365 kg). Locate at 3 feet on center.
- K. Cable Rack Mounting Channel: 1-1/2 x 3/4 inches steel channel, 48 inch length. Provide cable rack arm mounting slots on 1-1/2 inch centers.
- L. Cable Racks: Steel channel, 1-1/2 x 3/4 x 14 inches, with fastener to match mounting channel.
- M. Cable Supports: Porcelain clamps and saddles.
- N. Manhole Steps: Polypropylene plastic manhole step with 1/2-inch steel reinforcement. Cast steps at 12 inches on center vertically.
- O. Ladder: Aluminum, rung, 2-foot length, with top hook to engage manhole step in riser casting. Provide one ladder for each manhole.
- P. Sump Covers: ASTM A48; Class 30B gray cast iron.
- Q. Source Quality Control: Inspect manholes in accordance with ASTM C1037.

## 2.05 ACCESSORIES

Underground Warning Tape: 4 inch wide plastic tape, detectable type, colored yellow with suitable warning legend describing buried electrical lines.

## 3.00 - EXECUTION

### 3.01 DUCT BANK INSTALLATION

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 Moorpark College Parking Structure VCCCD Project No. 19125  
 IPD Architecture/Engineering/Consulting

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- A. Section 01400 - Quality Control: Manufacturer's instructions.
- B. Install duct to locate top of ductbank at depths as indicated on drawings.
- C. Install duct with minimum slope of 4 inches per 100 feet. Slope duct away from building entrances.
- D. Cut duct square using saw or pipe cutter; de-burr cut ends.
- E. Insert duct to shoulder of fittings; fasten securely.
- F. Join nonmetallic duct using adhesive as recommended by manufacturer.
- G. Wipe nonmetallic duct dry and clean before joining. Apply full even coat of adhesive to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
- H. Install no more than equivalent of three 90-degree bends between pull points; provide additional pull boxes as field conditions require.
- I. Provide suitable fittings to accommodate expansion and deflection where required.
- J. Terminate duct at manhole entries using end bell.
- K. Stagger duct joints vertically in concrete encasement 6 inches minimum.
- L. Use suitable separators and chairs installed not greater than 4 feet on centers.
- M. Band ducts together with standard commercial racking before backfilling with sand slurry.
- N. Securely anchor duct to prevent movement during concrete placement.
- O. Place concrete under provisions of Section 03300. Use mineral pigment to color concrete red.
- P. Provide minimum 3-inch concrete cover at bottom, top, and sides of ductbank.
- Q. Provide two No. 4 steel reinforcing bars in top of bank under paved areas.
- R. Connect to existing concrete encasement using dowels.
- S. Connect to manhole wall using dowels.
- T. Provide suitable pull string in each empty duct except sleeves and nipples.
- U. Swab duct. Use suitable caps to protect installed duct against entrance of dirt and moisture.

- V. Backfill trenches under provisions of Section 02225.
- W. Interface installation of underground warning tape with backfilling specified in Section 02225. Install tape 6 inches below finished surface.

### 3.02 PRE-CAST MANHOLE INSTALLATION

- A. Section 01400 - Quality Control: Manufacturer's instructions.
- B. Excavate for manhole installation under the provisions of Section 02222.
- C. Install and seal precast sections in accordance with ASTM C891.
- D. Install manholes plumb.
- E. Use precast neck and shaft sections to bring manhole cover to finished elevation.
- F. Attach cable racks to inserts after manhole installation is complete.
- G. Install drains in manholes and connect to site drainage system or if approved by engineer to 4 inch (DN100) pipe terminating in 1 cu yd crushed gravel bed under provisions of Section 15430.
- H. Dampproof exterior surfaces, joints, and interruptions of manholes after concrete has cured 28 days, under provisions of Section 07160.
- I. Backfill manhole excavation under the provisions of Section 02223.

END OF SECTION

1.00 - GENERAL1.01 WORK INCLUDED

Conductors; for power, lighting, sound, communication and control, including conductors for general wiring, flexible cords and cables, and ground conductors.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Submittals: Section 16000.

2.00 - PRODUCTS2.01 MATERIAL AND FABRICATION

- A. Conductors for General Wiring: Thermoplastic insulated rated for 600V manufactured in accordance with UL 83.
  - 1. Provide 3/4 hard drawn copper conductors. Provide solid conductor for #12 AWG and smaller. Provide stranded conductors for #10 AWG and larger.
- B. Conductor Connectors for General Wiring:
  - 1. Sizes No. 14 to No. 8: Splice with insulated spring wire connectors.
    - a. Ideal No. 451, 455 and 453.
    - b. Minnesota Mining: Types Y, R, G, and B.
    - c. Buchanan No. B1, B2 and B4.
  - 2. Size No. 6 or Larger, Copper: Splice and terminate with compression or pressure type connectors and terminal lugs.
- C. Provide connector sealing packs for all area lighting and exterior box splices which require complete protection from dampness and water.
  - 1. Scotchlok No.'s 3576, 3577 and 3578, by 3M Company.

3.00 - EXECUTION3.01 USE

- A. Conductors for General Wiring:
  - 1. Minimum 75 degrees C temperature rated insulation on conductors, except use minimum 90 degrees C temperature rated insulation on conductors in conduits exposed on roof, or where required due to ambient temperature.
  - 2. Stranded conductors at motors and other applications where subject to vibration.
  - 3. Minimum size conductors for power and lighting #12 AWG, except where noted.
  - 4. Minimum size conductors for control circuits #14 AWG stranded with THHN/THWN insulation.
- B. Use flexible cords and cables for connection of special equipment as indicated. Length not to exceed 72 inches.
- C. Ground Conductors:
  - 1. Provide an insulated green ground conductor for all branch circuit wiring

- where indicated.
2. Bare copper conductor may be used.
    - a. Install ground conductors in all non-metallic conduits as required by code. Install ground conductors in all motor branch circuits and all feeders. Where ground conductor size is not indicated, provide size as required for an equipment ground conductor by the National Electrical Code.
    - b. Install ground conductors in all flexible metal conduits.

### 3.02 INSPECTION

- A. Check conduit system for damage and loose connections, replace damaged sections.
- B. Check for caps at conduit openings. Make sure that inside of conduit is free of dirt and moisture.
- C. Pull mandrel, one size smaller than the conduit, through entire length of all underground conduits prior to conductor installation.

### 3.03 INSTALLATION

- A. Conductors for General Wiring:
  1. Color code conductors insulation as follows:
 

SYSTEM CONDUCTOR	VOLTAGE		
Phase A		208Y/120	480Y/277
Phase B		Black	Brown
Phase C		Red	Orange
		Blue	Yellow
  2. For conductors #6 AWG or larger, permanent plastic colored tape may be used to mark conductor in lieu of coded insulation. Tape shall cover not less than 2 inches of conductor insulation within enclosure.
    - a. Provide color tape on each end and at all terminal points and splices on wire enclosed in conduit.
    - b. Provide color tape every 3 feet on wire not enclosed in a listed wireway.
  3. When pulling conductors, do not exceed manufacturer's recommended values.
  4. Use polypropylene or nylon ropes for pulling conductors.
- B. Insulate splices with plastic electrical tape: Scotch No. 33+, Tomic No. 1T, or equal.
- C. Terminate all control wires with terminal lugs on terminal boards not designed with pressure plates. If splices are needed, use same procedure, installing a terminal board in a junction box for protection.
- D. All splices or connections shall be compression type Thomas & Betts or Burndy, no split bolt connections are allowed.

### 3.04 IDENTIFICATION

- A. Feeders: Identify with the corresponding circuit designation at over-current device

and load ends, at all splices and in pull boxes.

- B. Branch Circuits: Identify with the corresponding circuit designation at the over-current device and at all splices and devices.
- C. Control Wires: Identify with the indicated number and/or letter designation at all terminal points and connections.
- D. Alarm and Detection Wires: Identify with the indicated wire and zone numbers at all connections, terminal points, and coiled conductors within cabinets.
- E. Conductors Terminated By Others: Indicate location of opposite end of conductor, i.e., Pull Box-Room 101.
- F. For identification of conductors, use heat shrinkable white marking sleeves such as Brady Permasleeve with type written identification.
- G. Circuit designation is construed to mean panel designation and circuit number, i.e., LA-13.

END OF SECTION



## 1.00 GENERAL

### 1.1 DESCRIPTION OF WORK

Provide medium voltage cables as shown on the drawings and as specified.

### 1.2 QUALITY ASSURANCE

Provide the services of a qualified testing laboratory to perform the specified tasks. Notify the District's representative 72 hours in advance of performance of work, requiring testing. Provide all material required for testing.

### 1.3 SUBMITTALS

#### A. Shop Drawings

1. Complete data sheet for cable construction, shielding, insulation material, thickness of insulation and jacket, cable stranding and voltage rating.
2. Certified test reports for insulation resistance, power factor corona level, AC dielectric.

B. Certified Factory Test Report including the results of the test plus cable identification, factory order number, cable length and all cable specifications. No cable shall be installed in any duct or conduit until the District's representative has accepted test report.

C. Cable Pulling and Tension Calculations: No cable shall be installed until the calculations are approved.

#### D. Field Test Report

#### E. Qualifications of "Cable Splicers"

1. Submit a certification for the approval of the owner's representative containing the names and the qualifications of persons recommended to perform the splicing and termination of medium voltage cables approved for installation.
2. The certification shall indicate that persons who shall perform actual splicing and terminations have been adequately trained in the proper techniques and have had at least five years experience in the "cable splicer" classification and at least three years experience with this type of cable.

F. Submit 30" sample to show cable identification and date of manufacture.

### 1.4 TESTS

A. Factory Test: A complete test shall be done on each length of cable at the factory in accordance with ICEA S-68-516 and UL-1072. In addition a corona test shall be done per AEIC CS6-87, Section E.

#### B. Field Test

1. Visual and mechanical inspections of physical damage, shield grounding

- cable support, cable bend and termination.
2. DC High Potential Test shall be performed in accordance with Section K-2 of AEIC CS6-87 for each conductor.
  3. Testing of cables shall be performed by an independent testing agency at the contractor's expense. The testing agency shall have a minimum of 5 years' experience. Each person engaged in the testing procedures should also meet the experience requirements. Provide to the owner's representative documentation, including references, of the testing agency and agency's personnel experience for approval.
  4. Connect untested conductors in circuit to ground during test.
  5. Apply test voltage in at least eight equal increments to maximum test voltage.
  6. Record leakage current at each increment, allowing for charging current decay.
  7. Hold maximum test voltage for fifteen minutes. Record current at 30 seconds and every 60 seconds thereafter. Plot results on X-Y axis.
  8. Each insulated conductor provided under this section of the specifications shall be tested in accordance with Section F of AEIC CS6.

## 1.5 REFERENCES

- A. ICEA S-68-516
- B. AEIC CS6-96
- C. UL 1072
- D. IEEE 404-1986
- E. ASTM B-496
- F. Materials and/or installation shall meet or exceed the above referenced standards.

## 2.00 PRODUCTS

### 2.1 MATERIALS

- A. General
  1. 5/8kV ungrounded, shielded, single conductor cable, UL Listed Type MV-105, with ethylene-propylene-rubber (EPR) insulation, jacketed, triple tandem extruded. Manufactured within one (1) year of installation.
  2. Suitable for installation in conduit, subject to alternately wet and dry conditions.
  3. To operate satisfactorily both electrically and mechanically, at conductor temperatures not exceeding 105° C for normal loading, 140° C for emergency loading, emergency of 36 hours, and 250° C for short circuit loading assuming a short circuit duration of two seconds. Emergency overload operation may occur for periods up to 100 hours per year and with as many as five (5) such 100-hour periods within the lifetime of the cable.
  4. The cable shall be minimum 500,000 circular mils (500 kcmil), unless shown otherwise on the drawings.



- B. Conductor: Conductor shall be soft, round, annealed uncoated copper, concentric compact round Class B stranded per ASTM B-496.
- C. Strand Shielding: Stranding shielding shall be an extruded layer of semi-conducting ethylene-propylene rubber material over the conductors with thermal characteristics equal to or better than those of the insulation; chemically compatible with the insulation; firmly and continuously bonded to the overlaying insulation; easily removable; not less than 20 mils.
- D. Insulation: Insulation shall be high quality, ethylene-propylene rubber (EPR) base, thermosetting compound of high dielectric strength with heat, moisture, ozone, and corona resistant properties, homogenous, sold, and applied with good workmanship. The ethylene content of the elastomer used in the insulation compound shall not exceed 72% by weight nor shall the insulation compound contain any polyethylene. The cable manufacturer shall compound the insulation in its own facility using a closed system to insure maximum cleanliness. Insulation thickness shall be 220 mils minimum average, and not less than 90% of the specified minimum average thickness at any point; 133% insulation level, 15kV class. The insulation shall be triple tandem extruded with the conductor and insulation shield to prevent interfacial contamination. The extrusion operation shall be performed by three separate in line extruder heads thereby permitting the measurement and accurate individual control of the wall thickness of each layer of compound as the cable is being manufactured.
- E. Insulation Shielding: The insulation shielding shall be an extruded semiconducting layer of thermosetting EPR material directly over the insulation. The extruded shield shall be clean stripping and shall have a peel strength from the insulation between 4 to 24 lbs./0.5 inch width when tested per AEIC CS6. The thickness of the extruded shield shall be 32 mils min. point.
- F. Metallic Shielding Tape: Metallic shielding tape shall be an uncoated copper tape, helically applied over insulation shield 5 mils thick with minimum 12 1/2% overlap.
- G. Jacket: Jacket shall be 80 mils minimum average thickness, polyvinyl chloride jacketed extruded over the metallic shielding tape; smooth, of uniform composition and free of holes, cracks and imperfections. The minimum thickness at any point shall not be less than 80% of minimum average thickness.
- H. Identification: Provide durable lifetime identification printed, embossed, or engraved on outer surface of the jacket including manufacturer, place of manufacture, conductor type and size, insulation thickness in mils, jacket type, and the rated voltage.
- I. Moisture Absorption: The mechanical moisture absorption of the insulation shall be not exceed 5 milligrams per square inch of exposed surface, when immersed in distilled water at 70 degrees C for seven (7) days.
- J. Sealing: Seal ends of cable with mastic material and tight fitting plastic end cap to prevent entrance of moisture.
- K. Manufacturer: The cable shall be manufactured by Okonite or equal.

- L. Lubrication: Cable lubrication shall be made by American Polywater Corp., "Polywater J" or equal. The lubricant shall not affect the volume resistivity of semiconducting jacket or insulation shield present.
- M. Lugs: Cable lugs and connectors shall be made of copper alloy and shall be high pressure indent type. Manufacturers: Burndy, Thomas & Betts or equal.
- N. Cable Terminations
  - 1. Cable terminations shall meet IEEE 48; Class 1, shrinkable rubber or polymeric cable termination in kit form with ground clamp, non-tracking skirts, moisture-blocked ground braid and auxiliary materials; rated for voltage class of cable being terminated. As manufactured by 3M, Raychem, Elastimold or equal.
  - 2. Cable terminations shall be two-way 15kV molded rubber straight separable connectors.
- O. Cable Splices: T-splices or any other cable taps shall not be permitted.
- P. Arc and Fireproofing Tape Manufacturers shall be Bishop Model 43A, 3M Model700 or equal.

END OF SECTION

1.00 - GENERAL1.01 WORK INCLUDED

- A. Boxes; including:
  - 1. Outlet boxes.
  - 2. Pull and junction boxes.
  - 3. Cabinets.

1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Submittals: Section 16000.
- B. Support Material: Section 16190.

2.00 - PRODUCTS2.01 MATERIAL AND FABRICATION

- A. Outlet Boxes:
  - 1. Pressed Steel Boxes: Knockout type, hot-dipped or electro-plate galvanized.
  - 2. Cast Iron Boxes: Hot-dipped or electro-plate galvanized with threaded hubs.
  - 3. Cast Iron Conduit Bodies: Hot-dipped or electro-plate galvanized with threaded hubs.
  - 4. Cast copper free aluminum conduit bodies with threaded hubs.
  - 5. Covers for Pressed Steel Boxes: Hot dipped or electro-plate galvanized.
  - 6. Outlet boxes manufactured in accordance with UL 514.
- B. Pull and Junction Boxes:
  - 1. Sheet steel, hot-dipped or electro-plate galvanized, or prime coated and a final coat of manufacturer's standard enamel or lacquer finish. Manufactured in accordance with UL 50.
    - a. Where exposed to weather, provide raintight hubs for conduits entering the boxes, top and sides only.
  - 2. Floor Boxes:
    - a. Single gang, similar to Hubbell #B-2536.
    - b. Covers:
      - 1) Combination, similar to Hubbell #S-2525.
      - 2) Duplex receptacle, similar to Hubbell #S-3925.
    - c. Carpet flange, similar to Hubbell #S-3075 thru #S-3079.
    - d. Hubs: Provide hubs as required to suit the conduit arrangement.
  - 3. Pre-Cast Concrete Pull Boxes: As manufactured by Jensen Pre-Cast or Utility Vault and shown on drawings.
  - 4. High impact resistant PVC boxes: As manufactured by Carlon, Sedco, or R & G Sloan.
- C. Cabinets: Sheet metal, prime coat and final coat of manufacturer's standard enamel or lacquer finish. Manufactured in accordance with UL 50.
  - 1. Control Cabinet: NEMA 1 enclosure, door with butt hinges and flush handle latches.
    - a. Provide with removable steel back panel.
  - 2. Terminal Cabinets: NEMA 1 enclosure, door with concealed hinges and

- spring catch type flush cylinder locks. Key locks alike, provide two keys with each lock.
3. Provide engraved plastic nameplates with 1/2" minimum height letters indicating designation of control and terminal cabinets as shown on the drawings.
    - a. Secure nameplates with at least two screws or rivets. Cementing and adhesive installation not acceptable.

### 3.00 - EXECUTION

#### 3.01 USE

- A. Outlet Boxes:
  1. Ceiling Outlet Boxes: Not less than 4" octagonal by 2" deep.
  2. FDD cast iron or cast aluminum device boxes and conduit bodies with metal covers for exposed conduit installation. Provide gasket for covers in wet areas.
  3. Intercom, Microphone and TV Outlet Boxes: Not less than 4-11/16" square x 2-1/8" deep.
  4. Provide floor boxes with quantity of gangs as required for power, communication or control as indicated. Use boxes with barriers where required. Provide carpet flanges in carpeted areas.
- B. Pull and Junction Boxes:
  1. Use sheet steel boxes NEMA Type 1 for indoor and NEMA Type 3R for outdoor installation, except as follows.
  2. Use pre-cast concrete boxes for boxes flush in finish grade where requiring a nominal capacity greater than 144 cubic inches, where located in vehicular traffic areas, or where indicated.
  3. Use polyvinyl chloride (PVC) boxes flush in finish grade when the nominal internal volume is less than or equal to 144 cubic inches or where indicated.
  4. Use cast iron boxes for boxes flush in slab on grade.

#### 3.02 INSTALLATION

- A. Provide 3/8" fixture studs in wall bracket and ceiling boxes.
- B. Provide covers suitable for the fixtures or devices used.
- C. Make outlet box covers flush with finished surfaces.
- D. Close unused open knockouts with knockout seals.
- E. Provide 1" deep plaster rings on recessed outlet boxes installed in areas where concrete will be exposed after construction is complete.
- F. Where boxes are concealed in exposed concrete unit masonry, use square cornered types or boxes fitted with rings of sufficient depth for the box to be recessed completely within cavity of block or tile. Install box to insure that ring fits an opening sawed out of the masonry, so that no mortar is required to fill between ring and construction.

- G. Provide a 6" base of compacted crushed rock under pre-cast concrete pull boxes.
- H. Adjust floor boxes so they are level with top of finished floors.
- I. Provide pull boxes and junction boxes in all branch circuit and feeder runs as indicated. Do not provide pull boxes unless they are indicated or required by the Electrical Code.

### 3.03 IDENTIFICATION

Junction Boxes: Use permanent black marker, 2" high lettering, and on each cover plate indicate the power source and circuits contained within that junction box.

END OF SECTION



**1.00 - GENERAL**

1.01 **DESCRIPTION:** Division 1 and Section 16050 apply to this Section. Provide terminal cabinets for signal and communications terminals, complete.

1.02 **Related Work Not In This Section:**

1. Outlet, pull, and junction boxes.
2. Panelboards for lighting and power.

**2.00 - PRODUCTS**

2.01 **MATERIALS:** Cold rolled sheet steel, with hinged door and cylinder lock keyed to match panelboard cabinets.

2.02 **DESIGN:** To suit applicable system requirements; surface or flush-mounting as shown; knockouts as required. Design to match panelboard cabinets.

2.03 **FABRICATION:** One-piece, die-formed or continuously welded, and assembled in factory.

2.04 **FINISH:** Baked enamel on a suitable primer; color as specified elsewhere, required by standards, or as directs.

2.05 **INTERIORS:** Provide 5/8" plywood (fire resistant) backing in all signal and communications terminals.

**3.00 - EXECUTION**

3.01 **INSTALLATION:** Secure and substantial, cabinets attached to building walls or structure.

3.02 **IDENTIFICATION:** Provide identification nameplates; of engraved bakelite; riveted or screwed to each cabinet. Take text from drawings and as approved by Architect.

END OF SECTION





1.00 - GENERAL1.01 SECTION INCLUDES

Wiring devices.

1.02 RELATED WORK SPECIFIED ELSEWHERE

A. Identification: Section 16030.

B. Boxes: Section 16130.

1.03 SUBMITTALS

In accord with Section 16010

1.04 DEFINITION

A. Wiring devices: This term includes all wall switches, pushbuttons, receptacles, and plates used for general purpose installation.

2.00 - PRODUCTS2.01 MATERIAL AND FABRICATION

A. Wall switches:

1. Quiet toggle type, 20A – 120/277 VAC rated, with terminal screws to take up to No. 10 AWG conductors:

	SPST	DPST	3-WAY	SPST KEY SWITCH LOCK	4-WAY
Arrow-Hart	1991-I	1992-I	1993-I	1991-L	1994-I
Bryant	4901-I	4902-I	4903-I	4901-L	4904-I
General Electric	GE5951-2	GE5952-2	GE5953-2	GE5951-OL	GE5954-2
Hubbell	1221-I	1222-I	1223-I	1221-L	1224-I
Pass & Seymour/ Legrand	20AC1-I	20AC2-I	20AC3-I	20AC1-L	20AC4-I

2. Momentary contact type, 20A-120/277V, two-circuit, three-position, center off:

Arrow-Hart	1995-I
Bryant	4921-I
General Electric	GE5935-2
Hubbell	1557-I
Pass & Seymour/Legrand	1250-I

3. Passive infrared wall switch sensors: Ivory, 180° field of view, adjustable time out and ambient light, 1200 sq. ft. Coverage, 120 VAC, 60 Hz, 1500W. Maximum load, incandescent and fluorescent. As manufactured by Hubbell No. AT1201 or Owner-approved equivalent by Leviton or Pass & Seymour.
4. Fan speed controllers: AC unit rated 15A - 120V used to control up to twelve 56 in./52 in./48 in. ceiling fans or up to twenty 42 in. fans on a single circuit. Rinaudo's Reproductions No. 22394.

B. Passive infrared motion switching system:

1. Ceiling mount sensor, white, 500 sq. ft. coverage, requires control unit. Hubbell No. ATD500CRP.
2. Ceiling mount sensor, white, 2000 sq. ft. coverage, ceiling height dependent, requires control unit. Hubbell No. ATD2000CRP.
3. Ceiling or wall mount sensor, white, 1000 sq. ft. coverage, requires control unit. Hubbell No. ATD1000CRP.
4. Ceiling or wall mount hallway sensor, white, covers area 75 ft. long by 20 ft. wide, requires control unit. Hubbell No. PIR90HW1.
5. Low-voltage control unit, 120VAC, controls one to four sensors. Mount in 4 in. x 4in. enclosure. Hubbell No. CU120A.
6. Relay, 120VAC coil, used when load to be controlled exceeds capacity of a single circuit. Hubbell No. AAR

C. Receptacles, caps, and connectors:

1. 15A-125V, NEMA 5-15, parallel slot type with grounding pin:

	DUPLEX	SINGLE	GFI
Arrow-Hart	5252-1	5261-1	GF5242-1
Bryant	5252-1	5261-1	GFR52FT
General Electric	5252-2	5261-2	TGTR115F
Hubbell	5252-1	5251-1	GF5252-1
Pass & Seymour/Legrand	5252-1	5261-1	1591-SHG

2. 15A-250V, NEMA 6-15, straight blade grounding type:

	RECEPTACLE	CAP
Arrow-Hart	5661-I	6666
Bryant	5661-I	5666-N
General Electric	GE4069-2	GED0611
Hubbell	5661-I	5666-C
Pass & Seymour/Legrand	5662-I	5666-X

3. 15A-125V, NEMA L5-15, locking type with ground:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	4700	4721	4731
Bryant	4700	4721-NSY	4732-NSY
General Electric	GL4700	GLD0511	GLD0513
Hubbell	4700	4720-C	4729-C
Pass & Seymour/Legrand	4700	L515-P	L515-C

4. 20A-125V, NEMA 5-20, straight blade grounding type:

	RECEPTACLE	CAP
Arrow-Hart	5361-I	5362-I
Bryant	5361-I	5362-I
General Electric	GE4102-2	GE4108-2
Hubbell	5361-I	5362-I
Pass & Seymour/Legrand	5361-I	5362-I

5. 20A-125V, NEMA L5-20, two-pole, three-wire locking type, with ground:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6200	6202	6204
Bryant	70520-FR	70520-NP	70520-NC
General Electric	GL0520	GLD0521	GLD0523
Hubbell	2310-A	2311	2313
Pass & Seymour/Legrand	L520-R	L520-P	L520-C

6. 20A-125V, NEMA 5-20, two-pole, three-wire, straight blade isolated grounding type receptacle:

	DUPLEX	SINGLE
Arrow-Hart	IG5362	IG5361
Bryant	5362-IG	5361-IG
General Electric	GE8300-IG	GE8310-IG
Hubbell	IG-5362	IG-5361
Pass & Seymour/Legrand	IG-6300	IG-5361

7. 20A-125 VAC, two-pole, three-wire, NEMA 5-20, straight blade, specification grade, ivory color, ground fault circuit interrupter receptacle (GFCI), rated for feed-through wiring, with LED indicator light:

	GFCI RECEPTACLE
Hubbell	GF-5362I
Pass & Seymour	2091-S-L-I
Leviton	6898-I

8. 20A-125/250V, NEMA 14-20, three-pole, four-wire straight blade grounding type:

	RECEPTACLE	CAP
Arrow-Hart	5759	5757
Bryant	-	-
General Electric	GE1420	GED1421
Hubbell	8410	8411-C
Pass & Seymour/Legrand	L1420-R	L1420-P

9. 20A-250V, NEMA 6-20, two-pole, three-wire straight blade grounding type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	8510	6866	6869
Bryant	5461	5466N	5469N
General Electric	GE4182	GED0621	GED0623
Hubbell	5461	HBL5466-C	HBL5469-C
Pass & Seymour/Legrand	5871	5466-X	5469-X

10. 20A-120/208V, NEMA L21-20, four-pole, five-wire locking and grounding type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6470	6472	6474
Bryant	72120-FR	72120-NP	72120-NC
General Electric	GL2120	GLD2121	GLD2123
Hubbell	2510A	2511	2513
Pass & Seymour/Legrand	L2120R	L2120P	L2120C

11. 20A-250V, NEMA L6-20, two-pole, three-wire locking and grounding type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6210	6212	6214
Bryant	70620FR	70620NP	70620NC
General Electric	GL0620	GLD0621	GLD0623
Hubbell	2320A	2321	2323
Pass & Seymour/Legrand	L620-R	L620-P	L620-C

12. 20A-480V, NEMA L16-20, three-pole, four-wire locking type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6430	6432	6434
Bryant	71620-FR	71620-NP	71620-NC
General Electric	GL1620	GLD1621	GLD1623
Hubbell	2430A	2431	2433
Pass & Seymour/Legrand	L1620-R	L1620-P	L1620-C

13. 30A-125V, NEMA 5-30, two-pole, three-wire straight blade grounding type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	5716N	5717N	6716N
Bryant	9530-FR	9630-RP	-
General Electric	GE4138-3	GED0531	GED0533
Hubbell	9308	9309	-
Pass & Seymour/Legrand	3802	5921	-

14. 30A-125V, NEMA L5-30, two-pole, three-wire grounding and locking type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6330	6332	6334
Bryant	70530-FR	70530-NP	70530-NC
General Electric	GL0530	GLD0531	GLD0533
Hubbell	2610	2611	2613
Pass & Seymour/Legrand	L530-R	L530-P	L530-C

15. 30A-125/250V, NEMA 14-30, three-pole, four-wire straight blade grounding type:

	RECEPTACLE	CAP
Arrow-Hart	5744N	5746N
Bryant	9430-FR	5746
General Electric	GE4191-3	GED1431
Hubbell	9430	9431
Pass & Seymour/Legrand	5740	5741-AN

16. 30A-125/250V, NEMA L14-30, three-pole, four-wire grounding and locking type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6510	6512	6514
Bryant	71430-FR	71430-NP	71430-NC
General Electric	GL1430	GLD1431	GLD1433
Hubbell	2710-A	2711	2713
Pass & Seymour/Legrand	L1430-R	L1430-P	L1430-C

17. 30A-250V, NEMA L6-30, two-pole, three-wire locking blade grounding type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	6340	6342	6344
Bryant	70630-FR	70630-NP	70630-NC
General Electric	GL0630	GLD0631	GLD0633
Hubbell	2620-A	2621	2623
Pass & Seymour/Legrand	L630-R	L630-P	L630-C

18. 30A-250V, NEMA 6-30, two-pole, three-wire straight blade grounding type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	5700N	5701N	6700N
Bryant	9630-FR	9630-ANP	-
General Electric	GE4139-3	GE4328-9	GE4373-9
Hubbell	9330	9331	-
Pass & Seymour/Legrand	3801	5931	-

19. 50A-208V (50A-600V), three-pole, four-wire locking type with ground:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	3769	3765	3764
Bryant	3769	3765	3764
General Electric	LD3769	LD3765	LD3764
Hubbell	3769	3765-C	3764-C
Pass & Seymour/Legrand	3769	3765	3764

20. 50A-125/250V, NEMA 15-50, three-pole, four-wire grounding straight blade type:

	RECEPTACLE	CAP
Arrow-Hart	5754N	5745N
Bryant	9450-FR	5745
General Electric	GE4181-3	GE4180-3
Hubbell	9450	9451
Pass & Seymour/Legrand	5750	5751-AN

21. 50A-125/250V, three-pole, four-wire grounding locking blade type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	CS6369	CS6365	CS6364
Bryant	CS6369	CS6365	CS6364
General Electric	-	-	-
Hubbell	CS6369	CS6365	CS6364
Pass & Seymour/Legrand	-	-	-

22. 50A-250V, NEMA 6-50, two-pole, three-wire grounding straight blade type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	5709N	5710N	6709N
Bryant	9650-FR	9650-RP	-
General Electric	GE4141-3	GED0651	GED0653
Hubbell	9367	9368	-
Pass & Seymour/Legrand	3804	3869	-

23. 60A-120/208V, three-phase, 60 Hz, five-pole, five-wire, watertight, with threaded cap:

	BOX	ANGLE ADAPTER	RECEPTACLE BODY	COMPLETE ASSEMBLY
Hubbell	26401	26404	26520	-
Crouse-Hinds	-	-	-	Area-6575
Russell Stoll	-	-	-	DS6516-FRAB-

24. 60A-480V, NEMA L16-20, three-pole, four-wire locking type:

	RECEPTACLE	CAP	CONNECTOR
Arrow-Hart	-	-	-
Bryant	-	-	-
General Electric	-	-	-
Hubbell	HBL 26410	HBL 26402	HBL 26418
Pass & Seymour/Legrand	-	-	-

- D. Safety receptacle: 15A-125V, NEMA 5-15, straight blade grounding safety receptacle, Hubbell No. SG-62H-1.

- E. Door monitoring switches:

1. General: Provide magnetic door switches (one per leaf) and key switches at specific door locations as indicated on Drawings. Refer to Electrical Drawings details for schematic installation details of door switches.
2. Magnetic contact switches: Provide concealed magnetic SPDT switches with minimum 6-ft. wire leads, Sentrol No. 1076W-06 for hollow metal doors and frames.

Where necessary, provide other similar Sentrol types to suit concealed installation conditions, as approved by District and compatible with District's ride control and/or existing security system equipment. Color of switches to closely match finish or paint color of door frame.

3. Key switches: Arrow-Hart No. 1191L.

F. Device cover plates:

1. Interior plates: Specification grade plastic, 0.1 in. thick, ivory in color, UL listed.
  - a. Plates in kitchens and restrooms to be polished stainless steel, 0.040 in. thick except in kitchens use double lift lid weatherproof gasketed plates for convenience receptacles.
  - b. MATV plate: RMS No. CA-4028.
2. Exterior plates: Choose type of exterior cover plate in accord with the device location and/or manner in which device will be used. Device cover plates shall be die-cast aluminum with hinged cover, rated for respective type of use specified below, or as indicated on Drawings.
  - a. Outlet box weatherproof hoods: NEMA 3R rating, gasketed, for unattended use with cover closed, padlockable latching cover to meet OSHA lockout/tagout requirements, large cord opening and UL listed. As manufactured by Hubbell, Intermatic or Leviton.
  - b. Low profile weatherproof cover: Gasketed, approved for use with cover open, self-closing hinged covers (two independent self-closing lids for duplex receptacles which are horizontally mounted), UL listed. As manufactured by Hubbell, Leviton or Pass & Seymour.
  - c. Communication outlet weatherproof hoods: NEMA 3R rating for unattended use with cover closed, two-cord openings and UL listed. As manufactured by Red Dot.

### 3.00 - EXECUTION

#### 3.01 INSTALLATION

- A. Mount switches and receptacles in vertical position in building interiors.
- B. Mount receptacles with weatherproof plates in horizontal position.
- C. Install receptacles mounted vertically so that the ground contact falls on the top position, and horizontally-mounted receptacles with neutral pole in top position.
- D. Use plastic blank plates on J-boxes in public areas.
- E. Use mechanical type door switches for load control.
- F. Install receptacles for plug in lighting fixtures within 36 in. of fixture location.



- G. Use safety type receptacles with low profile weatherproof metal covers for all convenience outlets in guest accessible areas (i.e., queue lines, waiting areas, etc.).
- H. All GFI type exterior receptacles shall be provided with weatherproof metal hoods.
- I. GFI type receptacles shall not be fed-through wire.

END OF SECTION



## 2.00 - PRODUCTS

- 2.01 Nameplate shall be plastic laminate with 3/4" high letters in white on black background screwed onto equipment designations shall clearly state:
- A. Equipment Enclosure Nameplates.
    - 1. Manufacturer's nameplate including equipment design rating of current, voltage, KVA, HP, bus bracing rating, or as applicable.
    - 2. Equipment nameplate designating system usage and purpose, system nominal voltage, equipment rating for KVA, amperes, HP and RPM as applicable. Designation data per drawings or to be supplied with shop drawings approval.
  - B. Device nameplates: Device usage, purpose, or circuit number; manufacturer and electrical characteristic ratings including the following:
    - 1. Circuit Breakers: Voltage, continuous current, maximum interrupting current and trip current.
    - 2. Switches: Voltage, continuous current, horsepower or maximum current switching. If fused, include nameplate stating "Fuses must be replaced with current limiting type of identical characteristics."
    - 3. Contactors: Voltage, continuous current, horsepower or interrupting current, and whether "mechanically-held" or "electrically-held".
    - 4. Motors: Rated voltage, full load amperes, frequency, phases, speed, horsepower, code letter rating, time rating, type of winding, class and temperature.
    - 5. Controllers: Voltage, current, horsepower and trip setting of motor running over current protection.
- 2.02 Warning signs shall be minimum 18 gauge steel, white porcelain enamel finish with red lettering. Lettering to read "DANGER - HIGH VOLTAGE" in 1" letters. Warning signs to be included on door or immediately above door of all electrical equipment rooms, vaults or closets containing equipment rooms, vaults or closets containing equipment energized above 150 volts to ground, except where such spaces are accessible from public areas.
- 2.03 Warning designation in 1" red letters shall be painted by stencil or pre-printed adhesive on each pull box, cabinet or 1-foot length of exposed conduit stating "DANGER" and giving voltage of enclosed conductors such as "DANGER - 480 VOLTS", for all systems over 150 volts to ground.

## 3.00 - EXECUTION

- 3.01 Nameplates shall be mounted by self-tapping or threaded screws and bolts or by rivets.
- 3.02 Signs shall be permanently mounted with cadmium plated steel screws or nickel-plated brass bolts.

END OF SECTION



## 1.00 - GENERAL

### 1.01 WORK INCLUDED

Distribution panelboards.

### 1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Submittals: Section 16000.
- B. Overcurrent Protective Devices: Section 16180.
- C. Disconnects: Section 16170.
- D. Control Devices: Section 16901.

## 2.00 - PRODUCTS

### 2.01 MATERIAL AND FABRICATION

- A. Provide distribution panelboards with molded case breakers or fused switches for mains and feeders as indicated. All equipment shall be listed to meet or exceed the available short circuit current.
- B. Provide full length copper bussing including areas indicated as space only.
- C. Provide full size neutral bus where neutral bus is indicated.
- D. Provide copper ground bus adequate for number of grounded circuits.
- E. Circuit Breaker Type: Square-D Co. I-Line, with alternate bid for General Electric type AV Line.
- F. All circuit breakers shall be capable of being locked in the off position.

## 3.00 - EXECUTION

### 3.01 INSTALLATION

- A. Secure panelboards to structures to withstand wire pulling strains.
- B. Secure surface mounted panelboards to wood studs or channel material spanning metal studs.
- C. Do not use toggle bolts to wall mount units.
- D. Floor mounted units shall be on 4-inch concrete housekeeping pads.
- E. Secure to structure per seismic requirements.

### 3.02 LABELING AND IDENTIFICATION

- A. Provide engraved plastic nameplates on all distribution panelboards shown on the single line diagram.
- B. Provide panelboard and source feed designation on nameplates with minimum 3/8" lettering for the panel name and 3/4" height lettering for the source feed designation.

EXAMPLE:            DLA  
FED FROM:           T-2

- C. Provide engraved plastic nameplates with 1/4" minimum height letters at all branch overcurrent devices indicating the circuit designating and the load served.
- D. Secure nameplates with at least two screws or rivets. Cementing and adhesive installation not acceptable.

END OF SECTION

## 1.00 - GENERAL

### 1.01 WORK INCLUDED

Branch circuit panelboards.

### 1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Submittals: Section 16000.
- B. Overcurrent Protective Devices: Section 16180.
- C. Control Devices: Section 16901.

## 2.00 - PRODUCTS

### 2.01 MATERIAL AND FABRICATION

- A. Provide factory assembled, enclosed panelboards in dead front cabinets, with doors, surface mounted or recessed as indicated, not less than 20" wide and 5-3/4" deep. Height will depend on the number of breakers and spaces.
- B. Where a control compartment is indicated, provide an integral compartment with a separate hinged lockable door held with captive screws. Identify all internal control wiring with manufacturers wire numbering or control wire numbering when indicated, at all terminal points and connections.
- C. Provide feeder terminal lugs for both main lugs only and main breakers rated for use with copper conductors.
- D. Provide full length copper bussing including areas indicated as space only.
- E. Provide full size neutral bus where neutral bus is indicated. Provide equipment ground bus and bolt-on circuit breakers.
- F. Key all door locks alike.
- G. 120/208V, 3 Phase, 4 Wire Panelboards: Square-D Co. Type NQOD or Powerlink G3 NF with programmable module where designated, alternate bid for General Electric type AQ.
- H. 277/480V, 3 Phase, 4 Wire Panelboards: Square-D Co. Type NF, alternate bid for General Electric type CCB.
- I. All equipment shall be listed to meet or exceed the available fault current by 10%.
- J. Doors shall be hinged.
- K. All placards are welded steel type.

## 3.00 - EXECUTION

### 3.01 INSTALLATION

- A. Secure panelboards to building structure to withstand wire pulling strains.
- B. Secure surface mounted panelboards to wood studs or channel material spanning metal studs.
- C. Do not use toggle bolts.
- D. Contractor shall program lighting control Powerlink panelboard per owner's requirements.

### 3.02 LABELING AND IDENTIFICATION

- A. Provide engraved plastic nameplates on all branch circuit panelboards shown on the single line diagram.
- B. Provide panelboard and source feed designation on nameplates with 3/8" minimum height lettering for the panel name and 1/4" height lettering for the source feed designation.

EXAMPLE:           LA  
FED FROM:         DLA

- C. Secure nameplates with at least two spaces or rivets. Cementing and adhesive installation not acceptable.
- D. Provide a typewritten directory for each branch circuit panelboard, showing each circuits and its use. Provide metal directory frame with plastic window.

END OF SECTION



**1.00 - GENERAL****1.01 WORK INCLUDED**

Disconnects: Switches, fused or unfused.

**1.02 RELATED WORK SPECIFIED ELSEWHERE**

A. Submittals: Section 16010.

B. Fuses: Section 16180.

**2.00 - PRODUCTS****2.01 ACCEPTABLE MANUFACTURERS**

A. Square D Company

B. General Electric

**2.02 MATERIAL AND FABRICATION**

A. Provide heavy duty type, quick-make, quick-break disconnects with cover interlocks.

B. Provide NEMA Type 1 enclosure for dry locations, provide the proper enclosure for other locations as indicated.

C. Provide motor rated toggle switches where indicated.

D. Provide fused disconnect for elevator drive motors.

E. Provide rejection clips on disconnects where rejection type fuses are to be installed.

**3.00 - EXECUTION****3.01 INSTALLATION**

Securely fasten disconnects to structure to withstand wire pulling strains.

**3.02 LABELING AND IDENTIFICATION**

A. Provide engraved plastic nameplates on individually mounted disconnects with minimum 1/4" height letters indicating the load served and the source feed designation.

EXAMPLE:   LOAD:        A/C-1  
              FED FROM:   DHA-1

B. Secure nameplates with at least two screws or rivets. Cementing and adhesive installation not acceptable.

END OF SECTION



## 1.00 - GENERAL

### 1.01 WORK INCLUDED

Support devices for conduit, boxes, lighting fixtures and equipment.

## 2.00 - PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURERS

- A. Hangers, Straps and Beam Clamps:
  - 1. Efcor.
  - 2. Raco, Inc.
  - 3. Steel City.
  - 4. O.Z./Gedney Co.
  - 5. Caddy Fastening System by ERICO Products Inc.
- B. Channels and Fittings:
  - 1. Kindorf.
  - 2. Unistrut Corp.
- C. Anchors:
  - 1. Acherman-Johnson Corp.
  - 2. Phillips Drill Co.
  - 3. Rawl Products Co.

### 2.02 MATERIAL AND FABRICATION

- A. Hangers: Steel cadmium plated.
- B. Straps: One-hole and two-hole malleable iron, hot-dipped galvanized or steel, cadmium or zinc plated.
- C. Beam Clamps: Malleable iron, hot-dipped galvanized or cadmium plated.
- D. Channels and Fittings:
  - 1. Channels: Hot-dipped galvanized.
  - 2. Fittings: Galvanized.
- E. Anchors: Self drilling and expansion bolt types. No wood or fiber plugs or concrete nails are acceptable.

## 3.00 - EXECUTION

### 3.01 USE

- A. Use one-hole or two-hole straps for single conduit runs on walls or ceilings.
- B. Use hangers with solid steel rods for hanging single conduits.
- C. Use formed channel trapezes for groups of two or more conduits.

- D. To fasten boxes and supports to:
  - 1. Wood: Use wood screws or screw type nails of equal holding power.
  - 2. Brick and Concrete: Use bolts and expansion shields.
  - 3. Hollow Masonry Units: Use toggle bolts.
- E. Support sheet metal boxes from building structure directly or by bar hangers.
- F. Do not penetrate reinforced concrete beams with fastenings more than 1-1/2" or reinforced concrete joints with more than 3/4" fastenings to prevent contact with reinforcing steel.

END OF SECTION

Power-Dry (VPI) dry-type transformers - Vacuum-pressure impregnated (VPI) transformers are particularly suited for a wide range of commercial applications. Vacuum pressure impregnation of the windings includes a preheat, dry vacuum cycle; vacuum immersion; vacuum hold cycle; pressure cycle; and curing. This VPI process saturates the dielectric material, which contributes to its long life and durability. The secondary windings are constructed with sheet or wire conductors and Nomex(r) insulation. The secondary windings are wrapped in epoxy-impregnated Nomex(r) and baked to bond the conductor and Nomex. The primary windings are wound over the secondary winding in either barrel or disc construction.

#### 1.00 PRODUCT

#### 1.01 MANUFACTURERS

Square D Company [no equal] [or approved equal].

#### 1.02 POWER-DRY (VPI) SUBSTATION TRANSFORMERS

- A. The transformer(s) shall be the unit substation type with side-mounted primary and secondary terminations.
- B. Primary terminations shall be designed for close coupling to a metal enclosed air load break switch section. Secondary terminations shall be designed for close coupling to a switchboard section
- C. Windings shall be facing forward when facing the transformer front.
- D. The transformer(s) shall be rated kVA AA  
Primary voltage volts delta. Secondary voltage volts wye, 3-wire, 60 Hz with two 2-1/2% full-capacity above normal and two 2-1/2% full-capacity below normal primary taps. Impedance shall be manufacturer's standard impedance. All transformers shall have an average temperature rise of 115° C above a 40° C maximum, 30° C average ambient.
- E. The basic impulse levels (BIL) shall be a minimum of 60 kV for the 15 kV class
- F. The coil design shall be the type to provide the most efficient, reliable, and compact winding. Transformer coils shall be of the continuous wound construction and impregnated utilizing the VPI process, achieving 100% impregnation in one cycle. The coils shall be preheated and subjected to a dry vacuum of no less than 29.7 inches of mercury. Precatalyzed, 100% reactive-type polyester resin shall be introduced into the coil with vacuum maintained during the process. The coils shall then be subjected to a pressure of 75 psi for a suitable length of time to provide complete impregnation of the coils with no voids or air pockets that can create hot spots or cause corona formation. The coils shall then be cured in ovens with a minimum 2 mils coating over all Nomex insulated conductors.
- G. The coils shall be wound with aluminum conductors.
- H. All insulating materials are to be in accordance with IEEE Standard C57.12.01 for 220° C UL insulation system.

- I. All cores to be constructed of high grade, grain-oriented, non-aging silicon steel with high magnetic permeability, and low hysteresis and eddy current losses. Magnetic flux densities are to be kept well below the saturation point. Core lamination shall be miter cut at the core corners to reduce hot spots, core loss, excitation current, and sound level. The laminations shall be clamped together utilizing insulated bolts through the core laminations to provide proper pressure throughout the length of the core.
- J. The transformer enclosures shall be ventilated [indoor] [outdoor] and fabricated of heavy gauge, sheet steel construction. Enclosures are to be provided with lifting devices bolted or welded to the base structure and shall have jacking pads designed to be flush with the enclosure. The base is to be constructed of structural steel members to permit skidding or rolling in any direction. Provisions shall be made to completely isolate the core and coil from the enclosure. There shall be no metal-to-metal contact. Rubber vibration isolation pads shall be installed by the manufacturer between the core and coil and the enclosure. The core shall be visibly grounded to the ground bus or ground pad by means of a flexible grounding conductor sized in accordance with applicable UL and NEC standards.
- K. The paint color shall be ANSI 61
- L. Transformer sound levels shall be warranted by the manufacturer not to exceed the following values: 151 to 300 kVA 58 dB 301 to 500 kVA 60 dB 501 to 700 kVA 62 dB 701 to 1000 kVA 64 dB 1001 to 1500 kVA 65 dB 1501 to 2000 kVA 66 dB 2001 to 3000 kVA 68 dB 3001 to 4000 kVA 70 dB
- M. Metal-oxide, gapless-type distribution class lightning arresters shall be installed by the manufacturer on the high voltage side of the transformer to provide additional protection against high voltage lightning or switching surges.
- N. Fan cooling equipment shall include 3-phase electronic winding temperature monitor controlled automatically by a Type K thermocouple placed in the low voltage airduct. The temperature monitor must contain green, yellow, and red indicating lights. The green lamp indicates power, while the yellow and red lamps signal that fan and alarm contacts have been activated. Alarm contacts shall be provided for fans, alarm, and trip function. An audible alarm must sound when the highest phase temperature exceeds a preset point. The fans must be able to operate in either manual or automatic mode. Minimum six fans shall be provided. Each must have a minimum 6 inch diameter blade and shall be controlled automatically by the sensor in the low voltage air duct. Forced air cooling system shall include: fans, control wiring, controller with test switch, current limiting fuses in the power supply to the controller, indications lights, alarm silencing relay, auto/manual switch, and necessary accessories to properly control the system.
- O. Testing - Tests shall be conducted in accordance with the provisions of IEEE C57.12.91 and shall include, as a minimum, the following tests:
  - 1. Ratio
  - 2. Polarity
  - 3. Phase Rotation
  - 4. No-Load Loss

5. Excitation Current
6. Impedance Voltage
7. Load Loss
8. Applied Potential
9. Induced Potential
10. Impulse Test (typical data from previous unit is acceptable)
11. Temperature Test (typical data from previous unit is acceptable)
12. Sound Test (typical data from previous unit is acceptable)

END SECTION





## 1.00 - GENERAL

1.01 DESCRIPTION: Division 1 and Section 16050 apply to this Section. Provide 480-volt main switchgear, complete.

1.02 SUBMITTALS: Refer to Division 1 for procedures.

- A. Shop Drawings: Submit Shop Drawings together with specifications for all parts, components, and assemblies in this Section; include complete coordination curves for approval.
- B. Product and Equipment Data: In addition to requirements of Section 16050, submit six copies of Product and Equipment Data for all materials and equipment in this Section including, but not limited to, the following:
  - 1. Manuals: Before final acceptance of the Work, submit an "Operating and Maintenance Manual" prepared and submitted in accordance with Section 01700 and Section 16050 covering all equipment and including one complete set of reproducible of all Shop and Circuit Drawings, wiring schedules, and one-line overall diagrams of switchgear. Fully describe replacement parts in Schematic Diagrams. Also include a copy of approved System Parts List in each Manual.

## 2.00 - PRODUCTS

### 2.01 GENERAL:

- A. 480 Volt Switchgear: Complete, unitized, integral assembly, metal-clad, dead-front, dead-rear, indoor type.
- B. Manufacturer: General Electric or Square D.
- C. Ratings: Not less than required by NEC and not less than indicated on the Drawings, short circuit current ratings not less than the maximum short circuit currents available where the switchgear is being installed, as herein specified.
- D. Arrangements: Conform switchgear to arrangements and details indicated.
- E. Coordination: Coordinate components and their arrangements electrically and mechanically. Coordinate all circuit entrances including method of entrance and connections.
- F. Design: To withstand mechanical stresses caused by rough handling during shipping in addition to the electrical and mechanical stresses which will occur during operation.
- G. Interlocks: Incorporate interlocking as shown and as required for safe operation. Provide locks for all hinged doors.
- H. Factory Assembly: Assemble, connect, and wire switchgear at the factory so that minimal assembly will be required at the construction site.

- I. Finish: Thoroughly clean, phosphatize and paint metal surfaces at factory with primer and enamel or lacquer, light grey finish.
- J. Switchgear Enclosures: Steel assemblies, all braced and welded to ensure rigidity and alignment, standard gage steel sheet stretcher-leveled. Die-pierce holes for connecting the adjacent sections to ensure alignment and provide for future extensions. Provide all bolts, nuts, washers, and fittings of rustproof metal. Provide adequate space within each enclosure for equipment and cables. Mount the switchgear sections on structural steel supports, front and rear, for entire length of unit.
- K. Bussing and Connections: Provide busses of copper or aluminum, sized for continuous ratings and braced to withstand the short-circuit stresses as herein specified. Silver plate all joints, and make connections with a minimum of two high-strength bolts with spring washers. Support the busses on high-strength, non-hygroscopic insulators. Extend a suitably sized ground bus throughout all sections with cable connectors in each section.
- L. Identification: Provide an engraved nameplate for each circuit breaker; stating voltage, current rating, trip rating and load supplied. Include breaker frame size and type on nameplate unless readily identifiable without removing switchgear cover. Provide main unit nameplates. Attach nameplates with self-tapping screws.
- M. Auxiliary Wiring: Provide required fuse blocks and terminal blocks within switchboards. provide groups of control wires leaving switchboard with terminal blocks with suitable numbering strips. Hardware used on conductors shall have a high-tensile strength and an anti-corrosive zinc plating.
- N. Handling Means: Provide switchgear with adequate lifting means, type of switchgear capable of being rolled or moved into installation position and then bolted directly to floor without use of floor sills.
- O. Individual Shipping Sections: Design for bolting together at installation site. Provide all required bolting hardware as well as main bus splices between adjacent shipping sections.
- P. Conduit Space: Provide conduit space adequate to meet NEC requirements.
- Q. Terminals: Provide compression type terminals suitable for copper cable of sizes indicated.
- R. Minimum Short Circuit Bracing: 100,000 amperes.
- S. A-B-C Type Bus Arrangement: As viewed from front, use left-to-right, top-to-bottom, and front-to-rear throughout.
- T. Main Horizontal Bus Bars: Mount with all three phases arranged in sam vertical plane. Provide full capacity neutral.
- U. Vertical Sections: Align front and rear with depth as shown on Drawings.

- V. Circuit Breakers, Mains, and Feeders: Individually mount, barrier, and make rear-accessible with load-side insulated bus extensions. Provide lock-off capability on all breakers.
- W. Future Breakers: Provide blank breaker spaces in the switchboard suitable for future addition of breaker units.
- X. Cable Supports: Provide brackets in cable enclosures for cable support.

2.02 MAIN BREAKERS:

3,000 AMP and Smaller Main Breakers: The same type as listed for feeder breakers, manually operated, 100% rated in 2,000 AMP and 3,000 AMP frame sizes.

2.03 FEEDER BREAKERS:

- A. Breakers 100 AMP through 225 AMP frame: Molded case, static trip, series rated where shown on the Drawings.
- B. Breakers above 225A to 800A solid state trip with rating plugs. Rating plugs shall be interlocked so they are not interchangeable between the frames and interlocked such that the breaker cannot be latched with rating plug removed. Breaker shall have built-in test points for testing long delay and instantaneous, and ground fault (wherever specified) functions of breaker by a 120-volt operated test kit. Furnish a test kit capable of testing all breakers 1000 AMP and above. Furnish all breakers 100% rated.
- C. Breakers 1,000 AMP Through 3,000 AMP Frame: Provide breakers complete with built-in current transformers, solid state trip unit, and flux transfer shunt trip. Breakers shall have easily changed trip rating plugs with trip ratings as indicated on Drawings. Rating plugs shall be interlocked so they are not interchangeable between the frames and interlocked such that the breaker cannot be latched with rating plug removed. Breaker shall have built-in test points for testing long delay and instantaneous, and ground fault (wherever specified) functions of breaker by a 120-volt operated test kit. Furnish a test kit capable of testing all breakers 1000 AMP and above. Furnish all breakers 100% rated.
- D. Solid State Trip Element: Provide having independently adjustable short delay pickup and short delay time with high range fixed instantaneous override for high magnitude faults.

2.04 GROUND FAULT PROTECTION: Provide on main breakers with adjustable pickup from 20% of trip rating to 100% of trip rating, but not exceeding 1,200 AMP; ground fault time delay adjustable 0.1 to 0.5 seconds. Provide neutral ground fault current transformer, where required. Provide integral ground trip on all static trip breakers and ground relay on all thermal magnetic breakers.

2.05 TRIP INDICATORS: Provide ground overcurrent resettable trip indicators for main breakers through 3000 AMP frames, equipped with ground fault relaying.

2.06 INSTRUMENTATION:

- A. Types: Provide current transformers, ammeter, ammeter switch, potential transformers, and wattmeter for main breakers. Provide voltmeter and voltmeter switch for main bus. Provide test blocks for portable recording ammeter and voltmeter. Include 4-20 MA transducers for remote indication of 3-phase amperes, 3-phase watts, and single phase volts. As an option, provide Westinghouse Type IQ microprocessor metering device in lieu of ammeter, ammeter switch, voltmeter, voltmeter switch, and wattmeter.
- B. Power Company Metering: Provide bussed metering compartments according to applicable utility standards.

3.00 - EXECUTION

- 3.01 FACTORY ASSEMBLY AND TESTS: Provide switchgear that is completely factory assembled, wired, adjusted, and tested. After assembly, factory test complete switchgear for operation under simulated service conditions to assure accuracy of wiring and functioning of equipment.
- 3.02 LOW VOLTAGE: Give main circuits a dielectric test of 2,200 volts for one minute between live parts and ground and between opposite polarities. Give all the wiring and control circuits a dielectric test of 2,500 volts for one minute between live parts and ground.
- 3.03 SHIPPING: Ship each multi-unit section completely assembled; equip with shipping angles to permit handling with a crane. Reduce installation operations to a minimum.
- 3.04 INSTALLATION: Securely bolt switchgear to concrete floor. Electrically connect shipping sections with connectors furnished with the gear.
- 3.05 CHECK-OUT AND TESTING: The switchboard manufacturer shall furnish breaker and/or relay coordination curve showing coordination between the power company over-current protective device and 480-volt service switchboard mains and feeder devices. Manufacturer's service representative shall test and set all breaker and/or relay trip devices and submit a written report.

END OF SECTION

Section 16340 Compact Compartmentalized Medium Voltage Metal- Enclosed Load  
Interrupter Switchgear

1.00 - GENERAL

1.01 SECTION INCLUDES

Medium voltage compact compartmentalized metal-enclosed switchgear with load interrupter switches.

1.02 REFERENCES

- A. ANSI / IEEE C37.20.3 (1999)- Standard for Metal-Enclosed Interrupter Switchgear.
- B. ANSI / IEEE C37.20.4 (1999)- Standard for Indoor AC Medium-Voltage Switches used in Metal-Enclosed Switchgear.
- C. ANSI / IEEE 24(1999) - Standard Performance Characteristics and Dimensions for Outdoor Apparatus Bushings.
- D. ANSI / IEEE 48 (1999)- Standard Test Procedures and Requirements for High-Voltage Alternating-Current Cable Termination.
- E. ANSI Z55.1(1999) - Gray Finishes for Industrial Apparatus and Equipment.
- F. NEMA
- G. IEC 420 High-Voltage Alternating Current Switch-Fuse Combinations (Applicable sections to ensure proper coordination of the switch-fuse combination when fuses are utilized for opening the switch automatically) Test Duties 4 and 5.
- H. CAN/CSA C22.2 No. 31 Switchgear Assemblies.
- I. CAN/CSA C22.2 No. 193 High Voltage Full-Load Interrupter Switches.

1.03 SUBMITTALS

- A. The metal-enclosed switchgear assembly shall be in accordance with the contract documents, applicable codes and whichever is the most stringent.
- B. The manufacturer shall furnish a detailed Bill of Material and complete set of drawings including:
  - 1. Detailed front elevation.
  - 2. Single Line
  - 3. Floor Plan
  - 4. Schematics
  - 5. Wiring Diagrams
- C. The manufacturer shall furnish comprehensive instruction manuals covering the installation of the switchgear and the operation of it's various components.

#### 1.04 QUALITY ASSURANCE

- A. In accordance with (Division 1100)
- B. **Manufacturer:** Company specializing in medium voltage metal-enclosed switchgear with at least five years documented experience. The manufacturer of the switchgear must be the same as the manufacturer of the load interrupter switch.
- C. Equipment shall be UL listed and labeled for metal-enclosed type switchgear assemblies.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site under provisions of section 01650.
- B. Store and protect products under provisions of Section 01660.
- C. Accept equipment on site and inspect for shipping damage.
- D. Protect equipment from weather and moisture by covering with heavy plastic or canvas and by maintaining heat within enclosure in accordance with manufacturer's instructions.

#### 2.00 - PRODUCT

##### 2.01 MANUFACTURERS

- A. **Switchgear:** The metal-enclosed load interrupter switchgear shall be Square D type HVL/CC or approved equal. Submit shop drawings under the provisions of Section 01330.
- B. Current limiting fuses shall be Square D din style type or equal for 5.5kV voltage class (note: fuse size on one-line diagram). Fuses shall have a 65,000 amperes symmetrical interrupting capability at 5kV.
- C. The switchgear shall be equipped with an optional FUSELOGIC system to provide the following features:
  - 1. Provide direct acting, single phase protection 5.5 kV up to 175E using Square D din style fuses (or equal) to automatically open the stored energy (see section 2.03 B) operated load interrupter switch when a fuse blows. The system shall further prevent potential single phasing conditions by blocking the closing of the switch when a fuse is blown or if a fuse is not installed.
  - 2. Provide a system to prevent potential single phase conditions by blocking the closing of a manually operated load interrupter switch when a fuse is blown or not installed.
  - 3. Fuses shall be Square D din style or equal non-disconnect mounted fuses with provisions for removal and replacement from the front of the switchgear.

## 2.02 LOAD INTERRUPTER SWITCHGEAR ASSEMBLY

- A. The metal-enclosed switchgear assembly shall be compartmentalized into the following distinct compartments:
  - 1. Main bus compartment
  - 2. Switch Compartment
  - 3. Cable connection / fuse compartment
  - 4. Mechanism compartment
- B. The metal-enclosed switchgear with load interrupter switches shall consist of a single section and multiple section line-up with close coupled connection with the transformer, and be of outdoor non-walk-in construction. The sections shall contain the load interrupter switches and the necessary accessory components. The equipment shall be factory-assembled (except for necessary shipping splits) and operationally checked. The assembly shall be a self-supporting, floor mounted bay and shall be securely bolted to the transformer to form an integrated structure.
- C. The equipment shall be designed for front accessibility only.
- D. Cable entry shall be bottom.
- E. The complete assembly shall be constructed in accordance with applicable provisions of ANSI / IEEE C37.20.3-1987 and the minimum construction standards of the manufacturers of the major components such as power fuses or potential transformers. Provide adequate space for fuse handling when applicable. For automatic fuse opening the switch-fuse combination shall meet the applicable sections of IEC 420 to ensure proper coordination of the proposed switch-fuse combination. To comply with these requirements, a time delay relay may be used for fuse ratings that do not coordinate with the switch to ensure that any fault currents have decayed to values that the load interrupter switch can safely interrupt.
- F. In establishing the requirements for the enclosure design, consideration shall be given to such relevant factors as controlled access, tamper resistance, protection from ingress of rodents and insects.
- G. Switchgear rated 600 amps continuous shall not require ventilation openings to aid in cooling of the associated components.
- H. The integrated fused switchgear assembly shall withstand the effects of closing, carrying and interrupting currents up to the assigned maximum short circuit rating.
- I. The switchgear shall be low maintenance designed to reduce the requirement for annual/ periodic maintenance of the equipment. Equipment with scheduled maintenance intervals of 5 or more years is preferred.
- J. Two viewing ports shall be installed in the switch enclosure to enable visible verification of the switch blade position.

- K. An animated mimic bus attached to the end of the operating shaft shall be provided to give visual indication of the position of the switch on each bay.
- L. System Voltage: 4.76kV, three phase, solidly grounded three phase 4 wire.
- M. Operating Frequency: 60 Hz.
- N. Maximum Short Circuit Current: 25 kA RMS Symmetrical.
- O. Maximum Design Voltage: 5.5kV.
- P. Basic Impulse LEVEL (BIL): 60kV.
- Q. Power Frequency Withstand: 19kV.
- R. Short-Time Current (two second):
 

Interrupter switch	25 kA.
Grounding switch	25 kA
- S. Main Bus Ampacity: 1200 amperes, continuous.
- T. Integrated Short Circuit Rating: 25 kA, RMS symmetrical.

2.03 COMPONENTS

- A. The load interrupter switch, rated 600 amperes continuous and interrupting, shall be fixed mounted manually operated, and shall be quick-make, quick-break with the speed of operation independent of the operator. The grounding switch, on closing, shall be quick-make with the speed of operation independent of the operator. To provide for dependable operation, the device shall not rely on chains or cables to drive the blade assemblies open and closed. The operating mechanism shall be isolated from high voltage by a steel barrier and coupled through a direct drive shaft. Access to mechanism parts shall not require de-energizing of the equipment.
- B. The switch shall have three positions, open, closed and grounded.
- C. The switch shall have a four-time fault close capability.
- D. The switch shall be capable of 100 operations at 600 Amperes.
- E. The switch shall be capable of 1000 mechanical no load operations.
- F. The switch blades shall be contained in a single sealed for life enclosure. The interrupting medium pressure within the enclosure shall not exceed 6 PSI (0.4 Bars) at 5 or 15kV class equipment or 22 PSI (1.5 Bars) at 25.8 or 38kV class equipment. Refilling of the switch shall not be required. Maintenance of the interrupter module shall not be required over its life.
- G. The switch operating handle shall be removable. The handle must be suitable to operate the load interrupter mechanism as well as the ground switch mechanism.



- H. Voltage and Short Circuit Ratings: Match ratings specified for integrated assembly.
- I. Momentary Rating: 40kA RMS Asymmetrical.
- J. Fault Closing: 40 kA, RMS Asymmetrical.
- K. Load side live line indicators shall be provided as standard on the mechanism compartment. The live line indicator assembly shall be mounted in the mechanism compartment and shall be an easily removable module containing three neon indicators powered from voltage dividers within the 3 standoff insulators. Optional incoming line or main bus live line indicators shall be provided as required and shall be mounted in the low voltage compartment.

**2.04 ACCESSORIES**

- A. Provide a grounding switch on the load side of the fuses to discharge any capacitive voltage in the feeder cable prior to gaining access to the fuse compartment. Switch shall be mechanically interlocked with the main grounding switch of the load interrupter switch.
- B. Surge Arresters metal-oxide type: Distribution class, rated 4.76kV, 8MCOV; one per phase.
- C. Incoming Cable Termination: An anti-rotational mounting pad shall have provision for 2 single hole cable lugs.
- D. Provide compression lugs for terminating cables onto the switchgear terminal pads.
- E. Provide two 2" long-wave infrared inspection windows per vertical section. One window shall be for the lower compartment and the other for the upper compartment.
- F. Anti-condensation space heaters: For 120VAC supplied by user from control power transformer, sized by the manufacturer, with thermostats.
- G. Pad lock provisions for mechanism covers on the load interrupter switch and grounding switch mechanisms shall be supplied as standard to prevent unauthorized access to the operating mechanism.
- H. Mechanical Interlocks:
  - 1. An interlock shall be provided on the grounding switch mechanism to prevent insertion of the operating handle and operation of the grounding switch when the load interrupter switch is in the closed position.
  - 2. An interlock shall be provided on the load interrupter switch mechanism to prevent insertion of the operating handle and operation of the load interrupter switch when the grounding switch is in the closed position.
  - 3. An interlock shall be provided to prevent the removal of the high voltage access panel with the load interrupter switch closed. To access the high voltage compartment, the load interrupter switch must be opened and the

**Comment [m1]:** Stopping point.  
Remove other references to Section 01650, etc.

grounding switch must be in the closed position. The interlock must be directly attached to the operating mechanism and should not rely on long cables and linkages.

4. To facilitate cable testing in the high voltage compartment, the grounding switch can be returned to the open position. In this position interlocks are to be provided to prevent replacement of the high voltage access panel and prevent closure of the load interrupter switch.
- I. Key Interlocks: Schneider Locks/Kirk Key.
- J. Voltage Transformer Options:  
A voltage transformer bay shall contain a load interrupter with grounding switch. The voltage transformer shall be 120 VAC.  
The width of the unit shall be 20" or 29.5". [For both 5 and 17.5 kV.]
- K. Control Power Transformer Options:  
A control power transformer bay shall contain a load interrupter with grounding switch.  
Control Power Transformer, three phase, with primary disconnect fuse, 240/120 VAC secondary, 5kVA.  
The width of the unit shall be 29.5".
- L. Current Transformer Options:  
Each bay containing a load interrupter shall include the following as shown on the drawings:  
Bus mounted Donut Type Current Transformers 5A.
- M. Metering Options:  
Each bay[s] containing a load interrupter switch shall include the following as shown on the drawings:
  1. Ammeter with Selector Switch, 1% Accuracy.
  2. Voltmeter with Selector Switch, 1% Accuracy.

## 2.05 FABRICATION

- A. Construction: Outdoor, non-walk-in. Each equipment bay shall be a separately constructed cubicle assembled to form a rigid free standing unit. Minimum sheet metal thickness shall be 11 gauge steel on all exterior surfaces. Adjacent bays shall be securely bolted together to form an integrated rigid structure. Each individual unit shall be braced to prevent distortion.
- B. All bus joints shall use Belleville washers. Torque bolts that are used for bus joints or for insulators and direct support of any current carrying parts shall be marked with a bead of highly visible bright orange "torque seal", that will readily show when a bolt has loosened.
- C. The high voltage non-disconnect type fuses, shall be accessible only through a separate panel mechanically interlocked with the switch. Screened or penetrable barriers which may allow intentional or inadvertent contact with energized parts shall not be permitted.

D. The duplex switch configuration shall be equipped with a mechanical interlock between the two switches preventing paralleling of the two incoming lines. A single access panel shall be provided to the load side of the duplex configuration requiring that both switches shall be opened [and grounded] prior to accessing the fuses and load cable terminations.

E. Height: 9.2 inches, maximum including auxiliary support members on top and bottom.

Maximum Voltage	Indoor Single / Multiple	Outdoor Single / Multiple
4.76 & 15.0 kV	90"	99.75"

Maximum Voltage	Indoor Single / Multiple	Outdoor Single / Multiple
25.8 & 38.0 kV	108"	118.45"

F. Main bus shall be tin-plated copper, insulated rated 600 amps, and shall be supported directly by the switch.

G. For single bays, include a ground pad with lug. For multiple bay lineups, include continuous ground bus through the switchgear assembly, securely connected to the steel frame of each cubicle.

H. Main bus and ground bus connections shall be designed for easy for future extensions. Cutout areas with removable bolted on covers shall allow for future extension of the main bus. A knock-out shall be removable for the extension of the ground bus.

I. Outdoor units shall be designed with a sloped, drip-proof roof. The cubicles must have a door-in-door construction. The front outer door shall be a bulkhead type door with three point latching and vault type handle with provisions for padlocking. Cubicles are to be designed to allow front and rear access and shall not require the routing of line side or load side connections in front of the switch/fuse compartment. The roof design shall minimize the number of roof seams by covering several bays with one closure to reduce installation time and potential for leakage.

J. Anti-condensation space heaters: For 120VAC from control power transformer, sized by the manufacturer, with thermostats.

K. The metal-enclosed switchgear shall be fully assembled, inspected and tested at the factory prior to shipment. Large line-ups shall be split to permit normal shipping and handling as well as for ease of rejoining at the job site.

2.06 FACTORY FINISHING

A. All non-painted steel parts shall be zinc plated.

B. All painted steel parts shall be cleaned and a zinc-phosphate pre-treatment applied prior to paint application.

- C. Paint Color shall be ANSI-61 (light gray) TGIC polyester powder, applied electrostatically through air. Following paint application, parts shall be baked to produce a hard durable finish. The average thickness of the paint film shall be 2.0 mils. Paint film shall be uniform in color and free from blisters, sags, flaking and peeling.
- D. Adequacy of paint finish to inhibit the buildup of rust on ferrous metal materials shall be tested and evaluated per paragraphs 5.2.8.1-7 of ANSI C37.20.3-1987. Salt spray withstand tests in accordance with paragraph 5.2.8.4 shall be performed on a periodic basis to provide conformance to this corrosion resistance standard of at least 3500 hours minimum.

### 3.00 - EXECUTION

#### 3.01 EXAMINATION

- A. Visually inspect switchgear for evidence of damage and verify that surfaces are ready to receive work.
- B. Visually inspect to confirm that all items and accessories are in accordance with specifications and drawings.
- C. Verify field measurements are as shown on shop drawings.
- D. Verify that required utilities (e.g., control voltage for heater circuits on outdoor switchgear) are available, in proper location, and ready for use.
- E. Beginning of installation means installer accepts existing surface conditions.

#### 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions, applicable requirements of the NEC and in accordance with recognized industry practices.
- B. Connect the primary surge arresters if not connected. If required, use jumper cables, as provided by the switchgear manufacturer.
- C. Bending of high-voltage cables should be avoided or minimized. All necessary bends should meet at least the minimum radii specified by the cable manufacturer.

#### 3.03 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed by the installing contractor under provisions of Section 01400.
- B. Visually inspect switchgear for physical damage upon receipt.
- C. Perform mechanical operator tests in accordance with manufacturer's instructions.

- D. Check torque of all bolted connections, including cable terminations, either by observing the bead of indicating compound to confirm that it is still intact, or with a torque wrench to confirm the joint is tightened to the manufacturer's specifications.
- E. Touch-up all chips and scratches with manufacturer-supplied paint and leave remaining paint with District.
- F. Verify key interlock operation if applicable.
- G. Perform insulation resistance test on each phase to ground and phase to phase. Record results for future reference.
- H. Perform low-frequency withstand tests according to ANSI/IEEE C37.20.3, paragraph 5.5.
- I. Perform contact resistance test across each switch blade; report any contact resistance in excess of 50 micro-ohms.

END OF SECTION



## 1.00 - GENERAL

### 1.01 WORK INCLUDED

Floor standing switchboards; including main and feeder overcurrent protective devices, underground pull sections, disconnects and metering equipment as required.

### 1.02 QUALITY ASSURANCE

Reference Specification and Standards:

1. Standard for Safety for Dead-Front Switchboards, UL 891.
2. Requirements of the serving utility company.

### 1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. Submittals: Section 16010.
- B. Disconnects: Section 16170.
- C. Overcurrent Protective Devices: Section 16180.

## 2.00 - PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURERS

- A. Square-D Co.
- B. General Electric (alternate bid)

### 2.02 MATERIAL AND FABRICATION

- A. Provide switchboards with the voltage and ampere ratings for the main breaker or disconnect, the main bus and the feeder breakers, or disconnects and fuses as indicated on the one-line diagram. All equipment shall be listed to meet or exceed the available fault current.
  1. Provide busbars of silver plated copper.
  2. Provide full length bussing including areas indicated as space only.
  3. Provide circuit breakers or disconnects for the main and feeders, as indicated.
  4. Provide full length copper ground bus.
  5. Provisions for padlocking the circuit breakers or disconnect in the "on" and "off" positions.
  6. Provide full rated bussing (no cascading).
  7. All equipment shall be listed to meet or exceed the available fault current by 10%.
  8. Provide metering for KW, KVA, amperage, power factor and demand metering at main service entry.
- B. Coordinate with the serving utility company and provide all required service components including, but not limited to, the incoming lugs, metering sockets, current transformers, test blocks, etc.

### 3.00 - EXECUTION

#### 3.01 INSTALLATION

- A. Secure switchboards to structure to withstand wire pulling strains.
- B. Install switchboard sections plumb and in straight horizontal alignment as indicated. Securely fasten to one another, and anchor to floor slab with adequate concrete inserts and 5/8-inch bolts. As a minimum, four anchors per section are required.

#### 3.02 LABELING AND IDENTIFICATION

- A. Provide engraved plastic nameplates on all switch boards not shown as existing on the single line diagram, unless otherwise noted.
- B. Provide switchboard designation on nameplates with 3/4" height minimum lettering.
- C. Provide engraved plastic nameplates with 3/4" minimum height letters indicating circuit designation at branch overcurrent devices in switchboards.
- D. Secure nameplates with at least two screws or rivets. Cementing and adhesive installation not acceptable.

END OF SECTION



**1.00 - GENERAL****1.01 REFERENCES**

- A. N.E.C.: Article 250 "Grounding".
- B. Underwriter's Laboratories (U.L.). Standard A67 - "Grounding and Bonding Equipment". STD 869 - Grounding and Bonding.
- C. ITEE - Standards 142 and 241.

**1.02 DESCRIPTION OF SYSTEM:** A permanent grounding system with methods and materials in accordance with applicable Codes and Standards, able to conduct ground fault currents to the grounded neutral of electrical distribution systems, and limit potential differences between grounding conductors, raceways and enclosures.

**1.03 SUBMITTALS**

- A. Product Data: Submit manufacturer's data on grounding systems and accessories.
- B. Shop Drawings: Submit layout drawings of grounding systems and accessories including, but not limited to, ground wiring, copper braid and bus, ground rods, and plate electrodes.

**1.04 QUALITY ASSURANCE:** Installer qualifies with at least 3 years of successful installation experience on projects with electrical grounding experience similar to that required for project.

**1.05 DELIVERY, STORAGE, AND HANDLING:** Handle electrical grounding accessories and components carefully to avoid damage. Store in location that will protect from dirt and weather.

**2.00 - PRODUCTS**

**2.01 GROUND RODS:** Copper clad steel, unless indicated otherwise. Minimum dimension of 5/8" diameter by 8' long or larger if indicated and sectional rods with couplings where lengths exceeding 12' are specified or indicated, or where added driving depth is required to achieve a specified minimum resistance.

**2.02 GROUNDING ELECTRODE:** Bare stranded copper, 3/0 AWG unless indicated otherwise, for installation in soil or embedded in concrete and cable with type TW insulation when installed in raceway. Install without splice from connection to connection.

**2.03 GROUNDING CONDUCTORS:** Type TW insulation, unless specified or indicated otherwise with a continuous green outer insulating jacket for size #6 AWG and smaller and with green tape banding for #4 AWG and larger, marked at each access point (e.g.: Junction boxes, Enclosures).

**2.04 CLAMPS AND PRESSURE CONNECTORS:** Cast copper, copper alloy, or bronze alloy

suitable for use with aluminum and copper. Double bolt type with formed shoe and "U" cable clamp for connection to pipe or conduit; Single bolt type with cable shoe and "U" clamp for connections to flat bar or metal; and double bolt, parallel conductor split clamp type for cable to cable connections.

- 2.05 WELDED CONNECTIONS: Exothermic process (Cadweld or Thermoweld).
- 2.06 EQUIPMENT ROOM GROUND TERMINAL BAR: Copper 1/4" X 2-1/2" X 24", unless otherwise indicated. Two rows of holes on 1-1/2" centers for 1/2" bolt, to receive cables from two directions.

### 3.00 - EXECUTION

- 3.01 GENERAL: Ground conductive raceways, cable trays and enclosures for electrical systems wiring. Make ground circuits complete to form permanent conductive paths. Solidly ground each low voltage electrical system unless indicated or specified as ungrounded, or grounded through an impedance of a specified value. Provide bare conductors when in open air or soil and provide 600 volt, green, insulated conductors when in raceway.
- 3.02 MAIN GROUNDING JUMPER: Install a main grounding jumper between the system neutral and the enclosure ground bus (or directly to enclosure where ground bus is not present) at each location where system grounding is required. Main grounding jumper:
- A. Formed bus in switchboards and panelboards.
  - B. Formed bus or copper cable in transformers not coupled in unitized assembly with distribution equipment.
- 3.03 GROUND CONNECTIONS: Make grounding electrode connections electrically ahead of any overcurrent or disconnect device or tap connection such that disconnection of neutral load conductors does not interfere with or remove the system ground connection. Use separate lugs on the transformer neutral terminals for neutral and main grounding jumpers when cable is used for transformer connections.
- 3.04 SEPARATELY DERIVED SYSTEMS: For each separately derived system, grounded or ungrounded, install a grounding electrode conductor between each system enclosure ground bus (or bolted connection to enclosure where ground bus is not present) and a cold water pipe or building structural steel of one (1) inch size or larger near the separately derived system ground connection. Make connections to water pipes or steel accessible for easy inspection. Provide a separate ground conductor for each audio, video, isolated panels and UPS as noted on the plans.
- 3.05 SERVICE GROUND: For each low voltage service, install a grounding electrode conductor between the system enclosure ground bus and the water service entrance to the building and install bonding jumpers around insulating unions and removable fittings in the water pipe between the grounding electrode conductor connection to the water pipe and the water service entrance.
- 3.06 GROUNDING ELECTRODE SYSTEM: Install a complete grounding electrode system with interconnecting cables and terminations at the equipment room ground terminal bar. Make connections to the grounding electrode system accessible. Install the following grounding electrode systems:
- A. Metal frame of building.

- B. Grounding electrode encased by at least two inches of concrete, within and near the bottom of the building foundation or footing of the type specified in Part 2 - Products, at least 20 feet in length without splice from connection to connection.
  - C. Connection of other metal piping systems as required by National Electrical Code Article 250.
  - D. Driven ground rods.
  - E. Driven steel piles.
  - F. Connection to water service with bonding jumper around water meter.
- 3.07 GROUNDING ELECTRODE CONDUCTORS: Install grounding electrode conductor in PVC or other non-conductive, non-metallic enclosure where a raceway system is indicated or necessary for conductor installation. Install grounding electrode conductors without splice from the enclosure ground bus to the connection at the grounding electrode system.
- 3.08 GROUND RODS: Install a vertical position, full length below grade unless specified otherwise, and with conductor and top of rod 6" minimum below grade. Provide exothermic welds at all connections.
- 3.09 EQUIPMENT ROOM GROUND TERMINAL BAR: Install in equipment rooms where indicated. Mount bar by anchors and bolts using 1-1/2" long segments of 1/2" rigid conduit as spacer between bar and wall. Use a minimum of two supports, 18" on center. Connect grounding electrode system conductors, system enclosure ground bus, and other indicated electrode systems to the terminal bar. Label permanently all ground conductors as to destination location, e.g. TR1, panel IPS, etcetera.
- 3.10 EQUIPMENT GROUND: Form the equipment ground circuits with rigid metallic raceways (e.g., EMT, rigid steel conduit) unless indicated otherwise. Make all threaded coupling connections wrench tight. Install bonding jumpers for continuity around fittings and terminations where the conductive raceway is made non-continuous. Where indicated or specified, install ground conductors in raceways to augment the circuits formed by the metallic raceway system. Bond the conductors to boxes or enclosures in which access is possible. Size conductors as specified, indicated, or required by code, whichever is larger. Install grounding bushings and bonding jumpers to enclosures or ground bussing for the following: Service entrance feeder; each location where multiple ring knockouts are damaged during conduit installation; each location where conduits are stubbed up into floor mounted and each conduit termination at a painted enclosure where paint is not removed before installation of raceway.
- 3.11 FLEXIBLE RACEWAY GROUNDING: Install a ground conductor inside all flexible raceways (e.g., Flexible steel, liquid tight) regardless of length. Bond the conductor to the enclosure or ground bus in the nearest box or access on either side of the flexible section. Size conductor as specified, indicated, or required by code, whichever is larger.
- 3.12 NON-CONDUCTIVE RACEWAY: Install a ground conductor in raceways of non-conductive materials. Bond conductor to conductive enclosures in which access is possible. Bond non-current carrying conductive equipment contained in a non-conductive enclosure. Install insulated or bare conductors, sized as specified, indicated, or required by code, whichever is larger.

- 3.13 SECTIONAL RACEWAY: Install a ground conductor in sectional raceways with removable covers for access (e.g., Plug-in strips, surface raceway systems, and wireways) unless specified otherwise. Size conductor in accordance with the N.E.C. for the largest phase conductor size installed in raceway, or as indicated. Bond sections of the raceway to the ground conductor. Connect receptacle ground terminals in the raceway to the ground conductor, and make other ground connections indicated on the drawings.
- 3.14 CABLE SUPPORT SYSTEMS: Ground elements of the cable support system to panelboards, cabinets and switchboards from which their circuits originate. Install a ground conductor sized as required by code, as indicated, or #12 AWG, whichever is larger.
- 3.15 MULTI-CONDUCTOR CABLE, METALLIC SHEATH: Use multi-conductor cable with metallic sheath or armor approved for use as ground circuit conductor or install ground conductor(s). Size ground circuit conductor as required by code, as specified, or as indicated on the drawings, whichever is larger. Terminating devices for cable using the sheath or armor as the ground circuit conductor shall be approved for use as the connecting device between the cable and the enclosure. Terminate internal ground circuit conductors by lug to the interior of the enclosure or to the contained ground bus where present. Use bare or clearly identified internal grounding conductors.
- 3.16 MULTI-CONDUCTOR CABLE, NON-METALLIC SHEATHED: Use only non-metallic sheathed multi-conductor cables having a ground circuit conductor enclosed in the sheath the same size as the ungrounded conductors. Use bare or clearly identified internal grounding conductors. Terminate ground circuit conductor by lug to the enclosure ground bus where present or to the interior of the enclosure.
- 3.17 GROUND CONDUCTOR BONDING: Bond grounding conductors to boxes or enclosures at each access point. Do not use building steel as equipment grounding path. Use welded ground connections, at least where such are buried in soil, installed below slabs on grade, or embedded in concrete.

END OF SECTION

1.00 - GENERAL

1.01 REFERENCE STANDARDS

- A. National Electrical Manufacturer's Association (NEMA). NEMA STD Pub No.'s TR1 and TR27 and STD. ST20 'Dry Type Transformers for General Applications' 260-82 Labels.
- B. Underwriter's Laboratories (U.L.). Specification 506 'Specialty Transformers.'
- C. American National Standards Institute (ANSI). C57.12.25.
- D. Underwriter's Laboratories, Inc. - U.L. 506 'Safety Standard for Specialty Transformers.'

1.02 DEFINITION: A transformer in which the windings are immersed in air or some dry gas. A dry gas is one in which the gas remains in the gaseous state throughout the range of the transformer operating temperatures.

1.03 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data including rated KVA, frequency, primary and secondary voltages, percent taps, polarity, impedance and certification of transformer performance efficiency at indicated loads, percentage regulation at 100% and 80% power factor, no-load and full-load losses in watts, % impedance at 75 degrees C., hot-spot and average temperature rise above 40 degrees C. ambient, sound level in decibels, and standard published data.
- B. Shop Drawings: Submit manufacturer's drawings indicating dimensions, and weight loadings for transformer installations, showing layout, mountings and supports, spatial relationships to associated equipment and panel boards, and transformer connections to electrical equipment.

1.04 QUALITY ASSURANCE: Installer qualified with at least 5 years of successful installation experience on projects with power/distribution transformer work similar to that required for this project.

1.05 DELIVERY, STORAGE AND HANDLING: Handle transformer accessories and components carefully to avoid damage; store in location that will protect from dirt and weather.

2.00 - PRODUCTS

2.01 DRY TYPE TRANSFORMERS: Two aluminum windings type meeting NEMA TP-1 with the following insulation types:

KVA Rating	Minimum Insulation System Temperature Classification	Maximum Winding Temperature Rise
------------	------------------------------------------------------	----------------------------------

2 KVA & Below	Manufacturer's Standard U.L. Classified System	Rise Per U.L. 506
3 KVA thru 25 KVA	185 Degrees C.	115 Degrees C.
30 KVA & Above	220 Degrees C.	80 Degrees C.

2.02 PRIMARY WINDING: Voltage taps as follows unless indicated otherwise:

KVA Rating and Phase	Voltage Taps
2 KVA & Below, 1-Phase	No Taps Required
3 VA thru 9 KVA, 1 Phase & 3 Phase	Two 5 Percent FCBN Minimum
10 KVA thru 25 KVA, 1 Phase & 3 Phase	Four 2-1/2 Percent Minimum
Above 25 KVA, 1 Phase & 3 Phase	Four 2-1/2 Percent FCBN & Two 2-1/2 Percent FCAN

2.03 SHIELDED ISOLATION TRANSFORMERS: To establish ungrounded power sources where indicated. Core, shell, or torroidal construction will be acceptable. Provide an electrostatic shield between primary and secondary windings for core or shell types.

2.04 ACCEPTABLE MANUFACTURERS: General Electric Co.; Square D Co.

2.05 WINDINGS: All windings shall be copper.

### 3.00 - EXECUTION

3.01 INSTALLATION: Do not obstruct transformer ventilation openings. Maintain a minimum of 12" of clearance between floor mounted transformers and walls.

3.02 COORDINATE: Transformer installation work with electrical raceway and wire/cable work as necessary for proper interface.

3.03 INSTALL: Transformer on vibration mounts,.

3.04 CONNECT: Transformer to electrical wiring system

3.05 GROUNDING: Provide equipment grounding connections to assure permanent and effective ground.

3.06 TESTING: Upon completion of installation of transformers, energize primary circuit at

1.00 - GENERAL1.01 REFERENCES STANDARDS

- A. National Electrical Manufacturer's Association (NEMA). STDS Pub. No. IC2.
- B. Underwriter's Laboratories (U.L.). 508 "Electrical Industrial Control Equipment" 845 Installation.
- C. American National Standards Institute (ANSI). Pub #MG1 "Motors and Generators."
- D. National Electrical Manufacturers Association (NEMA) - ICS 2.3 83 Installation.
- E. NFPA -70.

- 1.02 SUBMITTALS: Shop Drawings (SD) and Operating and Maintenance Manuals (OMM) indicating manufacturer, types, ratings, and accessories for all motor starting equipment used on project.

MOTOR INFORMATION: Included with the Operating and Maintenance Manuals for each motor:

- Motor Designation
- Motor Function
- Motor Nameplate Voltage
- Motor Nameplate Horsepower
- Motor Nameplate Full Load Current
- Motor Service Factor
- Starter Manufacturer
- Starter Heater Number
- Heater Current Range
- Manufacturer's Table of Heater Numbers with Current Range

- 1.03 QUALITY ASSURANCE: Installer qualified with at least 3 years of successful installation experience on projects with electrical work similar to that required for this project.

- 1.04 DELIVERY, STORAGE, AND HANDLING: Handle motor starting equipment accessories and components carefully to avoid damage; store in location to protect from dirt and weather.

2.00 - PRODUCTS

- 2.01 MOTOR STARTING SWITCHES: Padlockable toggle type indicating "On", "Off", and "Trip" positions, and when specified in a circuit with an automatic device (e.g., a thermostat, or a "Hand-Off-Auto" selector switch).

- 2.02 MAGNETIC STARTERS: Unless indicated otherwise, minimum size 1, full voltage types with overload protection in all phases, low voltage release, external manual resets, and NEMA 1 enclosure. Equip each starter with a 120 volt coil, control transformer with fused secondary, auxiliary contacts, (and relay if required) and Hand-Off Automatic switch all sized for devices served.

- 2.03 COMBINATION MAGNETIC STARTER/SAFETY SWITCHES: Magnetic starters with rejection fuse clips sized for dual element fuses, defeatable cover interlocks, quick-make/quick-break switching mechanisms, and padlockable indicating handles.
- 2.04 COMBINATION MAGNETIC STARTER/CIRCUIT BREAKERS: Magnetic starters with thermal magnetic trip type circuit breakers having short-circuit interrupting ratings as described in Panelboards -Section 16164, defeatable cover interlocks, and padlockable handles.
- 2.05 COMBINATION MAGNETIC STARTER/MOTOR CIRCUIT PROTECTORS: Magnetic starters with adjustable magnetic trip type motor circuit protectors having minimum short-circuit interrupting ratings of 18,000 amperes RMS symmetrical, defeatable cover interlocks, and padlockable handles.
- 2.06 MULTI-SPEED STARTERS: Magnetic starters with time delay relays for controlled deceleration.
- 2.07 REDUCED VOLTAGE STARTERS: Part winding type reduced voltage magnetic starters unless indicated otherwise.
- 2.08 MISCELLANEOUS CONTROL CABINETS: NEMA 1 (unless indicated otherwise), U.L. listed, wall-mounted with door, sized as indicated on the drawings, Hoffman Engineering Co., or equal.
- A. Enclosure: Manufactured of minimum 16 gauge steel, with grey prime paint.
  - B. Device mounting panel: Minimum 14 gauge enameled steel.
  - C. Door Hardware: Latch and continuous hinge. Use three-point latch on doors exceeding 35" in height.
  - D. Terminal blocks, cover-mounted devices, internal components: Conforming to the requirements (including manufacturer's accepted as listed) of this Section.
- 2.09 CONTROL DEVICES: Heavy duty, oil tight, single hole mounting, mounted in starter covers unless indicated otherwise.
- A. Pilot lights: Indicating motor running with other pilot light colors and quantities as indicated.
  - B. Pushbutton stations: Labeled "Start", "Stop", and other designations as indicated.
  - C. Selector switches: Unless indicated otherwise, maintained position type, two position "On-Off" and three position "Hand-Off-Auto" when in a circuit with an automatic device (e.g., a thermostat).
- 2.10 MOTOR CONTROL CENTER (MCC): With NEMA 1B wiring unless indicated otherwise.
- A. Vertical Sections: 15" to 20" deep, approximately 90" high, rigid free-standing, joined together forming totally enclosed dead front assemblies.
  - B. Horizontal Wiring Troughs: Minimum 25 square inches, located at the top and at the



bottom, front accessible through separate covers, and continuous through all sections.

- C. Vertical Wiring Troughs: Full height with hinged door and cable supports provided for each section.
- D. Starters: Compartmentized combination magnetic type, drawout through size #4, with pull-apart terminal blocks.
- E. Bussing: Copper with full height vertical bussing through all available space. Provide provisions for future main bus extension.
  - 1. Arrangement: A-B-C front to rear, top to bottom, and left to right then facing the front.
- F. Bus Ratings:
  - 1. Horizontal Bus - 600 amps. Vertical Bus - 300 amps.
  - 2. Withstand Rating - 22,000 rms amperes symmetrical.
- G. Fully equip unused spaces for future use with all necessary bussing and hardware.
- H. Provide a full depth and height barrier between sections of motor control centers arranged in a single line-up when fed from two or more different services or feeders.

2.11 MOTOR STARTER PANELS: Wall mounted panelboards with vertical main bus, chassis mounted combination starters, and NEMA 1 B wiring.

2.12 ACCEPTABLE MANUFACTURERS: Square D or Allen-Bradley; alternate bid Cutler-Hammer; General Electric; Siemens-Allis.

2.13 MOTOR STARTER PANELS (MSP)

- A. 600 volt group control centers with provisions for mounting up to four size <1= or size <2= full voltage starters, wiring troughs top and bottom, removable barriers between starter compartments, and approximate dimensions of 32" wide by 26" high by 7" deep.
- B. Enclosures wall mounted with bolts, capable of being stacked vertically or lined up horizontally while being interconnected, and capable of conduit entry at top and bottom.
- C. Acceptable manufacturers: Square D or Allen Bradley.

### 3.00 - EXECUTION

3.01 GENERAL: Provide power connections to motors, controllers, and protective devices including items furnished by other divisions, unless otherwise indicated. Provide correct direction of rotation on motors, and leave equipment in proper working order.

3.02 OVERCURRENT AND OVERLOAD PROTECTION: Provide fuses specified and overload

elements sized in accordance with the ambient temperature, the motor nameplate full load amperes, and service factor. Indicate the fuse type, voltage, amperage, and the overload element manufacturer, type, and amperage on adhesive labels attached to the inside of each cover.

### 3.03 CONTROL WIRING

- A. By other Divisions when serving equipment by other Divisions, unless otherwise indicated.
- B. Minimum #14 AWG copper; #12 AWG copper for circuits longer than 200 feet, or for 120 volt motors.
- C. De-energized by motor disconnect (auxiliary switch, or load side control power transformer) or adjacent lockable control power switch.
- D. Neatly grouped, tied, and terminated at labeled terminal strips.

3.04 CONTROL DEVICES: Installed in starter covers, unless indicated otherwise. Flush mount remote devices in finished areas, surface mount remote devices in unfinished areas.

3.05 "HAND-OFF-AUTO" SWITCHES: Bypass the automatic controls and energize the circuit when in the "HAND" position. Install H-O-A switches in series with safety devices, overload relays, smoke detector contacts, freezestats, etc.

3.06 MOUNTING BOARDS: 3/4" exterior grade, primed and painted plywood. Secure equipment to mounting boards on uninsulated exterior walls.

3.07 COORDINATE WITH OTHER WORK: Including motor and electrical wiring/cabling work, as necessary to interface with other work.

3.08 ADJUST AND CLEAN: Inspect operating mechanisms. Make necessary adjustments for free mechanical movement. Touch up scratched or marred surfaces to match original finish.

3.09 FIELD QUALITY CONTROL: Subsequent to final connections, energize motor starters and demonstrate functioning of equipment in accordance with requirements. Where necessary correct malfunctioning units.

END OF SECTION

## 1.00 - GENERAL

### 1.01 WORK INCLUDED

Lighting fixtures, including lamps, accessories and support materials.

### 1.02 RELATED WORK SPECIFIED ELSEWHERE

- A. Submittals: Section 16010.
- B. Outlet and Junction Boxes: Section 16130.
- C. Supporting Devices: Section 16190.
- D. Contactors, Relays, Time Switches, Photocontrols, etc.: Section 16901.

## 2.00 - PRODUCTS

### 2.01 MATERIAL AND FABRICATION

- A. Fixtures schedule lists one or more acceptable manufacturers for each fixture type.
- B. Provide all lighting fixtures of each type from the same manufacturer.
- C. Provide sockets for screw base lamps of plated steel, brass or bronze.
- D. Lamps - Acceptable Manufacturers:
  - 1. General Electric.
  - 2. Phillips.
  - 3. Sylvania.
  - 4. As indicated for specialty lamps.
- E. Flexible metal conduit systems connecting individual tandem wired lighting fixtures.
  - 1. Conductors carrying line voltage and current shall be sized in accordance with the overcurrent device protecting the circuit indicated.
  - 2. Provide a #12 AWG minimum size ground conductor.
- F. Provide electronic ballasts for all fluorescent and HID fixtures.

## 3.00 - EXECUTION

### 3.01 INSTALLATION

- A. Provide a lighting fixture for each lighting outlet indicated.
- B. Provide recessed and semi-recessed fixtures with mounting frames compatible with the ceiling and wall systems employed and secure fixture mechanically to frame.
- C. Align rows of suspended and surface mounted fluorescent fixtures to form straight lines at uniform elevations.
- D. Provide swivel ball-type hangers which will allow a minimum of 45 degrees angle for

fixtures indicated as pendant mounted.

- E. Make recessed fixture fit snugly against ceiling to prevent light leakage.
- F. Support suspended and surface mounted fluorescent fixtures as follows:
  - 1. Fixtures not over 12 inches wide and not over 50 inches long, a minimum of two fastenings.
  - 2. Fixtures not over 12 inches wide and over 50 inches long, a minimum of three fastenings.
  - 3. Fixtures over 12 inches wide and not over 50 inches long, a minimum of four fastenings.
- G. Support pendant mounted fluorescent fixtures as follows:
  - 1. Single fixtures not over 12 inches wide, a minimum of two single pendants.
  - 2. Single fixtures over 12 inches wide, a minimum of two single pendants at each end or one double pendant at each end.
  - 3. Continuous rows of fixtures not over 12 inches wide, a minimum of one single pendant for each fixture plus one for each row.
  - 4. Continuous rows of fixtures over 12 inches wide, a minimum of two single pendants or one double pendant for each fixture plus one for each row.
  - 5. Locate pendants for continuous row fixtures at each joint and each end of row.
  - 6. Rigidly fasten continuous row fixtures together with fixtures manufacturer supplied joiner.
- H. Provide each lighting fixture with the lamps indicated on the fixture schedule.
  - 1. Provide self-extinguishing lamps in open-bottom or unshielded metal halide fixtures.
- I. Clean and relamp existing fixtures to be reused.
- J. EMT shall not be used to support suspended fixtures of any type. Suspension shall be by means of standard hangers, where available and applicable, by rigid threaded conduit and fittings, or by rods.
- K. Where fixtures are to be mounted on, or suspended from concrete ceiling, provide cast-in-place inserts.
- L. Fixtures shall not be supported by outlet box cover screws alone; provide a fixture stud or "hickey" for added support.
- M. Provide a junction box at each exit light fixture indicated.
- N. Provide weatherproof boxes and connectors and liquid tight flexible conduit to each light fixture.
- O. All suspended fixtures will be installed with 1/8-inch safety cable and four Crosby clamps (two top and two bottom) to be used as a fixture support backup.

END OF SECTION

PART 1 - GENERAL

Not used.

PART 2 - PRODUCTS2.1 PRODUCTS

Provide a complete emergency power system including power plant powered by diesel engine driven generator and operated by means of a signal from an automatic transfer switch. The system shall be complete, tested, and meet all the functional requirements of a fully automatic emergency power source, serving full load power stabilized at rated voltage and frequency within 10 seconds after normal power source fails.

2.2 The power plant supplier shall be a factory authorized distributor and/or dealer with parts stocking within a 50 mile radius of job site, he shall run factory and field tests on the assembled power plant and shall give a 2 year warranty. All field installation, tests, and operational problems during warranty shall be his sole responsibility. He shall furnish factory trained Engineer for a minimum 2 working days or as needed to satisfy Architect and Owner that system is functioning properly.

2.3 Acceptable suppliers are Caterpillar, Onan or Kohler, no substitutes. (Olympian generators are not acceptable.)

2.4 POWER PLANT: Rating based on continuous power stand-by rating of generator and with capabilities to carry 100% full load for 4 hours without damage to engine, generator or components, and with capabilities or motor starting while carrying full connected load as shown on drawings.

Common base, capable of skidding into place.

Minimum 18" flexible section in all electrical, fuel and exhaust lines at connection to power plant.

Flexible steel disc coupling to engine generator.

Lifting brackets.

Factory finish in corrosion resistant light grey.

Necessary filters, after burners, or equipment required so that all local, state and government regulations are met with regard to antipollution during start as well as run period for emergency power plant.

Vibration isolator springs by Caldyn.

Restraint brackets to prevent vertical or horizontal movement of over 1/2" during seismic shock.

Critical quality muffler.

Outdoor enclosure with removable panels for equipment access (unless noted otherwise on the plans).

Muffler shall be totally enclosed with outdoor enclosure

240 gallon, double wall, base tank with detection alarm

## 2.5 ENGINE

1800 rpm, naturally aspirated or turbo-charged. Inter-cooling or after cooling is not acceptable.

Starting by battery driven starter. Include charging generator with voltage regulator; cranking sequencer which will give four start attempts before locking out; over-cranking protection; pre-wired adjustable (120-140 F) water jacket heater thermostatically controlled or 'Kim Hotstart' pre-heater, and wired through an oil pressure disconnect switch to a terminal strip for 120 or 208 V remote source.

Governor high speed electronic, Woodward #2301 or approved equivalent, as required to maintain generated frequency at 60 Hz at 75% full load within a steady state band width of +/- .25%. Frequency shall not vary over 3% from no load to full load. Governors using engine crankcase lube oil will not be acceptable. Include a safety break-up centrifugal type limiting speed governor as part of the fuel system to limit speed to 110% of rated RPM.

Fuel and lubrication systems for diesel engine, complete with replaceable element type air cleaner; primary and secondary fuel filter and oil filter; full pressure lubrication system with positive displacement lube oil pump and spring loaded bypass valve; lube oil cooler. Main fuel tank to be contained within the skid frame base and shall be minimum 240 gallon capacity or 24 hour capacity at full load, whichever is greater.

Cooling system with sufficient capacity for cooling engine when generator is delivering 115% full load for two hours at ambient of 100 degrees F. Include water circulating pump and thermostatic valve to maintain recommended engine temperature; radiator with drain and air vent and fan with protective guard; two jacket water corrosion resistant elements. Radiant shall be filled with antifreeze solution of strength as recommended by manufacturer.

Exhaust system with critical 3 chamber Kittel TR model silencer; flexible 18" minimum length exhaust adapter, sized as recommended by engine supplier for each exhaust on engine; and drawing with shut-off valve at lowest point of silencer.

Battery for engine start, 24 volt DC, sized for four starts at 30 seconds cranking duration each, with ambient of 15 degrees F., mounted on earthquakeproof tray in enclosure with all necessary battery cables, hydrometer, and including separate battery charger with high rate and trickle charge and with DC voltmeter, DC ammeter and circuit for low voltage alarm.

Auxiliary switches for overspeed trip and automatic overspeed shutdown by air door control at a speed 10% greater than the normal specified operating RPM. The engine shall shut down on overspeed, low oil pressure, high oil temperature, and high water temperature by

means of auxiliary switches, actuating signal lights and alarms.

Temporary batteries may be used for testing but new, unused batteries shall be furnished after final testing is complete and before acceptance.

## 2.6 GENERATOR

Voltage and phases per plans, 60 Hz, 12 wire rated at 0.8 power factor stand-by service and rating as shown on drawings.

Brushless, balanced 4 pole revolving field type with rotating rectifier exciter mounted on end of shaft, single ball bearing support to stator housing rotor connected by semi-flexible steel disc coupling to engine flywheel to assure permanent alignment free of injurious torsional vibrations at speeds up to 125% of synchronous.

Insulation in accordance with latest NEMA standards using minimum Class F materials.

Voltage regulator of static solid state design to give plus or minus 2% regulation from no-load to full-load; instantaneous voltage dip less than 20% of rating when full-load at rated power factor suddenly applied: and recovery to stable operation of voltage within 1% of rating within 4 seconds. Manual adjustment of plus or minus 5% of normal to be included by a lockable device or screwdriver slot in rheostat shaft. All voltage sensing 3-phase. Include field forcing to assure 300% full load current during fault.

Shielding of generator, exciter and regulator in accordance with most recent mil specification to prevent radio frequency interference.

## 2.7 CONTROL EQUIPMENT

Panel mounted with vibration isolators to plant frame.

Panel to include self illumination from generator circuit.

Control equipment to include hardware and software to interface with end users BACnet system. Notification to BACnet shall include all error and warning notices and all normal functions. Hardware (plus cabling), software and programming shall be included with this equipment.

Devices - frequency meter; running time meter, voltage adjusting rheostat; AC voltmeter, ammeter and respective 3-phase selector switches; 3 current transformers; manually operated molded case circuit breaker; engine water temperature gauge with high temperature cut out and red warning light; engine oil pressure gauge with low pressure cut out and red warning light; overspeed cut out with red warning light; overcrank red indicator light; low battery voltage red indicator light; low battery voltage red indicator light; engine control switch labeled "OFF", "AUTOMATIC", "MANUAL", and "TEST", with red indicating light when switch in other than automatic position; vernier throttle or speed control to permit manual adjustment to within 1/4 Hz; nameplates giving designations of all devices and one reading "WARNING". Return to automatic position for generator to function; instrument scales shall not exceed 150% of unit full load rating; all devices wired through terminal blacks so signal and alarm circuits can be readily wired to remote locations.

Provide indicator building panel in the Police Station (24 light NFPA standard panel) with the following devices in the security office:

Green pilot light with engraving to indicate 'engine running'.

One audible alarm with silencing switch and red warning light to indicate engine start failure. Engrave alarm silencing switch "ON" and "OFF". Provide warning on switch to return to "ON" position when trouble has been corrected.

### PART 3 - EXECUTION

- 3.1 The engine generator set shall be mounted on a rigid steel chassis suitable for installations of spring isolators.
- 3.2 Bolt the isolators to anchors fastened in the floor slab. When anchors are set in the slab, the bolts shall be in place when concrete is poured to prevent filling of anchor holes. The generator frame shall be grounded to local grounding system.
- 3.3 Ground generator neutral solidly to system ground electrode.
- 3.4 Provide seismic restraints to limit vertical and horizontal movement to 1/2" during seismic shock.
- 3.5 Before delivery to the site, the set shall be given a preliminary operation and load test as an assembled power plant. The tests shall include load test with resistance loads at 25, 50, 75, and 100 of the specified continuous full load capacity of the generator and shall be run at 115% for on hour to assure performance of all specified functions. Certified factory test reports shall be submitted showing all data requested below under Paragraph H.
- 3.6 Upon approval of the preliminary performance, the sets, complete with equipment and controls, shall be delivered to the site and installed by the Electrical Contractor at least 30 days before completion of the contract. Wiring diagrams for the complete installation shall be framed and mounted on the wall in generator room.
- 3.7 Upon completion of the installation work, including electrical connections, grounding, and controls; the Electrical Contractor shall provide all necessary facilities, instruments and equipment, including approved electrical loads required for the load tests, arrange for test runs as follows:  
  
Load tests a 0, 1/4, 1/2, and 3/4 until readings are constant for 10 minutes. (Each load test is a 20 minute minimum).  
  
100% full load test for 4 hours shall be made consecutively with the above test.  
  
Vibration analysis to insure that final installation conforms to engine and generator manufacturer's certified performance.
- 3.8 After complete emergency facilities are connected, load tests shall be run as under and above up to the maximum actual load available from connected equipment. Contractor shall schedule both tests with the Owner's representative and notify the Architect of the schedule so that final tests may be witnessed.



3.9 Readings required during both preliminary and final tests shall be taken and shall include the following:

Frequency

Voltage

Current

Wattage

Ambient temperature

Water Temperature

Exhaust air temperature

Generator frame temperature

Oil pressure and temperature.

3.10 Furnish complete records of the preliminary factory and field tests and of the actual total load tests in quintuplicate to the Owner for review. This data must be submitted before equipment will be accepted.

3.11 Emergency Generator Unit shall be in a weather protective housing with factory installed exhaust silencer.

3.12 (4) sets of factory maintenance and factory instruction manuals shall be provided.

END OF SECTION



**1.00 - GENERAL**

1.01 **SUBMITTALS:** Submittals for approval shall include a letter from the manufacturer, or his local representative, stating that the manufacturer will issue notarized certification of compliance, as specified below.

- A. **Service:** The manufacturer must have a factory warehouse, at which spare parts are stocked and where a Field Service Engineer permanently resides, located within 50 miles of the jobsite. The Field Service Engineer shall be a full time employee of the manufacturer, factory trained, and one whose primary duty is field service.
- B. **Certification:** Upon completion of manufacturing, the manufacturer shall issue a notarized letter certifying compliance with the specifications which is signed and sealed by a registered professional engineer who is a full time employee of the manufacturer. The certifications shall identify all equipment by serial number(s) and shall not contain any exceptions to the final specifications.

**2.00 - PRODUCTS**

2.01 **GENERAL:** Furnish and install automatic transfer switch with the amperage, voltage, number of poles, and withstand ratings as shown on the drawings. Switch shall be listed per U.L. STD. #1008 as a recognized component for emergency systems and rated for all classes of loads when installed in an unventilated enclosure. Switch must be capable of handling 100% tungsten-filament lamp loads without derating. Switch shall be rated to exceed the available fault current switch.

2.02 **CONSTRUCTION:** Switch shall be electrically operated and mechanically held by a single or double solenoid direct operating mechanism. Switch shall have adequately sized and mechanically braced contacts to withstand momentary surge currents during transfer and retransfer. Each switch shall be capable of manual operation by one person.

**2.03 ACCESSORIES FOR GENERATOR TRANSFER SWITCH:**

- A. Non-adjustable (one second, nominal) time delay to override momentary dips in normal source.
- B. Full phase voltage relay supervision of the normal source (65%-70% D.O. and 92%- 95% P.U.) with at least one close differential relay (83%-85% D.O. and 92%-95% P.U.) to detected "Brown-Out" conditions.
- C. Voltage/Frequency lockout relay (90% P.U. nominal) to prevent premature transfer.
- D. Auxiliary pilot contacts rate 10 amperes at 480 V.A.C. (two closed on "N" and two closed on "E").
- E. System test switch (momentary type).
- F. Pilot lights to indicate source to which the load is connected.
- G. Adjustable air diaphragm time delay (0-2 minutes) on transfer to emergency source.

- H. Adjustable (2-25 minutes, nominal) time delay on retransfer to normal.
- I. Gold plated engine starting control contacts (one N.C. and one N.O.).
- J. Insulated neutral plate.
- K. Non-adjustable time delay (5 minutes, nominal) on shutdown of engine generator after retransfer of the load to normal.
- L. Adjustable automatic plant exerciser for weekly operation with necessary engine cool down timing control.

2.04 ACCEPTABLE MANUFACTURERS: Asco or Russelectric.

3.00 - EXECUTION

3.01 Generator transfer switch shall be wall mounted as shown on drawings.

END OF SECTION

**1.00 - GENERAL****1.01 WORK INCLUDED**

Provide all labor, materials, tools, and equipment required for the complete installation of work as called for in the Contract Documents

**1.02 SCOPE**

- A. This section includes the copper and optical fiber installation and terminations requirements
- B. This section includes minimum requirements for the following:
  - a) A 50-pair PE-89 type OSP UTP cable will be homerun from each building's IDF, through designated manholes and handholds, to campus utility space ES-8, where-in they will be spliced to an existing 300-pair PE-89 cable using 3M 710 style splice blocks, and housed within an existing Preformed splice closure.
  - b) Within each IDF the 50-pair UTP cable will be directly terminated into NORDX/CDT Gigabix™ rackmount enclosure within 19" relay rack mounted in room 142. Cables will be properly grounded via #6 ground conductor to in-room telecommunications ground bus.
  - c) An OSP fiber 24 strand Multimode 50um plus 12 strand Singlemode, will be installed from each building's IDF homerun to campus utility building ES-8, via designated manholes and handholds as indicated on campus infrastructure documents. Fibers will be terminated within G-building in the existing sub-floor IDF-1 and will be installed into an existing Belden/CDT Fiberexpress™ rackmount enclosure within the IDF. Fiber to be installed in MaxCell textile innerduct MXC-3003.

**1.03 RELATED SECTIONS**

- A. Related Documents – Drawings and Specifications, including General and Special Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Work of other Sections – Coordinate the Work of this Section with the Work of other Sections as required to properly execute the Work and as necessary to maintain satisfactory progress of the Work of the Sections. Other sections containing related Work, but not limited to, are the following:
  - 1. Section 16111 – Conduits and Raceways
  - 2. Section 16135 – Cable Tray (Flex-Tray)
  - 3. Section 16710 –General Requirements
  - 4. Section 16711 – Communications Rooms and Spaces
  - 5. Section 16716 – Communications Horizontal Cabling

**1.04 QUALITY ASSURANCE**

- A. All cable shall be installed in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the contract documents shall be subject to the control and approval of the District's

Representative. Equipment and materials shall be of the quality and manufacture indicated. The equipment specified is based upon the acceptable manufacturers listed. Where "or equal" is stated, equipment shall be equivalent in every way to that of the equipment specified and subject to approval.

- B. Materials and work specified herein shall comply with the applicable requirements of:
1. ANSI/TIA/EIA-568-B.1 -- Commercial Telecommunications Wiring Standard General Requirements: Cabling and Field Testing.
  2. ANSI/TIA/EIA-568-B.2 -- Commercial Telecommunications Wiring Standard Copper Requirements: Connectors and Cables
  3. ANSI/TIA/EIA-568-B.3 -- Commercial Telecommunications Wiring Standard Fiber Requirements: Cabling And Field Testing
  4. EIA/TIA-569 – Commercial Building Standard for Telecommunications Pathways and Spaces.
  5. TIA/EIA-606 – Administration Standard for Telecommunication Infrastructure of Commercial Buildings.
  6. TIA/EIA- 607 – Commercial Building Grounding and Bonding for Telecommunications.
  7. ANSI/TIA/EIA – 758, Customer-Owned Outside Plant Telecommunications Cabling Standard, April 1999
  8. BICSI - TDMM, Building Industries Consulting Services International, Telecommunications Distribution Methods Manual (TDMM) – 9th Edition, 2000
  9. National Fire Protection Agency (NFPA – 70), National Electrical Code (NEC) -National Electrical Manufacturers Association (NEMA).
  10. American Society for Testing Materials (ASTM).
  11. National Electric Code (NEC).

#### 1.05 SUBMITTALS

- A. Manufacturers catalog sheets, specifications and installation instructions shall be provided for all products to be installed within the scope of work included under this contract. (submit with bid).
- B. Test Results and Documentation.

### PART 2 - PRODUCTS

#### 2.01 COPPER RISER CABLE

- A. Materials – ANSI/TIA/EIA Category 3 compliant, 24-gauge, twisted pair, solid conductor, CMR rated, flame retardant jacket, pair count as specified on the drawings. ANSI/TIA/EIA Category 5e powersum, 25-pair, 24-gauge, twisted

pair, solid conductor, CMR rated, flame retardant jacket, pair count as specified on the drawings.

B. Manufacturer – Belden/CDT or equal.

#### 2.02 OPTICAL FIBER CABLE (RISER)

A. Materials –UL OFNR/CSA FT4 rated multi-fiber cable containing 900 micron tight-buffered fibers surrounded by dielectric strength members and a flame retardant outer jacket. Cable shall contain composite 12 strand singlemode/24 strand multimode (50um) optical fibers.

B. Manufacturer – OCC DX series or equal.

#### 2.03 OPTICAL FIBER INNERDUCT (OSP)

A. Materials – Textile 3-celled 3" innerduct with independent pull-lines per cell.

B. Manufacturer – MaxCell Part# MXC-3003 or equal.

#### 2.04 OSP RATED OPTICAL FIBER OPTIC CABLE

A. Materials – Flame –retardant, UV-stablized, fully waterblocked for use in indoor/outdoor applications. Dielectric jacketed, loose-tube construction composite 12 strand singlemode/24 strand multimode (50um) optical fiber cable. Note: All loose tube cables must be provided with the appropriate fan-out kits to transition from loose tube construction to tight buffered (900 micron) fiber for termination.

B. Manufacturer –CORNING (P/N 036XWF-A7396A20) or equal. Fan-out kit – CORNING (P/N FAN-BT25-06) or equal.

#### 2.05 VOICE CABLE TERMINATION BLOCKS

A. 100 pair, rack mounted, GIGABIX TYPE IDC-type blocks, fully loaded with 5-pair connecting blocks, complete with designation stripes and distribution rings. Representative product: P/N AX101985

B. Manufacturer: NORDX

#### 2.06 FIBER OPTIC CONNECTORS

A. Materials – SC-type, with ceramic ferrule, bayonet style mounting

B. Manufacturer –3M Hotmelt™ 6300 MM and 8300 SM.

#### 2.07 FIBER OPTIC TERMINATION HARDWARE

A. Materials – At new building IDF-1.1 install 19" Rack-mountable 2RU (3.5") high Belden FiberExpress P/N AX101943 housing with optional 1U cable manager. Appropriate Belden FiberExpress modules to accommodate terminated fiber to be provided at both ends.

B. Manufacturer –Belden

#### 2.08 OSP COPPER SPLICE CASE AND SPLICE MODULES

A. Materials – OSP rated, multiple entry, straight in-line type with 900 pair capacity. Complete with appropriately sized and fitted endplates, 710-type connecting modules and grounding hardware. Installed in premises entrance

IDF at CDC end, pre-existing at LRT end..

- B. Manufacturer – Preformed Line Products, 3M, Avaya

## 2.09 LABELS

- A. Materials: Vinyl plastic type that meet UL 969 requirements, preprinted or laser printed type, and easily distinguishable.
- B. Manufacturers – Panduit, W.H. Brady, Ideal.

## PART 3 - EXECUTION

### 3.01 SYSTEM DESCRIPTION

Only new equipment and material, produced by manufacturers that are recognized nationally by the telecommunication industry and approved by Underwriters Laboratory shall be used as specified in this Section or as shown on the Drawings.

### 3.02 SURFACE CONDITIONS

Examine the areas and conditions under which the work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

### 3.03 INSTALLATION:

- A. Contractor shall install all cables, frames, blocks, cable management, connectors, manhole cable rack hardware, and all appropriate termination mounting hardware.
- B. Contractor shall utilize conduits and cable trays as specified in the plans for the placement of voice and data backbone cables.
- C. Within final entry/exit manhole and/or handholds, each OSP cable is to make a service rotation of the interior space so-as to establish a usable service-loop. Additionally, within each terminus room a minimum 8' service loop of each cable is to be secured to the wall.
- D. Where penetrations through fire rated walls, acoustical or other walls for cable-ways have been provided for the Contractor, such penetrations shall be sealed by the Contractor in compliance with applicable code requirements and as directed in Section 16710.

### 3.04 BONDING AND GROUNDING

The Contractor shall be responsible for ensuring ground continuity by properly bonding all appropriate cabling, closures, cabinets, service boxes, and framework. All grounds shall consist of #6 AWG copper wire and shall be attached to an approved building ground which is bonded to the main electrical ground. Grounding must be in accordance with ANSI/TIA/EIA-607, NEC, NFPA and all local codes and practices.

### 3.05 IDENTIFICATION & LABELING

- A. Confirm specific labeling requirements with customer's project coordinator prior cable installation or termination.
  - 1. Backbone cables shall be marked at each endpoint and at all intermediate pull/ access points or junction boxes. Label shall indicate



origination and destination ID, sheath ID and strand or pair range.

2. The contractor shall develop and submit for approval a labeling system for the cable installation. The District will negotiate an appropriate labeling scheme with the successful contractor. At a minimum, the labeling system shall clearly identify all components of the backbone system: racks, cables, and patch panels. The labeling system shall designate the cables origin and destination and a unique identifier for the cable within the system. Racks and patch panels shall be labeled to identify the location within the cable system infrastructure. All labeling information shall be recorded on the as-built drawings and all test documents shall reflect the appropriate labeling scheme.
3. All label printing will be machine generated by system software using indelible ink ribbons or cartridges. Self-laminating labels will be used on cable jackets, appropriately sized to the OD of the cable, and placed within view at the termination point on each end

### 3.06 ACCEPTANCE TESTING

- A. All distribution cables shall meet or exceed all performance specifications designated by ANSI/EIA/TIA 568-B, and IEEE for telephone and data communications.
- B. No later than five days after testing, Contractor shall furnish the Owner with a documentation binder and electronic disks of all test results from OTDR and power meter test equipment. Electronic copies of test results must be presented in format acceptable to the District (runtime software application included in necessary). The content requirements for these forms are described in the following sections.
- C. Copper Cables: Testing of all copper wiring shall be performed prior to system cut-over. 100 percent of the OSP and horizontal wiring pairs shall be tested for opens, shorts, polarity reversals, transposition and presence of AC voltage. Test shall include length, mutual capacitance, characteristic impedance, attenuation, and near-end and far end cross-talk. The Contractor, at no charge shall bring any pairs not meeting the requirements of the standard into compliance with the standards and specifications. Complete, end to end test results must be submitted to the District. Test results for each of the above tests and associated cable lengths shall be generated by an automated testing device. Test results must be permanently recorded and presented for review in both hardcopy and in a computer-readable format.
- D. Fiber Optic Cables - No later than five days after testing, Contractor shall furnish the Owner with a documentation binder and electronic disks of all test results from OTDR and power meter test equipment. Electronic copies of test results must be presented in a readable format (runtime software application included in necessary). The content requirements for these forms are described in the following sections.
  1. OTDR Test Results
    - a) Contractor shall furnish on disc with application software, electronic strip charts and/or tracer recordings on each and every fiber strand in each and every cable in one direction at both 850 and 1300 nanometer wavelengths for multimode fiber, 1310 and 1550 for singlemode, with the

following information:

- 1) Date of test
- 2) Name of test personnel
- 3) Test wavelength
- 4) Pulse duration(s) and scale range(s)
- 5) Index of refraction
- 6) Fiber cable type and part number
- 7) Fiber tube and/or fiber strand number
- 8) Direction of test
- 9) Overall distance in meters
- 10) Attenuation in dB or dBm

2. Power Meter Test Results

a) Contractor shall furnish attenuation assessments for both 850 and 1300 nanometer wavelengths for multimode fiber and 1310 and 1550 for singlemode on each and every fiber in each and every cable, in both directions with the following information:

- 1) Date of test
- 2) Name of test personnel
- 3) Fiber cable type and part number
- 4) Fiber number
- 5) TX wavelength
- 6) TX location
- 7) RX location
- 8) TX model and serial number
- 9) RX model and serial number
- 10) Attenuation dB or dBm

3. Contractor may be required to perform additional testing as required by District to ensure compliance with mated pair connection loss, splice loss and overall link loss. Any cables failing to meet above indicated standards must be removed and replaced, at no cost to the District, with cables, which prove, in testing, to meet the standards. The installation will not be accepted until testing has reported that all pairs meet the appropriate standards.

3.07 PROJECT RECORD DOCUMENTATION

- A. Prepare and submit under provisions of Section 01340. The Subcontractor must provide a database of cable records, both hard copy and on floppy disk, using District approved format (Excel spreadsheet or otherwise specified) for use by the District for cable and facilities management. The cable records format must include, at a minimum, the following information about each cable

1) Distribution Cable Pair Assignments.

2) Test Results.

- B. Three (3) sets of reproducible as-built floor plans plus vertical rack elevations and wall mounted termination field details in digital format (AutoCAD v.14) showing all installed cables, pair and strand assignments, routing, terminal and outlet locations, patch panels and labeling conventions.
- C. These documents must be delivered to the District no more than 20 working days after completion and acceptance of Contractor's work.
- D. Two (2) sets of B-size plans, in color and laminated, illustrating all station locations and designations, to be provided to the District upon completion of the testing. One copy to be affixed to the IDF door, and one copy to be provided for archival purposes to the District.

END OF SECTION



**PART 1 - GENERAL****1.01 SUMMARY**

This Section establishes the general requirements for the installation of voice and data intra-building horizontal cabling and terminations. Work under this section includes providing all labor, materials, tools, and equipment required for the complete installation of work called for in the Contract Documents.

**1.02 RELATED SECTIONS**

- A. Related Work of other Sections - Coordinate the Work of this Section with the Work of other Sections as required to properly execute the Work and as necessary to maintain satisfactory progress of the Work of other Sections. Other Sections containing related Work, but not limited to, are the following:

1. Section 16111 – Conduits and Raceways
2. Section 16710 –General Requirements
3. Section 16711 – Communications Rooms and Spaces
4. Section 16715 – Backbone Cabling Requirements

- B. Products Furnished and Installed by Others

1. All phone instruments and voice cross-connects and data patching.

**1.03 SCOPE OF WORK**

- A. This section covers all horizontal media and associated hardware required to connect all the work area outlet to their prospective telecommunications rooms as described on the working drawings. All horizontal cables shall be run from the outlet location to the telecommunications room in one complete segment.

- B. The horizontal cabling requirements for voice and data network services from the Telecommunication Rooms terminal hardware to the work area information outlets, as shown on the drawings, are as follows:

1. Staff workstations: two Category 5E-pair enhanced 4-pair UTP, CMR rated cable for voice services plus two Category 6 enhanced performance 4-pair UTP CMR rated cable for data services. Typical mounting will be in a single-gang bezel cover a 4S box.
2. Courtesy workstations: two Category 6 enhanced performance 4-pair UTP, CMR rated cables for data services.
3. Student workstations: Typically installed into Wiremold 5400 raceway, but periodically appearing within in-wall or surface-mount conduit, these stations include from two to six Category 6 enhanced performance 4-pair UTP, CMR rated cables depending upon individual symbols within the plans.

- C. The installation of new horizontal data connecting hardware and cable wiring systems that will provide voice and data network connectivity to the workstation outlets shall meet or exceed the following performance parameters:
1. Voice Cable - Category 5E (enhanced) specifications as described in ANSI/TIA/EIA 568- B.1.
  2. Data Cable – Category 6 specifications as described in the SP 3727 AD1-ANSI/TIA/EIA Draft Standard for the Transmission Performance Specifications for 4 pair 100 ohm Category 6 Cabling.

#### 1.04 CONFORMANCE

- A. Work and materials shall conform to the latest rules of the National Electric Code, the National Board of Fire Underwriters (wherever standards have been established), the National Fire Protection Association (NFPA 70-latest edition), the regulations of the State Fire Marshall, all OSHA regulations and requirements (specifically, the Telecommunication Safety Orders), and the building fire and electrical codes of the County of Ventura, California. Nothing in these specifications shall be construed to permit work not conforming to the most stringent of applicable codes.
- B. Should any change be necessary to the Drawings or Specifications to make the work comply with these requirements, the District shall be notified at once by the Contractor, and he shall temporarily cease work on all parts of the contract, which are affected.

#### 1.05 QUALITY ASSURANCE

- A. All cable shall be installed in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the contract documents shall be subject to the control and approval of the Architect. Equipment and materials shall be of the quality and manufacture indicated. The equipment specified is based upon the acceptable manufacturers listed. Where the phrase or equal is stated, equipment shall be equivalent in every way to that of the equipment specified and subject to approval.
- B. Strictly adhere to all both industry and Belden/CDT specified installation practices when installing the cabling. A manufacturer audit will take place during installation and upon completion and any cables visually or electronically deemed unfit for performance will be replaced by the contractor.
- C. Use adequate numbers of skilled workmen thoroughly trained and experienced on the necessary crafts and completely familiar with the specified requirements and methods needed for the proper performance of the Work in this Section.
- D. Materials and work specified herein shall comply with the following:
1. ANSI/TIA/EIA-568-B.1 -- Commercial Telecommunications Wiring Standard General Requirements: Cabling and Field Testing.
  2. ANSI/TIA/EIA-568-B.2 -- Commercial Telecommunications Wiring Standard Copper Requirements: Connectors and Cables
  3. ANSI/TIA/EIA-568-B.3 -- Commercial Telecommunications Wiring

Standard Fiber Requirements: Cabling And Field Testing

4. EIA/TIA-569 – Commercial Building Standard for Telecommunications Pathways and Spaces.
5. TIA/EIA-606 – Administration Standard for Telecommunication Infrastructure of Commercial Buildings.
6. TIA/EIA- 607B – Commercial Building Grounding and Bonding for Telecommunications.
7. ANSI/TIA/EIA – 758, Customer-Owned Outside Plant Telecommunications Cabling Standard, April 1999
8. BICSI - TDMM, Building Industries Consulting Services International, Telecommunications Distribution Methods Manual (TDMM) – 9th Edition, 2000
9. National Fire Protection Agency (NFPA – 70), National Electrical Code (NEC) -National Electrical Manufacturers Association (NEMA).
10. American Society for Testing Materials (ASTM).
11. National Electric Code (NEC).

1.06 SUBMITTALS

- A. Manufacturers catalog sheets, specifications and installation instructions for all cable, termination and splicing hardware, and protector panels.
- B. Comply with the provisions of Section 01340.

1.07 DELIVERY AND STORAGE

- A. Delivery of Materials - Deliver material (except bulk materials) in manufacturer's unopened containers fully identified with manufacturer's name, trade name, type, class, grade, size and color.
- B. Storage of Materials - Store materials in unopened containers. Store off ground and under cover, protect form damage.

PART 2 - PRODUCTS

2.01 VOICE STATION TERMINATION BLOCKS (COMMUNICATIONS ROOMS)

- A. Materials – GigaBIX type IDC-type punch down modular jack connectors, 3U rack mounted, 100 pair mounts using 4-pair designated blocks or modules. Rack elevation details to be provided at time of installation by College District personnel. . . Representative product P/N AX101955
  1. Connecting blocks shall contain double ended, insulation displacing quick clips that terminate 22-26 gauge conductors. These clips shall provide gas tight connection between the conductor and cross-connect wire and shall be fully enclosed in non-conductive plastic, eliminating the possibility of accidental contacts on circuits.

2. Each 25-pair module shall be properly connectorized with appropriate connecting blocks per the cable type terminated. Provide all associated hardware (distribution rings, mounts, and labeling components) to insure a complete installation as described in the manufactures documentation.

B. Manufacturer – Belden/CDT (type IBDN)

C. Quantity – Provide termination blocks in quantities sufficient to terminate all circuits as shown on the drawings, including capacity to accommodate a growth factor of 25 percent.

#### 2.02 DATA STATION CROSS CONNECT – COPPER CABLE (COMMUNICATIONS ROOMS)

A. Materials – Belden/CDT GigaBIX patch panels mounted within open relay rack or enclosures stipulated within section 16711 and indicated in the plans. Rack elevation details to be provided at time of installation by College District personnel. Representative product P/N AX101611. All panels will be provided with optional cable support bracket.

#### 2.03 DATA STATION PATCH PANELS – OPTICAL FIBER CABLE (COMMUNICATIONS ROOMS)

A. Materials – Belden/CDT IBDN FiberExpress 1U fiber housing and suitable FiberExpress modules. Representative product P/N AX101943 housing with AX102032 management kit; plus modules AX101714 12-LC multimode and AX101944 6-LC singlemode

B. Quantity – One each per IDF

#### 2.04 HORIZONTAL VOICE CABLE

A. Materials – 24 AWG solid copper 4 twisted pair type CMP or CMR rated as required by installation pathway, Category 5e cable. Color: white.

B. Manufacturer – Belden/CDT (type 1200 series).

#### 2.05 HORIZONTAL DATA CABLE – COPPER

A. Materials - 24 AWG solid copper 4 twisted pair type CMP or CMR rated as required by installation pathway, Category 6 cable. Color: blue.

B. Manufacturer – Belden/CDT (type 4800 series).

#### 2.06 WORK AREA OUTLETS

A. Materials - Voice - modular, IDC connecting block, 6 pos. RJ13 Category 5e rated. Color: Ash

B. Materials - Data - modular, IDC connecting block, 8 pos. RJ45, Category 6 rated.



Color: Blue

- C. Materials - Voice only, surface mount, stainless steel faceplate, with phone mounting brackets. RJ45, 568A wired.
- D. Manufacturer – Belden/CDT, CSI/Suttle Apparatus

#### 2.07 STATION OUTLET FACEPLATE

- A. Materials - Voice/Data – 4, 6, or 8 port single gang, to be used with double-gang outlet box fitted with a single-gang reducer, as specified on the construction drawings. Color: coordinate with Architect prior to ordering. Installations within surface boxes or in-wall junction boxes will use Belden/CDT MediaFlex faceplates, representative product P/N AX101713
- B. Manufacturer – Belden/CDT

#### 2.08 CUSTOM MILLWORK/ SURFACE MOUNT FURNITURE OUTLET ADAPTER

- A. Materials – 6 port fire retardant plastic, UL94V-0, multi-media outlet box, side entry with snap on cover, for mounting directly to wall/furniture surface or standard electrical box. Color: coordinate with project architect.
- B. Manufacturer – Belden/CDT (type MDVO)

#### 2.09 MODULAR FURNITURE OUTLET ADAPTER

- A. Materials – 4 port fire retardant plastic, UL94V-0, snap-in module, sized to fit standard modular furniture runway knockouts 69.3 x 34.7 mm (2.73 x 1.37 in.). Color: coordinate with project architect.
- B. Manufacturer – Belden/CDT (type MDVO)

#### 2.10 WIREMOLD 5400 RACEWAY OUTLET ADAPTER

- A. Materials – Where activating 5400 series raceway, use standard wiremold 5450 series device adapters. For data outlets, supplement this with Wiremold modular components activation faceplate P/N AC-SFP-001, modular jack adapter P/N 2A-U2NOR and fillers as necessary P/N 2A-BL.
- B. Manufacturer – CommScope, PN 2277K or equal.

#### 2.11 LABELS

- A. Materials: Vinyl plastic type that meet UL 969 requirements, preprinted or laser printed type, and easily distinguishable.
- B. Manufacturers – Panduit, W.H. Brady, Ideal

### PART 3 - EXECUTION

### 3.01 SURFACE CONDITIONS

Examine the areas and conditions under which the Work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 WARRANTY

- A. Properly installed and audited, Belden/CDT extends a (25) twenty-five year Extended Product and Application Assurance Warranty for the data wiring system which includes all intra-building data horizontal wiring and components, and all new optical inter-building cabling and components. This may only be secured through the use of an authorized and in good-standing Belden/CDT Certified Systems Vendor (CSV). A list of CSVs may be obtained by contacting Belden/CDT, and there are several in the Southern California region.
- B. Minimum 25-Year Extended Product Warranty
  - 1. The minimum 25-Year Extended Product Warranty shall ensure against product defects. All approved cabling components shall exceed the specifications of TIA/EIA-A and ISO/IEC IS 11801 and exceed the attenuation and NEXT requirements of TIA/EIA TSB 67 and ISO/IEC IS 11801 for data cabling links/channels. The cable installation will exceed the loss and bandwidth requirements of TIA/EIA TSB 67 and ISO/IEC IS 11801 for fiber links/channels, for a minimum fifteen (25) year period. The warranty shall apply to all passive data components.
  - 2. The 25-Year Extended Product Warranty shall cover the replacement or repair of defective product(s) and labor for the replacement or repair of such defective product(s) for a minimum (25) fifteen year period.
  - 3. Minimum 25-Year Application Assurance and Channel Performance Warranty
    - a) The minimum 25-Year Application Assurance and Channel Performance warranty shall cover the failure of the data wiring system under normal and proper use. All components of the data solution shall exceed the specifications of the ANSI/TIA/EIA 568-B and IOS/IEC 11801 for component and link/channel specifications in support of applications currently standardized which include, but are not limited to, the following: 155 Mbps ATM, 100 Mbps Fast Ethernet, 100VG-AnyLan, 100 Mbps TP-PMD and 1000Base-T.

### 3.03 SYSTEM CERTIFICATION

- 1. Upon successful completion of the installation and subsequent inspection, the customer shall be provided with a numbered certificate, from the manufacturing company(s), registering the installation.
- 2. During installation, the manufacturing company(s) representative will request periodic review of work in-progress so-as to evaluate compliance to manufacturer installations standards. At such times the manufacturer representative will submit a request at least 48 hours in advance of the site visit. The contractor's signal and electrical personnel will be expected

to attend and take note of the manufacturer representative's exceptions.

### 3.04 INSTALLATION

- A. The Contractor shall provide and install all cables, frames, block, connectors, patch panels, wire management, equipment racks and all appropriate mounting hardware.
- B. The Contractor shall utilize conduits and cable tray for the placement of voice and data cables and wiring.
- C. In suspended ceiling and raised floor areas where conduits or cable tray are not available, the Contractor shall bundle cables (1-inch max. diameter) and support with j-hooks attached to the building structure and framework at a maximum of four-foot intervals. Properly rated Velcro straps shall be used in all appropriate areas.
- D. A workstation sites a service loop of no less than 6' will be secured above all ceiling locations, secured in service basket-tray where ceilings are open, and/or stowed out of site within or behind systems furniture as applies to the individual station type. For installations within Wiremold 5400 surface raceway, a service return of no less than 12" will take place where-in the cables for an individual station location will exceed the location and return leaving 24" working cable within the raceway.
- E. At the IDF termination site, a service loop of no less than 6' will be secured above the ladder rack in a manner so-as to avoid congesting the ladder but providing adequate rework for future terminations or locations within the rack elevations.
- F. Install all above ceiling cabling prior to installation of ceiling tiles. Coordinate timing of ceiling installation with General Contractor.
- G. Any Ceiling tiles broken or defaced by the cabling contractor during the installation and testing process shall be replaced at no cost to the District.
- H. Where penetrations through fire rated walls, acoustical or other walls for cable-ways are required, such penetrations shall be sealed by the Contractor in compliance with applicable code requirements and as directed by the District. The minimum sealing requirement is:
  - 1. Four inches of ceramic fiber or mineral wool tightly packed into opening to fill voids between cables, and
  - 2. A minimum of 1-1/2-inch thick layer of FSP Putty (Nelson Firestop #AA439) over the surface of forming material to fill annular space between cables and the conduit opening.

### 3.05 LOCATIONS

- A. Coordinate with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section. Install the work of this Section in strict accordance with the original design, the approved Shop Drawings, pertinent requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures as approved by the

Architect, anchoring all components firmly into position for long life under hard use.

### 3.06 WORK AREA OUTLETS

- A. Cables shall be coiled in the in-wall or surface-mount boxes if adequate space is present to house the cable coil without exceeding the manufacturer's bend radius. In hollow wall installations where box-eliminators are used, excess wire can be stored in the wall. No more than 12" of UTP and 36" of fiber slack shall be stored in an in-wall box, modular furniture raceway, or insulated walls. Excess slack shall be loosely coiled and stored in the ceiling above each drop location when there is not enough space present in the outlet box to store slack cable.
- B. Cables shall be dressed and terminated in accordance with the recommendations made in the ANSI/TIA/EIA-568-B document, manufacturer's recommendations and best industry practices.
- C. Pair untwist at the termination shall not exceed 12 mm (one-half inch).
- D. Bend radius of the cable in the termination area shall not be less than 4 times the outside diameter of the cable.
- E. The cable jacket shall be maintained to within 25mm (one inch) of the termination point.
- F. Data jacks, unless otherwise noted in drawings, shall be located in the bottom position(s) of each faceplate. Data jacks in horizontally oriented faceplates shall occupy the right-most position(s).
- G. Voice jacks shall occupy the top position(s) on the faceplate. Voice jacks in horizontally oriented faceplates shall occupy the left-most position(s).
- H. From the Communications Rooms as described in the drawings, install, terminate and test voice/data copper and coaxial cables in the quantities specified to each outlet as shown on the Communications drawings. These rooms are designated to support all low voltage systems for this section of the building. The Contractor is responsible for coordinating the location of all equipment and termination hardware, cable routing and management for all systems occupying this room. Proper clearances must be maintained to all equipment and workspaces. All station cables shall be home-run from the outlet to this room. Each cable shall be a complete segment, splicing is not allowed.
- I. Station Wiring Configurations
  - 1. Voice/Data Only Outlet:
    - a) The standard wiring is composed of two Category 5E, 4-pair cable for voice and two category 6, 4-pair cables for data. Each cable type shall be identified by a unique color, i.e. voice = white, data = blue. The cable color-coding shall be consistent throughout. In associated Comm. Room as specified on the drawings, all voice and data station cables shall be terminated. The voice cables on wall mount blocks and the data cables on rack mounted 48-port patch panels.

- b) At the student outlet, a two port, four port, or 6 port single-gang faceplate (or as specified on the drawings) shall support (4) modular RJ45 inserts. Each insert shall be colored coded, ie. Voice 1 & 2 = white, Data 1 & 2 = blue. The faceplate shall be colored as specified by the Project Architect.
2. Each voice-only station outlet is composed of one 4-pair Category 5E cable with a single RJ14 insert on a stainless steel faceplate with nodes for mounting a phone. The fourth pair is coiled and not terminated.

### 3.07 HORIZONTAL DISTRIBUTION CABLE INSTALLATION

- A. Cable shall be installed in accordance with manufacturer's recommendations and best industry practices.
- B. A pull cord (nylon; 1/8" minimum) shall be co-installed with all cable installed in any conduit.
- C. Cable raceways shall not be filled greater than the TIA/EIA-569-A maximum fill for the particular raceway type or 40%.
- D. Cables shall be installed in continuous lengths from origin to destination (no splices) except for transition points, or consolidation points.
- E. Where transition points, or consolidation points are allowed, they shall be located in accessible locations and housed in an enclosure intended and suitable for the purpose.
- F. The cable's minimum bend radius and maximum pulling tension shall not be exceeded.
- G. Within ceiling spaces, upon exiting homerun pathway (conduit, cable tray, basket tray, etc.), all horizontal cables shall be supported at a maximum of 48" (1.2 meter) intervals. At no point shall cable(s) rest on acoustic ceiling grids or panels. J-hooks are not acceptable, soft-surface, minimum 1" contact surface suspension slings will be used to support cable bundles from homerun pathway to drop location.
- H. Horizontal distribution cables shall be bundled in groups of no more than 24 cables. Cable bundle quantities in excess of 24 cables may cause deformation of the bottom cables within the bundle and degrade cable performance.
- I. Cable shall be installed above fire-sprinkler systems and shall not be attached to the system or any ancillary equipment or hardware. The cable system and support hardware shall be installed so that it does not obscure any valves, fire alarm conduit, boxes, or other control devices.
- J. Cables shall not be attached to ceiling grid or lighting fixture wires. Where support for horizontal cable is required, the contractor shall install appropriate carriers to support the cabling.
- K. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the contractor prior to final acceptance at no cost

to the District.

- L. Cables shall be identified by a self-adhesive label in accordance with the System Documentation Section of this specification and ANSI/TIA/EIA-606. The cable label shall be applied to the cable behind the faceplate on a section of cable that can be accessed by removing the cover plate.
- M. Unshielded twisted pair cable shall be installed so that there are no bends smaller than four times the cable outside diameter at any point in the run and at the termination field.
- N. Pulling tension on 4-pair UTP cables shall not exceed 25-lbf for a four-pair UTP cable.

### 3.08 HORIZONTAL CROSS CONNECT INSTALLATION

- A. Cables shall be dressed and terminated in accordance with the recommendations made in the TIA/EIA-568-A standard, manufacturer's recommendations and best industry practices.
- B. Pair untwist at the termination shall not exceed 13 mm (0.5 inch).
- C. Bend radius of the cable in the termination area shall not exceed 4 times the outside diameter of the cable.
- D. Cables shall be neatly bundled and dressed to their respective panels or blocks. Each panel or block shall be fed by an individual bundle separated and dressed back to the point of cable entrance into the rack or frame.
- E. The cable jacket shall be maintained as close as possible to the termination point.
- F. Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support ties. Cables labeled within the bundle, where the label is obscured from view shall not be acceptable.

### 3.09 TERMINAL BLOCKS AND FRAMES

- A. Set blocks and frames as indicated or specified.
- B. Install blocks and frames in plumb with building construction. Align properly.
- C. Use products of a single manufacturer for each type of equipment installed. Different manufacturers may be used for different types of equipment, if the requirements of the specification are fulfilled.

### 3.10 BONDING AND GROUNDING

The Contractor shall be responsible for ensuring ground continuity by properly bonding all appropriate cabling, closures, cabinets, service boxes, and framework. All grounds shall consist of #6 AWG copper wire and shall be attached to an approved building ground which is bonded to the main electrical

ground. Grounding must be in accordance with the ANSI/TIA/EIA-607, NEC, NFPA and all local codes and practices.

### 3.11 IDENTIFICATION & LABELING

- A. Confirm specific labeling requirements with customer's project coordinator prior cable installation or termination.
- B. Cables
  - 1. Backbone cables shall be marked at each endpoint and at all intermediate pull/ access points or junction boxes. Label shall indicate origination and destination ID, sheath ID and strand or pair range.
  - 2. Horizontal cables shall be marked at each end, on the sheath 6" from end, indicating the room and outlet to which the cable is wired. The contractor shall develop and submit for approval a labeling system for the cable installation. The District will negotiate an appropriate labeling scheme with the successful contractor. At a minimum, the labeling system shall clearly identify all components of the system. The labeling method will be determined mutually by District IT and campus IT staff at time of installation.

### 3.12 TESTING AND ACCEPTANCE

- A. General
  - 1. All cables and termination hardware shall be 100% tested for defects in installation and to verify cabling system performance under installed conditions according to the requirements of ANSI/TIA/EIA-568-B.1, and B.3. All pairs of each installed cable shall be verified prior to system acceptance. Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors in all cables installed.
  - 2. All cables shall be tested in accordance with this document, the ANSI/TIA/EIA standards, the NORDX Certification Program Information Manual and best industry practice. If any of these are in conflict, the Contractor shall bring any discrepancies to the attention of the project team for clarification and resolution.
  - 3. The District or it's representative will perform a 10% random test of all stations using the same test instrument used by the contractor. The resulting random tests will be compared with the results provided by the contractor. If a variance of more than 10% of the random sample occurs, or if there are performance effecting results found, than the customer will request a full retest of all stations take place with an independent test firm of it's choosing and at the expense of the contractor.
- B. Copper Channel Testing
  - 1. All twisted-pair copper cable links shall be tested for continuity, pair reversals, shorts, opens and performance as indicated below. Additional testing is required to verify Category performance. Horizontal cabling

shall be tested using a level IIe or level III test unit for category 5e or Category 6 performance compliance, respectively.

2. Continuity - Each pair of each installed cable shall be tested using a test unit that shows opens, shorts, polarity and pair-reversals, crossed pairs and split pairs. Shielded/screened cables shall be tested with a device that verifies shield continuity in addition to the above stated tests. The test shall be recorded as pass/fail as indicated by the test unit in accordance with the manufacturers' recommended procedures, and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested prior to final acceptance.
3. Length - Each installed cable link shall be tested for installed length using a TDR type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the ANSI/TIA/EIA-568-B.1, and B.3 Standards. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number. For multi-pair cables, the shortest pair length shall be recorded as the length for the cable.
4. Category 5e Performance
  - a) Follow the Standards requirements established in:
    - ANSI/TIA/EIA-568-B.1
  - b) A level IIe or better test unit is required to verify category 5e performance and must be updated to include the requirements of ANSI/TIA/EIA-568-B.1. A level III test unit is required to verify category 6 performance.
5. Category 6 Performance
  - a) Follow the Standards requirements established in:
    - SP-3727 AD1-ATIA/EIA Draft Standard
  - b) A level III test unit is required to verify proposed Category 6 performance.
  - c) The basic tests required are:
    - Wire Map
    - Length
    - Attenuation
    - NEXT (Near end crosstalk)
    - Return Loss
    - ELFEXT Loss
    - Propagation Delay
    - Delay skew
    - PSNEXT (Power sum near-end crosstalk loss)
    - PSELFEXT (Power sum equal level far-end crosstalk loss)

#### C. Fiber Testing

1. All fiber testing shall be performed on all fibers in the completed end to



end system. There shall be no splices unless clearly defined in an RFP. Testing shall consist of an end to end power meter test performed per ANSI/TIA/EIA-568-B.3. The system loss measurements shall be provided at 850 and/or 1300 nanometers for multimode fibers and 1310 and/or 1550 nanometers for single mode fibers. These tests also include continuity checking of each fiber.

2. For horizontal cabling system using multimode optical fiber, attenuation shall be measured in one direction at either 850 nanometer (nm) or 1300 nm using an LED light source and power meter.
3. Backbone multimode fiber cabling shall be tested at both 850 nm and 1300 nm (or 1310 and 1550 nm for singlemode) in one direction.
4. Test set-up and performance shall be conducted in accordance with ANSI/TIA/EIA-526-14 Standard, Method B.
5. Where links are combined to complete a circuit between devices, the Contractor shall test each link from end to end to ensure the performance of the system. **ONLY BASIC LINK TEST IS REQUIRED.** The contractor can optionally install patch cords to complete the circuit and then test the entire channel. The test method shall be the same used for the test described above. The values for calculating loss shall be those defined in the ANSI/TIA/EIA Standard.
6. Attenuation testing shall be performed with a stable launch condition using two-meter jumpers to attach the test equipment to the cable plant. The light source shall be left in place after calibration and the power meter moved to the far end to take measurements.

### 3.13 SYSTEM DOCUMENTATION

- A. Upon completion of the installation, the telecommunications contractor shall provide three (3) full documentation sets to the Engineer for approval. Documentation shall include the items detailed in the sub-sections below. Additionally, two (2) color B-size prints, laminated, illustrating station locations and designations, will be provided to the owner; one copy to be affixed to the IDF door of that floor.
- B. Documentation shall be submitted within ten (10) working days of the completion of each testing phase (e.g. subsystem, cable type, area, floor, etc.). This is inclusive of all test results and draft as-built drawings. Draft drawings may include annotations done by hand. Machine generated (final) copies of all drawings shall be submitted within 20 working days of the completion of each testing phase. At the request of the Engineer, the telecommunications contractor shall provide copies of the original test results.
- C. The Engineer may request that a 10% random field re-test be conducted on the cable system, at no additional cost, to verify documented findings. Tests shall be a repeat of those defined above. If findings contradict the documentation submitted by the telecommunications contractor, additional testing can be requested to the extent determined necessary by the Engineer, including a 100% re-test. This re-test shall be at no additional cost to the District.

### 3.14 TEST RESULTS

- A. Test documentation shall be provided on disk within three weeks after the completion of the project. The disk shall be clearly marked on the outside front cover with the words "Project Test Documentation", the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, an annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment.
- B. The field test equipment shall meet the requirements of ANSI/TIA/EIA-568-B.1, B.3, including applicable TSB's and amendments. The appropriate level IIe tester shall be used to verify Category 5e cabling systems. The appropriate level III tester shall be used to verify proposed Category 6 cabling systems.
- C. Printouts generated for each cable by the wire (or fiber) test instrument shall be submitted as part of the documentation package. Alternately, the telecommunications contractor may furnish this information in electronic form (3.5" diskette). These diskettes shall contain the electronic equivalent of the test results as defined by the bid specification and be of a format readable from Microsoft Excel (version 6.0 or later).
- D. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be documented.

### 3.15 AS-BUILT DRAWINGS

- A. The drawings are to include cable routes and outlet locations. Outlet locations shall be identified by their sequential number as defined elsewhere in this document. Numbering, icons, and drawing conventions used shall be consistent throughout all documentation provided. The District will provide floor plans in paper and electronic (DWG, AutoCAD 2002) formats on which as-built construction information can be added. These documents will be modified accordingly by the telecommunications contractor to denote as-built information as defined above and returned to the District.
- B. The Contractors shall annotate the base drawings and return a hard copy (same plot size as originals) and electronic (AutoCAD 2002) Format.
- C. These documents must be delivered to the District no more than 20 working days after completion and acceptance of Contractor's work.

END OF SECTION

## 1.00 – GENERAL

### 1.01 SUMMARY

- A. This specification document provides the requirements for the Local Automatic Fire Alarm Systems throughout the facility. These systems shall include, but not be limited to, system terminal cabinets, signal power boosters, backboards, terminal strips, devices with termination, wire/cabling, testing and verification and other relevant components. The work is to be considered a design-build type project, relying upon the contractor's expertise in the layout, design and implementation of a local automatic fire alarm system. The contractor is required to submit for approval to DSA, the local AHJ, authority-having jurisdiction. The contractor shall include all costs for devices, wire, cable, panels, installation labor, tests, approvals and as-built documentation. Additionally, the contractor will be required to provide the necessary interfaces (control modules, etc.) to the monitoring system in which audio is incorporated. All conduits for the fire alarm systems and associated wiring shall be included. The fire alarm contractor shall provide "shop" drawing layouts to District showing device locations, mounting heights and conduit size requirements.

### 1.02 WORK INCLUDED

#### General Requirements

1. The contractor shall furnish and install a complete new fire alarm systems comprising of fire alarm panels, signal booster panels, Manual Pull Stations, Smoke Detectors, Heat Detectors, Duct Detector connections, Hood Suppression system alarm connections, connection to building water flow, tamper and post indicator valves, Alarm Horns, Alarm Strobes, Alarm Horn/Strobes, Alarm Mini-Horns as required by code and as specified herein.
2. Labeling
  - a. All system equipment shall be labeled with the manufacturer's name and logotype to assure the integrity of the complete system.

### 1.03 RELATED WORK DOCUMENTS

- A. Submittals
- B. Coordination
- C. Electrical General Requirements
- D. Electrical Raceway
- E. Electrical Conduit
- F. Electrical Outlet and Junction Boxes
- G. Electrical Interior Pull boxes and wireways

- H. Electrical Grounding systems
- I. Fire Alarm Audio Evacuation Systems
- J. Mechanical Plans (connections to heating and air conditioning units)
- K. Plumbing Plans (sprinkler flow, tamper and Post Indicator Valve locations)
- L. Food Service Plans (hood suppression systems locations)
- M. Systems Plans (monitoring systems)
- N. Electrical Plans

1.04 DESCRIPTION:

- A. This section of the specification includes the furnishing, installation, and connection of the microprocessor controlled, intelligent reporting fire alarm equipment required to form a complete coordinated system ready for operation. It shall include, but not be limited to, alarm initiating devices, alarm notification appliances, control panel, auxiliary control devices, annunciators, and wiring as shown on the drawings and specified herein.
- B. The fire alarm system shall comply with requirements of ICBO Standards, VDE, VdS, DIN and CEN Standards for protected premises signaling systems except as modified and supplemented by this specification. The system field wiring shall be supervised either electrically or by software-directed polling of field devices.
- C. The FACP and peripheral initiation devices shall be manufactured 100% by a single manufacturer (or division thereof).
- D. The installing company shall employ only factory-trained technicians on site to install and perform the final checkout and to ensure the systems integrity.

1.05 SCOPE:

- A. A new intelligent reporting, microprocessor controlled fire detection system shall be installed in accordance to the project specifications and drawings.
- B. Basic Performance:
  - 1. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded on a two wire Signaling Line Circuit (SLC).
  - 2. Initiation Device Circuits (IDC) shall be a two-wire circuit.
  - 3. Notification Appliance Circuits (NAC) shall be a two-wire circuit
  - 4. Digitized electronic signals shall employ check digits or multiple polling.
  - 5. A single ground or open on the system Signaling Line Circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.
  - 6. Alarm signals arriving at the main FACP shall not be lost following a power failure (or outage) until the alarm signal is processed and recorded.
  - 7. The Alarm System shall perform the following functions:
    - a. Provide automatic fire alarm detection in all building spaces as dictated by local code requirements.

- b. Provide evacuation signals for employees and guests as dictated by local code requirements.
- c. Connect all buildings local fire alarm panels into a seamless network incorporating a central control console located in the administration building and remote console in the guard gatehouse.
- d. Interface with local show control, audio systems, ride control to perform the required activation or shutdown as dictated by local code requirements.
- e. Perform any added functions as specified or required by local codes or AHJ.

C. BASIC SYSTEM FUNCTIONAL OPERATION

- 1. When a fire alarm condition is detected and reported by one of the system initiating devices, the following functions shall immediately occur:
  - a. The system alarm LED shall flash.
  - b. A local piezo electric signal in the control panel shall sound.
  - c. A backlit 80 character LCD display shall indicate all information associated with the fire alarm condition, including the type of alarm point and its location within the protected premises.
  - d. Printing and history storage equipment shall log the information associated each new fire alarm control panel condition, along with time and date of occurrence.
  - e. All system output programs assigned via control-by-event equations to be activated by the particular point in alarm shall be executed and the associated system outputs (alarm Notification appliances and/or relays) shall be activated.

1.06 CONDITIONS - DSA Requirements

Manual pull stations must comply with CBC Sections 1117B.6 and 1118B.

1.07 SUBMITTALS

A. General:

- 1. All references to manufacturer's model numbers and other pertinent information herein is intended to establish minimum standards of performance, function and quality. Equivalent equipment from other manufacturers may be substituted for the specified equipment as long as the minimum standards are met.
- 2. For equipment other than that specified, the contractor shall supply proof that such substitute equipment equals or exceeds the features, functions, performance, and quality of the specified equipment.

B. Software Modifications

- 1. Provide the services of a factory trained and authorized technician to perform all system software modifications, upgrades or changes. Response time of the technician to the site shall not exceed 4 hours.
- 2. Provide all hardware, software, programming tools and documentation necessary to modify the fire alarm system on site. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modification on site. Modification of software shall not require

power-down of the system or loss of system fire protection while modifications are being made.

- C. Certifications:
1. Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of the installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.
- D. Owner's designated representative shall approve all equipment submittals.
- E. In addition to the General requirements, submit all materials for approval arranged in the same order as Specifications, Individually referenced to Specification paragraph and drawing number Submit number required In Division I plus three (3) copies of A4 material and 2 prints plus one reproducible of drawings in A0, minimum. Submit A4 items bound in volumes and A0 drawings in edgebound sets.
- F. Progress Schedule: Include duration and milestones for the following:
1. All submittals specified.
  2. Shipment to site.
  3. Installation.
  4. Field testing.
  5. Training.
  6. First beneficial use date.
- G. Manufacturer's Product Data:
1. List of Materials: For each item, Include:
    - a. Manufacturer.
    - b. Model number.
    - c. Listing: DIN, VDE, VdS, CEN, EN or none.
    - d. Quantity.
  2. Manufacturer's Product Data: In sequence of List of Materials, Data sheet for each item, including all accessories, marked for proposed product. Photo copies will not be accepted. Original manufacturer specifications sheets only.
- H. Field/Shop Drawings:
1. Resubmit: for coordination reference complete with corrections from previous submittal:
    - a. List of Materials.
    - b. Manufacturer's Product Data.
  2. Field (installation) Drawings: Collate in sequence:
    - a. Drawing Index/symbol sheet.
    - b. Floor plans. At scale of Contract Documents. Show:
      - 1) Devices with circuit number.
      - 2) Rough-in.
      - 3) Mounting height.
      - 4) Conduit size.
      - 5) Wire type.
      - 6) Wire fill.
    - c. Sections/Elevations. At scale of Contract Documents.

- 1) Mounting location reference.
- d. Enlarged Plans. At scale of Contract Documents or larger as required for trade coordination. Show:
  - 1) Refer to "floor plans".
  - 2) Architectural features.
  - 3) Clearances.
- e. System conduit riser drawing, show:
  - 1) Terminal cabinets.
  - 2) Coordination with floor plans.
  - 3) Wire runs not shown on floor plans.
  - 4) Wire type.
  - 5) Wire fill.
- f. Mounting details
  - 1) Stamped and signed by Engineer licensed in jurisdiction for work of this type.
  - 2) Show loads, strength of connections, etc.
  - 3) Show calculations - on drawings or in bound volume for review by authorities having jurisdiction.
  - 4) Provide details for:
    - a) Racks/cabinets/panels
- g. Installation details as required.
  - 1) Terminal cabinets: terminations.
- h. Wire run sheets (if used) Show:
  - 1) Wire Number.
  - 2) Source.
  - 3) Designation
  - 4) .Signal Type.
  - 5) Wire type.
  - 6) Operating level or voltage (if applies).
3. Shop (Fabrication) Drawings: Collate In sequence:
  - a. Drawing Index/symbol sheet (if separate set from Field Drawings).
  - b. System functional drawings. Submit separate drawing for each system/subsystem. Show:
    - 1) Equipment: Function, make, model.
    - 2) Wire number.
    - 3) Wire Type.
  - c. Fabrication details submit for:
    - 1) Receptacles.
    - 2) Panels.
    - 3) Special mounting provisions.
    - 4) Legends/engraving details. Half or full size:
      - a) Receptacles.
      - b) Panels.
      - c) Equipment.
4. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
5. Include manufacturer's name(s), model numbers, ratings, power requirements, equipment layout, device arrangement, complete wiring point-to-point diagrams, and conduit layouts.
6. Show annunciator layout, configurations, and terminations.

I. Shop and Field Test Reports

1. Schedule: Submit test reports In timely manner relative to Project

schedule such that owner may conduct Verification of submitted Test Data at District's option, without delay of progress.

- a. Shop test report: Submit prior to shipping completed system to project site.
  - b. Field test report: Submit following system completion and prior to and as condition precedent to District's acceptance of the Work of this Section.
2. Test Reports: Include:
    - a. Time and date of test.
    - b. Personnel conducting test.
    - c. Test Object.
    - d. Procedure used.
    - e. Test equipment, Including serial and date of calibration.
    - f. Results of test - numerical or graphical presentation.
  3. Verification of Submitted Test Data: District may elect to verify some or all test data submitted. Retest in presence of designated observer(s) at reasonable convenience of District. Provide technician familiar with work of this Section. Provide all test equipment.
- J. Reference Data for Operation, Maintenance and Repair
1. In addition to the requirements of Division 1, submit one (1) additional set. Submit in three post binders (not ring binder) with Tabs.
  2. Index.
  3. Systems operating Instructions.
  4. Reduced set of system Record Drawings.
  5. Key schedule.
  6. Maintenance and spare parts schedules.
  7. Shop and Field Test Reports.
  8. Equipment manuals. Collate alphabetically by manufacturer. Provide manufacturer's original operation, Instruction and service manuals for each equipment item. For each set, provide manufacturer's original printed copies only. Photocopies not acceptable.
- K. Record Drawings in AutoCAD R2011 format min.
1. Quantity:
    - a. Review sets: as for Shop and Field Drawings.
    - b. Record set:
      - 1) Three (3) blueline.
      - 2) One CD disk with applicable .DWG files and all equipment submittals (catalog information) and current active CSFM listings
  2. Content: All drawings required under "Field and Shop Drawings". Show "as Installed" condition.
- L. Other than Specified Equipment
1. Equipment other than specified shall be considered for approval provided the following is submitted in writing by the contractor to the Consultant ten (3) days before the bid date:
  2. Complete lists, descriptions and drawings of materials to be used.
  3. A complete list of current drain requirements during normal supervisory conditions, trouble conditions, and alarm conditions
  4. Battery standby calculations showing total standby power needed to meet the system requirements as specified



- M. Substituted Equipment
  - 1. If equipment other than that specified is supplied, it shall be the contractor's obligation to submit the appropriate documentation and allow the specifying Consultant sufficient time to consider the equality of the substituted items.
- N. Satisfying the Entire Intent of these Specifications
  - 1. It is the contractor's responsibility to meet the entire intent of these specifications. Deviations from the specified items shall be at the risk of the contractor until the date of final acceptance by the Consultant and District's representative.
  - 2. All costs for removal, relocation, or replacement of a substituted item shall be at the risk of the contractor.

1.08 GUARANTY/WARRANTY:

All work performed and all material and equipment furnished under this contract shall be free from defects and shall remain so for a period of at least one (1) year from the date of acceptance. The full cost of maintenance, labor and materials required to correct any defect during this one year period shall be included in the submittal bid.

1.09 POST CONTRACT MAINTENANCE:

- A. Complete maintenance and repair service for the fire alarm system shall be available from a factory trained authorized representative of the manufacturer of the major equipment for a period of five (5) years after expiration of the guaranty.
- B. As part of the submittal, include a quote for a maintenance contract to provide all maintenance, test, and repair described below. Include also a quote of unscheduled maintenance/repair, including hourly rates for technicians trained on this equipment, and response travel costs. Submittals that do not identify all post contract maintenance costs will not be accepted. Rates and costs shall be valid for the period of five (5) years after expiration of the guaranty.
- C. Maintenance and testing shall be on a semiannual basis or as required by the AHJ. A preventive maintenance schedule shall be provided by the contractor that shall describe the protocol for preventive maintenance. The schedule shall include:
  - 1. Systematic examination, adjustment and cleaning of all detectors, manual fire alarm stations, control panels, power supplies, relays, waterflow switches and all accessories of the fire alarm system.
  - 2. Each circuit in the fire alarm system shall be tested semiannually.
  - 3. Each smoke detector shall be tested in accordance with the requirements of VDE, DIN Standards.

1.10 POST CONTRACT EXPANSIONS:

- A. The contractor shall provide parts and labor to expand the system specified, if so requested, for a period of five (5) years from the date of acceptance.
- B. As part of the submittal, include a quotation for all parts and material, and all installation and test labor as needed to increase the number of intelligent or addressable devices by ten percent (10%). This quotation shall include intelligent

smoke detectors, intelligent heat detectors, addressable manual stations, addressable monitor modules and addressable control modules equal (list actual quantity of each type).

- C. Quotation shall include installation and test labor and labor to reprogram the system for this 10% expansion. If additional FACP hardware would be required, include the material and labor necessary to install this hardware.
- D. Do not include cost of conduit or wire or the cost to install conduit or wire except for labor to make final connections at the FACP and at each intelligent addressable device. Do not include cost of conventional peripherals or the cost of initiating devices or Notification appliances connected to the addressable monitor/control modules.
- E. Submittals that do not include this estimate of post contract expansion cost will not be accepted.

#### 1.11 APPLICABLE STANDARDS AND SPECIFICATIONS:

- A. The specifications and standards listed below form a part of this specification. The system shall fully comply with the latest issue of these standards.
  - 1. Association of German Underwriters E. V. Cologne (VdS)
  - 2. DIN 57833
  - 3. DIN 14675 Parts 1 and 2
  - 4. VDE 0100, 0800, 0833
  - 5. EN 54, Part 1
  - 6. EN 54, Part 5
  - 7. California Building Code
  - 8. California Electrical Code
  - 9. California Mechanical Code
  - 10. California Fire Code
  - 11. Local Building Codes.
  - 12. All requirements of the Authority Having Jurisdiction (AHJ).

#### 1.12 APPROVALS:

- A. The system shall have proper listing and/or approval from internationally recognized agencies.
- B. The system shall be listed by the international agencies as suitable for extinguishing release applications.

#### 2.00 - PRODUCTS

##### 2.01 EQUIPMENT AND MATERIAL, GENERAL:

- A. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protective signaling system, meeting the Fire Alarm Code.
- B. All equipment and components shall be installed in strict compliance with

manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.

- C. All Equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.

## 2.02 CONDUIT AND WIRE:

### A. Conduit:

1. Conduit shall be in accordance with the local requirements.
2. Where possible, all wiring shall be installed in conduit or raceway. Conduit fill shall not exceed 40 percent of interior cross sectional area where three or more cables are contained within a single conduit.
3. Cable must be separated from any open conductors of Power, or Class circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, as per DIN 57800.
4. Wiring for 24 volt control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
5. Conduits shall not enter the Fire Alarm Control Panel, or any other remotely mounted Control Panel equipment or backboxes, except where conduit entry is specified by the FACP manufacturer.
6. Conduit shall be 3/4 inch (19.1 mm) minimum.

### B. Wire:

1. All fire alarm system wiring shall be new.
2. Wiring shall be in accordance with local codes (e.g., DIN 57800, VDE 0800) and as recommended by the manufacturer of the fire alarm system. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 18 AWG (1.02 mm) for Initiating Device Circuits and Signaling Line Circuits, and 14 AWG (1.63 mm) for Notification Appliance Circuits.
3. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
4. Wire and cable not installed in conduit shall have a fire resistance rating suitable for the installation.
5. Wiring used for the multiplex communication loop shall be twisted and shielded and support a minimum wiring distance of 10,000 feet. The system shall support up to 1,000 ft. of untwisted, unshielded wire. The system shall permit use of IDC and NAC wiring in the same conduit with the communication loop.
6. All field wiring shall be completely supervised.
7. The Fire Alarm Control panel shall be capable of T-Tapping two wire type Signaling Line Circuits (SLC's) Systems, which do not allow or have restrictions in, for example, the amount of T-Taps, length of T-Taps etc., are not acceptable.
8. All wire/cable used in underground or below grade, applications shall be rated by the manufacturer for the intended use.

- C. Terminal Boxes, Junction Boxes and Cabinets:
  - 1. All boxes and cabinets shall be DIN listed for their use and purpose.
- D. Initiating circuits shall be arranged to serve like categories (manual, smoke, water flow). Mixed category circuitry shall not be permitted except on signaling line circuits connected to intelligent reporting devices.
- E. The Fire Alarm Control Panel shall be connected to a separate dedicated branch circuit, maximum 16 amperes. This circuit shall be labeled at the Main Power Distribution Panel as FIRE ALARM. Fire Alarm Control Panel Primary Power wiring shall be 12 AWG. The Control Panel Cabinet shall be grounded securely to either a cold water pipe or grounding rod.

### 2.03 MAIN FIRE ALARM CONTROL PANEL:

- A. The FACP shall be a Edwards/GE and shall contain a microprocessor based Central Processing Unit (CPU). The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent detectors, addressable modules, printer, annunciators, and other system controlled devices.
- B. System Capacity and General Operation
  - 1. The control panel shall provide, or be capable of expansion to 2000 intelligent/addressable devices.
  - 2. The system shall include Form-C alarm and trouble relays rated at a minimum of 2.0 amps @ 30 VDC. It shall also include four Class B (Style Y) programmable Notification Appliance Circuits.
  - 3. The system shall support programmable driven relays.
  - 4. The Fire Alarm Control Panel shall include a full featured operator interface control and annunciation panel that shall include a backlit Liquid Crystal Display, individual, color coded system status LEDs, and an alphanumeric keypad for the field programming and control of the fire alarm system.
  - 5. All programming or editing of the existing program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the Fire Alarm Control Panel.
  - 6. The FACP shall provide the following features:
    - a. Drift Compensation to extend detector accuracy over life.
    - b. Sensitivity Test
    - c. Maintenance Alert to warn of excessive smoke detector dirt or dust accumulation.
    - d. System Status Reports to display or printer.
    - e. Alarm Verification, with verification counters.
    - f. PAS presignal.
    - g. Rapid manual station reporting (under 2 seconds).
    - h. Non-Alarm points for general (non-fire) control.
    - i. Periodic Detector Test, conducted automatically by software.
    - j. Pre-alarm for advanced fire warning.
    - k. Cross Zoning with the capability of: counting two detectors in alarm, two software zones in alarm, or one smoke detector and one thermal detector.

- l. March time and temporal coding options.
  - m. Walk Test, with check for two detectors set to same address.
  - n. Security Monitor Points.
  - o. Control-By-Time for non-fire operations, with holiday schedules.
  - p. Day/Night automatic adjustment of detector sensitivity.
  - q. Device Blink Control for sleeping areas.
- C. Central Microprocessor
- 1. The Microprocessor shall communicate with, monitor, and control all external interfaces with the control panel. It shall include EPROM for system program storage, non-volatile memory for building-specific program storage, and a "watch dog" timer circuit to detect and report microprocessor failure.
  - 2. The microprocessor shall contain and execute all control-by-event programs for specific action to be taken if an alarm condition is detected by the system. Control-by-event equations shall be held in non-volatile programmable memory and shall not be lost even if system primary and secondary power failure occurs.
  - 3. The microprocessor shall also provide a real-time clock for time annotation of system displays, printer, and history file. The time-of-day and date shall not be lost if system primary and secondary power supplies fail. The real time clock may also be used to control non-fire functions at programmed time-of-day, day-of-week, and day-of-year.
- D. Display
- 1. The display shall provide all the controls and indicators used by the system operator and may be used to program all system operational parameters.
  - 2. The display shall include status information and custom alphanumeric labels for all intelligent detectors, addressable modules, and software zones.
  - 3. The display shall provide an 80-character back-lit alphanumeric Liquid Crystal Display (LCD). It shall also provide Light-Emitting-Diodes (LEDs), that will indicate the status of the following system parameters: AC POWER, SYSTEM ALARM, SYSTEM TROUBLE, SIGNAL SILENCED, SUPERVISORY, and PRE-ALARM.
  - 4. The Display shall provide a key touch key-pad with control capability to command all system functions, entry of alphabetic or numeric information, and field programming. Two different password levels shall be provided to prevent unauthorized system control or programming.
  - 5. The Display shall include the following operator functions: SIGNAL SILENCE, RESET, DRILL, and ACKNOWLEDGE.
- E. Signaling Line Circuit (SLC)
- 1. The SLC interface shall provide power to and communicate with intelligent detectors (Ionization, Photoelectric, or Thermal) and intelligent modules (monitor or control). This shall be accomplished over a single SLC loop and shall be capable of Style 4 or Style 6 wiring.
  - 2. The loop interface shall receive analog information from all intelligent detectors that shall be processed to determine whether normal, alarm, or trouble conditions exist for each detector. The software shall automatically maintain the detector's desired sensitivity level by adjusting for the effects of environmental factors, including the accumulation of dust

in each detector. The analog information shall also be used for automatic detector testing and for the automatic determination of detector maintenance requirements.

3. The detector software shall meet all local VDE and VdS requirements and be certified by VdS as a calibrated sensitivity test instrument.
4. The detector software shall allow manual or automatic sensitivity adjustment.

F. Serial Interfaces

1. An EIA-232 interface between the Fire Alarm Control Panel and Listed Electronic Data Processing (EDP) peripherals shall be provided.
2. The EIA-232 interface shall allow the use of printers, CRT monitors, and PC compatible computers.
3. The EIA-232 interface shall include special protocol methods that allow off-site monitoring of the FACP over standard dial-up phone lines. This ancillary capability shall allow remote readout of all status information, including analog values, and shall not interfere with or degrade FACP operations when used. It shall allow remote FACP Acknowledge, Reset, or Signal Silence in this mode. It shall also allow adjustment of detector sensitivity and readout of the history file.
4. An EIA-485 interface shall be available for the serial connection of remote annunciators and LCD displays.
5. The EIA-485 interface may be used for network connection to a Proprietary Receiving Unit.

G. Enclosures:

1. The control panel shall be housed in a DIN listed cabinet suitable for surface or semi-flush mounting. Cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish.
2. The door shall provide a key lock and shall include a glass or other transparent opening for viewing of all indicators.

H. All interfaces and associated equipment are to be protected so that they will not be affected by voltage surges or line transients, consistent with DIN standards.

I. An optional module shall be available which provides Form-C relays rated at 5.0. The relays shall track programmable software zones.

J. Power Supply:

1. The Power Supply shall operate on 220 VAC, 50 Hz, and shall provide all necessary power for the FACP.
2. It shall provide 5.0 amps of usable Notification appliance power, using a switching 24 VDC regulator. A 3.0 amp notification expansion power supply shall be available for the demanding requirements visual devices, for a total system capacity of 8 amps.
3. It shall provide a battery charger for 30 hours of standby using dual-rate charging techniques for fast battery recharge.
4. It shall provide a very low frequency sweep earth detect circuit, capable of detecting earth faults.
5. It shall be power-limited.
6. It shall provide optional meters to indicate battery voltage and charging current.

- K. Field Charging Power Supply: The FCPS is a device designed for use as either a remote 24 volt power supply or used to power Notification Appliances.
1. The FCPS shall offer up to 6.0 amps (4.0 amps continuous) of regulated 24 volt power. It shall include an integral charger designed to charge 7.0 amp hour batteries and to support 30 hour standby.
  2. The Field Charging Power Supply shall have two input triggers. The input trigger shall be a Notification Appliance Circuit (from the fire alarm control panel) or a relay. Four outputs (two Style Y or Z and two style Y) shall be available for connection to the Notification devices.
  3. The FCPS shall include an attractive surface mount backbox.
  4. The Field Charging Power Supply shall include the ability to delay the AC fail delay requirements.
  5. The FCPS include power limited circuitry.
- L. Field Wiring Terminal Blocks
1. For ease of service all panel I/O wiring terminal blocks shall be a removable, plug-in type and have sufficient capacity for 18 to 12 AWG wire. Terminal blocks, which are permanently fixed, are not acceptable.
- M. Operators Controls
1. Acknowledge Switch:
    - a. Activation of the control panel Acknowledge switch in response to new alarms and/or troubles shall silence the local panel piezo electric signal and change the alarm and Trouble LEDs from flashing mode to steady-ON mode. If multiple alarm or trouble conditions exist, depression of this switch shall advance the 80-character LCD display to the next alarm or trouble condition.
    - b. Depression of the Acknowledge switch shall also silence all remote annunciator piezo sounders.
  2. Signal Silence Switch: Activation of the Signal silence switch shall cause all programmed alarm notification appliances and relays to return to the normal condition after an alarm condition. The selection of notification circuits and relays that are silenceable by this switch shall be fully field programmable within the confines of all applicable standards. The FACP software shall include silence inhibit and auto-silence timers.
  3. System Reset Switch: The system reset switch shall cause all electronically-latched initiating devices, appliances or software zones, as well as all associated output devices and circuits, to return to their normal condition.
    - a. Holding the system RESET switch shall perform a lamp test function.
  4. Drill (Evacuate) Switch.
    - a. The drill switch shall activate all notification appliance circuits. The drill function shall latch until the panel is silenced or reset.
- N. Field Programming
1. The system shall be programmable, configurable and expandable in the field without the need for special tools or electronic equipment and shall not require field replacement of electronic integrated circuits.
  2. All programming may be accomplished through the standard FACP Keypad.
  3. All field defined programs shall be stored in non-volatile memory.

4. The programming function shall be enabled with a password that may be defined specifically for the system when it is installed. Two levels of password protection shall be provided in addition to a key-lock cabinet. One level is used for status level changes such as zone disable or manual on/off commands. A second (higher-level) is used for actual change of program information.
  5. Program edit shall not interfere with normal operation and fire protection. If a fire condition is detected during programming operation, the system shall exit programming and perform fire protection functions as programmed.
  6. A special program check function shall be provided to detect common operator errors.
  7. An Auto-Program (self-learn) function shall be provided to quickly install initial functions and make the system operational.
  8. For flexibility, an off-line programming function, with batch upload/download, shall also be available.
  9. New fire alarm systems shall be programmed into the campus fire alarm network system. Contractor to provide all passwords and an electronic copy of the installed operating program.
- O. Specific System Operations
1. Smoke Detector Sensitivity Adjust: A means shall be provided for adjusting the sensitivity of any or all analog intelligent smoke detectors in the system from the control panel. Sensitivity range shall be within the allowed window.
  2. Alarm Verification: Each intelligent addressable smoke detector in the system shall be independently selected and enabled to be alarm verified. The alarm verification delay shall be programmable from 5 to 30 seconds. The FACP shall keep a count of the number of times that each detector has entered the verification cycle. These counters may be displayed and reset by the proper operator commands.
  3. Point Disable: Any device in the system may be enabled or disabled through the system keypad.
  4. Point Read: The system shall be able to display or print the following point status diagnostic functions:
    - a. Device status.
    - b. Device types.
    - c. Custom device labels.
    - d. View analog detector values.
    - e. Device zone assignments.
    - f. All program Parameters.
  5. System Status Reports: Upon command from an operator of the system, a status report will be generated and printed, listing system status.
  6. System History Recording and Reporting: The Fire Alarm Control Panel shall contain a History Buffer that will be capable of storing up to 800 system alarms/troubles/operator actions. Each of these activation's will be stored and time and date stamped with the actual time of the activation. The contents of the History Buffer may be manually reviewed, one event at a time, or printed in its entirety.
    - a. Although the foreground history buffer may be cleared for user convenience, a background, non-erasable buffer shall be maintained which provides the last 800 system events.
    - b. The History Buffer shall use non-volatile memory. Systems that



- use volatile memory for history storage are not acceptable.
7. Automatic Detector Maintenance Alert: The Fire Alarm Control Panel shall automatically interrogate each intelligent smoke detector and shall analyze the detector responses over a period of time.
    - a. If any intelligent smoke detector in the system responds with a reading that is below or above normal limits, then the system will enter the Trouble Mode, and the particular detector will be annunciated on the system display, and printed on the optional printer. This feature shall in no way inhibit the receipt of alarm conditions in the system, nor shall it require any special hardware, special tools or computer expertise to perform.
  8. Pre-alarm Function: The system shall provide two levels of pre-alarm warning to give advance notice of a possible fire situation. Both pre-alarm levels shall be fully field adjustable. The first level shall give an audible indication at the panel. The second level shall give an audible indication and may also activate control relays. The system shall also have the ability to activate local detector sounder bases at the pre-alarm level, to assist in avoiding nuisance alarms.
  9. Software Zones: The FACP shall provide 99 software zones. All addressable devices may be field programmed to be grouped into software zones for control activation and annunciation purposes.

#### 2.04 SYSTEM COMPONENTS:

- A. Signaling Devices
  1. STROBES (as required by Code)
    - a. Strobes shall be provided as required and indicated on the contract drawings and shall have a flash rate not to exceed 60 times per minute.
    - b. The word "Fire" shall appear on the lens or lens plate.
    - c. Strobes shall be a 15cd, 1Hz minimum for restrooms and 110cd, 1Hz for large rooms (i.e., library, multi-use, meeting, etc.).
    - d. Strobes shall mount to 2 gang box, flush or surface as shown on drawings.
  2. HORNS (as required by Code)
    - a. Alarm Horns shall be provided as required and as indicated on the contract drawings.
    - b. Horns shall mount to a 4 sq. box. for interior use and a cast weatherproof, gasketed box for exterior use.
    - c. Horns shall be red in color.
    - d. Sound pressure level shall be 85dBA at 10 feet
    - e. Screw terminals shall be provided for field connections.
    - f. Unit may be configured with optional Strobe for interior Horn/Strobe applications.
  3. HORN/STROBES (as required by Code)
    - a. Horn/Strobe combination units shall be supplied as required and as indicated on the contract drawings.
    - b. Strobes shall not to exceed 60 flashes per minute.
    - c. The word "Fire" shall appear on the lens or lens plate.
    - d. Strobes shall be a 75cd, 1Hz minimum restrooms and 110cd, 1Hz for large rooms (i.e., library, multi-use)
    - e. Wiring for Strobes shall be separate from Horn Circuits. Strobes shall mount to face of Horn unit.

- f. Wiring for Horns shall be separate from Strobe Circuits. Horns shall mount to a 4 sq. box. for interior use.
  - g. Horns shall be red in color.
  - h. Sound pressure level shall be 85dBA at 10 feet
  - i. Screw terminals shall be provided for field connections.
4. MINI-HORNS (as required by Code)
- a. Mini-Horn units shall be supplied as required and as indicated on the contract drawings.
  - b. Horns shall mount to a single gang or double gang box for interior use.
  - c. Mini-Horns shall be red in color.
  - d. Sound pressure level shall be 90dBA at 10 feet
  - e. Screw terminals shall be provided for field connections.
- B. Addressable Devices - General
- 1. Addressable Devices shall provide an address-setting means using rotary decimal switches.
  - 2. Addressable Devices shall use simple to install and maintain decade (numbered 1 to 10) type address switches. Devices, which use a binary address setting method, such as a dip switch, are not an allowable substitute.
  - 3. Detectors shall be intelligent and addressable, and shall connect with two wires to the Fire Alarm Control Panel Signaling Line Circuits.
  - 4. Addressable smoke and thermal detectors shall provide dual alarm and power LEDs. Both LEDs shall flash under normal conditions indicating that the detector is operational and in regular communication with the control panel, and both LEDs shall be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. If required, the flashing mode operation of the detector LEDs shall be optional through the system field program. An output connection shall also be provided in the base to connect an external remote alarm LED.
  - 5. The fire alarm control panel shall permit detector sensitivity adjustment through field programming of the system. Sensitivity shall be automatically adjusted by the panel on a time-of-day basis.
  - 6. Using software in the FACP, detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by DIN, VDE and/or VdS as meeting the calibrated sensitivity test requirements.
  - 7. The detectors shall be ceiling-mount and shall include a separate twist-lock base with tamper proof feature. An optional base shall be available with a built-in (local) sounder rated at 85 DBA minimum.
  - 8. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.
  - 9. Detectors shall also store an internal identifying type code that the control panel shall use to identify the type of device (ION, PHOTO, THERMAL).
- C. Addressable Pull Box (manual station as required by Code)
- 1. Addressable pull boxes shall, on command from the control panel, send data to the panel representing the state of the manual switch and the

- addressable communication module status. They shall use a key operated test-reset lock, and shall be designed so that after actual emergency operation, they cannot be restored to normal use except by the use of a key.
2. All operated stations shall have a positive, visual indication of operation and utilize a key type reset.
  3. Manual stations shall be constructed of Lexan with clearly visible operating instructions provided on the cover. The word FIRE shall appear on the front of the stations in raised letters, 1.75 inches or larger.
- D. Intelligent Photoelectric Smoke Detector
1. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.
- E. Intelligent Thermal Detectors
1. Thermal detectors shall be intelligent addressable devices rated at 135 degrees Fahrenheit (58 degrees Celsius) and have a rate-of-rise element rated at 15 degrees F (9.4 degrees C) per minute. It shall connect via two wires to the fire alarm control panel signaling line circuit.
- F. Intelligent Duct Smoke Detector
1. The in-duct smoke detector housing shall accommodate either an intelligent ionization detector or an intelligent photoelectric detector, of that provides continuous analog monitoring and alarm verification from the panel.
  2. When sufficient smoke is sensed, an alarm signal is initiated at the FACP, and appropriate action taken to change over air handling systems to help prevent the rapid distribution of toxic smoke and fire gases throughout the areas served by the duct system.
- G. Addressable Dry Contact Monitor Module
1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional alarm initiating devices (any N.O. dry contact device) to one of the fire alarm control panel SLC loops.
  2. The monitor module shall mount in a 4-inch square, 2-1/8 inch deep electrical box.
  3. The IDC zone shall be suitable for Style D or Style B operation. An LED shall be provided that shall flash under normal conditions, indicating that the monitor module is operational and in regular communication with the control panel.
  4. For difficult to reach areas, the monitor module shall be available in a miniature package and shall be no larger than 2-3/4 inch x 1-1/4 inch x 1/2 inch. This version need not include Style D or an LED.
- H. Two Wire Detector Monitor Module
1. Addressable monitor modules shall be provided to connect one supervised IDC zone of conventional 2-wire smoke detectors or alarm initiating devices (any N.O. dry contact device).
  2. The two-wire monitor module shall mount in a 4-inch square, 2-1/8 inch deep electrical box or with an optional surface backbox.
  3. The IDC zone may be wired for Class A or B (Style D or Style B) operation. An LED shall be provided that shall flash under normal

conditions, indicating that the monitor module is operational and in regular communication with the control panel.

I. Addressable Control Module

1. Addressable control modules shall be provided to supervise and control the operation of one conventional NACs of compatible, 24 VDC powered, polarized audio/visual notification appliances. For fan shutdown and other auxiliary control functions, the control module may be set to operate as a dry contact relay.
2. The control module shall mount in a standard 4-inch square, 2-1/8 inch deep electrical box, or to a surface mounted backbox.
3. The control module NAC may be wired for Style Z or Style Y (Class A/B) with up to 1 amp of inductive A/V signal, or 2 amps of resistive A/V signal operation, or as a dry contact (Form-C) relay. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary relay or NACs may be energized at the same time on the same pair of wires.
4. Audio/visual power shall be provided by a separate supervised power loop from the main fire alarm control panel or from a supervised listed remote power supply.
5. The control module shall be suitable for pilot duty applications and rated for a minimum of 0.6 amps at 30 VDC.

J. Waterflow Indicators:

1. Flow switches shall be integral, mechanical, non-coded, non-accumulative retard type.
2. Flow switches shall have an alarm transmission delay time that is conveniently adjustable from 0 to 60 seconds. Initial settings shall be 30 Å 45 seconds.
3. Flow switches shall be located a minimum of one (1) foot from a fitting that changes the direction of the flow and a minimum of three (3) feet from a valve:

K. Sprinkler and Standpipe Valve Supervisory Switches:

1. Each sprinkler system water supply control valve riser or zone control valve, and each standpipe system riser control valve shall be equipped with a supervisory switch. Standpipe hose valves, and test and drain valves shall not be equipped with supervisory switches.
2. Each Post Indicator Valve (PIV) or main gate valve shall be equipped with a supervisory switch.
3. Mount switch so as not to interfere with the normal operation of the valve and adjust to operate within two revolutions toward the closed position of the valve control, or when the stem has moved no more than one-fifth of the distance from its normal position.
4. The mechanism shall be contained in a weatherproof aluminum housing that shall provide a 3/4 inch tapped conduit entrance and incorporate the necessary facilities for attachment to the valves.
5. Switch housing to be finished in red baked enamel.
6. The entire installed assembly shall be tamper proof and arranged to cause a switch operation if the housing cover is removed, or if the unit is removed from its mounting.
7. Valve supervisory switches shall be provided and connected under this section and installed by mechanical contractor.

- L. LCD Alphanumeric Display Annunciator:
  - 1. The alphanumeric display annunciator shall be a supervised, back-lit LCD display containing a minimum of forty (40) characters for alarm annunciation in clear English text.
  - 2. The LCD annunciator shall display all alarm and trouble conditions in the system.
  - 3. Up to 32 LCD annunciators may be connected to an EIA 485 interface. LCD annunciators shall not reduce the annunciation or point capacity of the system. Each LCD shall include vital system wide functions such as, System Acknowledge, Silence and Reset.
  - 4. LCD display annunciators shall mimic the main control panel 80 character display and shall not require special programming.
  - 5. The LCD annunciator shall have switches that may be programmed for System control such as, Global Acknowledge, Global Signal Silence and Global System Reset. These switch inputs shall be capable of being disabled permanently or by a key lockout function on the front plate.

## 2.05 BATTERIES:

- A. Shall be 12 volt, Gell-Cell type (two required).
- B. Battery shall have sufficient capacity to power the fire alarm system for not less than thirty hours (30) plus thirty minutes (30) of alarm upon a normal AC power failure.
- C. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks refilling, spills and leakage shall not be required.

## 3.00 - EXECUTION

### 3.01 INSTALLATION:

- A. Installation shall be in accordance with the VDE, DIN, EN, VdS Standards, along with local codes, as shown on the drawings, and as recommended by the equipment manufacturer.
- B. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed in unfinished areas. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage.
- C. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.

## 4.00 – GUARANTEE AND TEST

### 4.01 General

- A. The contractor shall guarantee all equipment and wiring free from inherent

mechanical and electrical defects for one year from the date of final acceptance by consultant.

- B. Acceptance shall consist of the following:
1. Burn-in period.
    - a. The system shall be accepted for start of warranty upon successful completion and testing of AHJ and Consultant.
    - b. Burn-In period shall be a 30 day time frame to allow the system to operate free of defects, grounds, programming faults, etc.
    - c. The 30 day Burn-In shall begin the day of acceptance by AHJ.
    - d. The Burn-In period shall be 30 days of continuous use without system trouble, false alarm, open, short or ground condition present.
    - e. Should the system fail for any reason during the burn-in period, the contractor shall respond immediately upon notification by owner's personnel and correct said deficiencies.
    - f. Upon correction and restoration, the "Burn-In" period shall be reset to "0" and the 30 day count shall begin again.
    - g. Start of Warranty shall commence upon day 31 of successful "Burn-In" period.

#### 4.02 Final Test (as applicable for project devices)

- A. Provide the service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system. All testing shall be in accordance with VDE, VdS and DIN Standards.
1. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
  2. Close each sprinkler system flow valve and verify proper supervisory alarm at the FACP.
  3. Verify activation of all flow switches.
  4. Open initiating device circuits and verify that the trouble signal actuates.
  5. Open and short signaling line circuits and verify that the trouble signal actuates.
  6. Open and short Notification Appliance Circuits and verify that trouble signal actuates.
  7. Ground all circuits and verify response of trouble signals.
  8. Check presence and audibility of tone at all alarm notification devices.
  9. Check installation, supervision, and operation of all intelligent smoke detectors using the Walk Test.
  10. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.
  11. When the system is equipped with optional features, the manufacturer's manual should be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.
- B. Before the installation shall be considered completed and acceptable by the awarding authority, a test on the system shall be performed as follows:

1. The contractor's job foreman, in the presence of a representative of the manufacturer, a representative of the owner, the inspector of record (IOR) and the fire department shall operate every building fire alarm device to ensure proper operation and correct annunciation at the control panel.
2. Audibility tests shall be performed utilizing a calibrated Decibel Meter. The system shall be capable of supplying 15dB over ambient noise levels. Tests shall be conducted in the presence of the Consultant and AHJ at selected locations by Consultant/AHJ. Prior to acceptance, testing the contractor shall have verified signal levels in each area as to meeting the above criteria.
3. Where application of heat would destroy any detector, it may be manually activated.
4. The initiation circuits and the indicating appliance circuits shall be opened in at least two (2) locations per zone to check for the presence of correct supervisory circuitry.
5. When the testing has been completed to the satisfaction of both the contractor's job foreman and the representatives of the manufacturer and owner, a notarized letter co-signed by each attesting to the satisfactory completion of said testing shall be forwarded to the owner and the fire department.
6. The contractor shall leave the fire alarm system in proper working order, and, without additional expense to the owner, shall replace any defective materials or equipment provided by him under this contract within one year (365 days) from the date of final acceptance and successful burn in period.
7. Prior to final test, the fire department must be notified in accordance with local requirements.
8. Submit completed Certification form. The form shall be submitted in type written format. Hand written forms will not be accepted.

4.03 As-Built Drawings, Testing, and Maintenance Instructions

- A. A complete set of reproducible "as-built" drawings in AutoCAD R2000 format (CDs and sheets) showing installed wiring, color coding, and wire tag notations for exact locations of all installed equipment, specific interconnections between all equipment, and internal wiring of the equipment shall be delivered to the owner upon completion of system acceptance.
- B. Operating and Instruction Manuals
  1. Operating and instruction manuals shall be submitted prior to testing of the system. Four (4) complete sets of operating and instruction manuals shall be delivered to the owner upon completion.
  2. The owner shall be furnished with all programming disks for each installation as well as hard copy printouts. Provide necessary training and/or schooling to designated owner personnel at no additional cost to owner. Training shall be at the District's designated location, by factory trained personnel. Provide all necessary interconnection cables for remote programming via "laptop" computer.
- C. Testing Frequency Instructions
  1. Complete, accurate, step-by-step testing instructions giving recommended and required testing frequency of all equipment, methods for testing each individual piece of equipment, and a complete trouble-

shooting manual explaining how to test the primary internal parts of each piece of equipment shall be delivered to the District upon completion of the system.

- D. Maintenance instructions shall be complete, easy to read, understandable, and shall provide the following information:
1. Instruction on replacing any components of the system, including internal parts.
  2. Instructions on periodic cleaning and adjustment of equipment with a schedule of these functions
  3. A complete list of all equipment and components with information as to the address and phone number of both the manufacturer and local supplier of each item.
  4. User operating instructions, shall be provided prominently displayed on a separate sheet located next to the control unit.
  5. Administrative staff of the District shall be thoroughly instructed in the use of system by authorized distributor. Such service shall be provided in conjunction with the Fire Alarm equipment.
  6. Maintenance staff shall be thoroughly instructed in the use of the System. Training shall include a minimum of three (1)hour sessions, to be scheduled at the District's designated time.
  7. Maintenance instruction shall be performed in the same manner as described above. Training shall include a minimum of three (1) hour sessions, to be scheduled at the District's designated time.

END OF SECTION



## 1.00 - GENERAL

### 1.01 SUMMARY

#### A. SCOPE

1. This section outlines the requirements for the Local Area Networks system switches, system hubs, networking modules (transceivers) and connectivity at the MC/MDF and at the various IC/IDF's throughout the District's facility.
2. Administrative Network
  - a. The Administrative Network distribution components will be located in telecom room MDF and in various communications rooms throughout the facility. The system is connected via CAT 5e or 6e (as noted on the plans) cabling to various server and workstation locations throughout the building.
  - b. Administrative Network nodes are located throughout the building. These are fed by fiber optic cabling to the MDF and distributed locally via UTP CAT 5e or 6e (as noted on the plans) cabling infrastructure. The Administrative Network will be a Fast-EtherNet design providing switched 100Mbit speed to various workgroups in the facility.
  - c. The contractor will be responsible to install, program, test and document the system as installed, verifying throughput rates.
  - d. The contractor will be required to work in close coordination with the owner's information systems director and staff.

### 1.02 WORK INCLUDED

- A. Furnish and install all required system switches, system hubs, system 100/1000BASE-T modules, transceivers, patch cables and accessories for a complete system.
- B. The installation shall include interconnect/patching equipment (fiber and copper), jumpers (optical fiber and twisted-pair copper), hub & switch equipment, optical fiber transceivers, routers, asynchronous controllers, optical fiber transceivers, and any other equipment enumerated within. In addition to material and equipment, contractor shall provide labor and any incidental material required for installation. All active equipment shall be installed and connected to the cable system.
- C. Configuration, programming and testing of the local area networks.
- D. New local area network locations are listed on the drawings.

### 1.03 RELATED DOCUMENTS

- A. SECTION 16000 - GENERAL ELECTRICAL CONDITIONS;
- B. SECTION 16750 - CABLING & DISTRIBUTION SYSTEMS

### 1.04 FUNCTIONAL REQUIREMENTS

- A. Transmission Media. The example LAN will use both twisted-pair and fiber optic

cable plant to provide connectivity between user workstations located in offices and network resources located in the facility computer room(s).

- B. Host/Server Access. The network will allow users to access all host/server resources, including future application servers, such as additional database servers. There should be full compatibility with existing initiatives (e.g., a new financial system, security system, and telephone and employee services database repository).
- C. Outside Communications. The network will need to support future access to external networks through routers. These communications will use the Transport Control Protocol/Internet Protocol (TCP/IP) protocol.
- D. Environment/Facility Considerations. The network architecture design must take into account existing space, power, and heat constraints.
- E. Flexible Architecture. The design must have sufficient flexibility to permit grouping users into distinct "workgroups" for office automation services. Physical features, such as a layered distribution scheme, redundant patching, and real-time configuration and topology modifications, will be included in the design. The overall transition strategy should minimize downtime and denial of service.
- F. Office Automation Services. The network will support a broad range of office automation services for DOS, Windows, and Macintosh workstations. The following services will be provided:
  - 1. File storage and retrieval;
  - 2. Network printing;
  - 3. Support of commercial off-the-shelf (COTS) desktop applications (in the DOS, Windows and Macintosh environments), including electronic mail and calendaring; and fax services.

#### 1.05 Operational Requirements

- A. Network Management. The design will contain methods and tools for the efficient management and control of the network. The capability to monitor and manage both network traffic and physical components of the network will be provided.
- B. Fault Recovery. The design will include contingency or back-up plans should any element of the network fail.

#### 1.06 Performance Requirements

- A. Network Response. The servers and other components of the network must be sized to avoid unacceptable start-up delays when workstations are first activated, long login times, and slow response during normal network utilization (e.g., application startup and exit, file retrieval and save operations). Response times for network desktop applications should not be significantly greater than stand-alone usage.
- B. Network Availability. The users must be able to access the network 24 hours a

day, seven days a week unless specifically made unavailable at organization discretion (e.g., for administrative or maintenance activities).

1.07 Network Capacity. Individual components of the network will be sized as indicated below:

- A. The cable plant -- The cable plant will provide for approximately 150 cable drops distributed throughout the offices and facility.
- B. User workstations -- Initially, service will be provided for approximately 50 local users. However, when fully operational, the network will be capable of supporting approximately 150+ local users (150+ Windows-based PCs and servers).
- C. Intelligent hub equipment -- All hub equipment will be sized to support all ports plus 25% spare ports for growth.

1.08 REFERENCES AND STANDARDS INCORPORATED

- A. Published specifications, standards, tests or recommended methods of trade, industry or government organizations apply to work of this section where cited by abbreviation noted below:
  - 1. EIA Electrical Industries Association
  - 2. IEEE Institution of Electrical and Electronics Engineers
  - 3. ISO International Standards Organization
  - 4. ITU International Telecommunications Union
  - 5. CCITT Consultative Committee of International Telegraph and Telephone
  - 6. ANSI American National Standards Institute
  - 7. TIA Telecommunications Industry Association
  - 8. ASTM American Society for Testing and Materials
  - 9. NEC National Electric Code
  - 10. FCC Federal Communications Commission
  - 11. CEA Insulated Cable Engineers Association, Inc.
  - 12. IEC International Electrotechnical Commission
  - 13. NEMA National Electrical Manufacturers Association
  - 14. UL Underwriters' Laboratories, Inc.
  - 15. IPC The Institute for Interconnecting and Packaging Electronic Circuits
  - 16. NFPA National Fire Protection Association
  - 17. BICSI Building Industry Consulting Service International
- B. Nothing in the drawings, details, or specifications shall be construed to permit work not conforming to applicable laws, ordinances, rules, or regulations and standard industry IEEE 802 Ethernet standards.
- C. It is not the intent of the drawings, details, or specifications to repeat requirements of codes except where necessary for completeness or clarity.

1.09 SUBMITTALS

- A. Submit manufacturer's data literature for each item used describing each product, including specification, installation instructions and general recommendations.

- B. Submit manufacture's data literature on system hubs, switches, 100/1000BASE-T modules, 100/1000BASE-FB modules, 100/1000Base2 modules, power supplies and accessories.
- C. As per section 16010 - General drawings, submittals and shop drawings.
- D. In addition to the requirements of Division 1, submit all materials for approval, arranged in same order as specifications, individually referenced to specification paragraph and drawing number. Submit number required in Division 1 plus three (3) copies of 8 1/2" x 11" material and 2 prints and one reproducible of drawings in 24" X 26" size, minimum. Submit 8 1/2" x 11" items bound in volumes and 24" X 36" drawings in edgebound sets.
- E. Progress Schedule: Include duration and milestones for the following:
  - 1. All submittals specified.
  - 2. Completion of equipment buyout.
  - 3. Completion of equipment receipt at fabrication shop.
  - 4. Shop fabrication.
  - 5. Shop testing.
  - 6. Shipment to site.
  - 7. Installation.
  - 8. Field testing.
  - 9. Training.
  - 10. First use date.
- F. Manufacturer's Product Data:
  - 1. List of Materials: For each item include:
    - a. Manufacturer.
    - b. Model number.
    - c. Listing: UL, City Lab or none.
    - d. Quantity.
  - 2. Manufacturer's Product Data: In sequence of list of materials, data sheet for each item, including all accessories, marked for proposed product.
- G. Field and Shop Drawings:
  - 1. Resubmit: for coordination reference complete with corrections from previous submittal:
    - a. List of Materials.
    - b. Manufacturer's Product Data.
  - 2. Field (installation) Drawings: collate in sequence:
    - a. Drawing index/symbol sheet.
    - b. Floor plans. At scale of contract documents. Show:
      - 1) Devices with circuit number.
      - 2) Rough-in.
      - 3) Mounting height
      - 4) Conduit size
      - 5) Wire type.
      - 6) Wire fill.
    - c. Sections/Elevations. At scale of contract documents.
      - 1) Mounting location reference.
    - d. Enlarged Plans. At scale of contract documents or larger as

- required for trade coordination. Show:
- 1) Refer to floor plans.
  - 2) Architectural features.
  - 3) Rack cabinets.
  - 4) System furniture.
  - 5) Clearances.
- e. System conduit riser drawing, show:
- 1) Terminal cabinets.
  - 2) Coordination with floor plans.
  - 3) Wire runs not shown on floor plans.
  - 4) Wire type.
  - 5) Wire fill.
- f. Mounting details
- 1) Stamped and signed by engineer licensed in jurisdiction for work of this type.
  - 2) Show loads, strength of connections, etc.
  - 3) Show calculations - on drawings or in bound volume for review by authorities having jurisdiction.
  - 4) Provide details for:
    - a) Racks.
  - 5) Installation details as required.
  - 6) Terminal cabinets: terminations.
- g. Wire run sheets (if used) show:
- 1) Wire number.
  - 2) Source.
  - 3) Designation.
  - 4) Signal type.
  - 5) Wire type.
  - 6) Operating level or voltage (if applies).
- h. Shop and Field Test Reports
3. Schedule: Submit test reports in timely manner relative to project schedule such that District may conduct verification of submitted test data at owner's option, without delay of progress.
- a. Shop test report: Submit prior to shipping completed system to project site.
  - b. Field test report: Submit following system completion and prior to and as condition precedent to District's acceptance of the work of this section.
4. Test Reports: Include:
- a. Time and date of test.
  - b. Personnel conducting test.
  - c. Test object.
  - d. Procedure used.
  - e. Test equipment, including serial and date of calibration.
  - f. Results of test - numerical or graphical presentation.
5. Verification of submitted test data: District may elect to verify some or all test data submitted. Retest in presence of designated observer(s) at reasonable convenience of District. Provide technician familiar with work of this section. Provide all test equipment.

H. Reference Data for Operation, Maintenance and Repair

1. In addition to the requirements of Division 1, submit 3 sets. Submit in

three post binders (not ring binder) with tabs.

- a. Index.
- b. Systems operating instructions.
- c. Reduced set of system record drawings.
- d. Key schedule.
- e. Maintenance and spare parts schedules.
- f. Shop and Field Test Reports.
- g. Equipment manuals. Collate alphabetically by manufacturer. Provide manufacturer's original operation, instruction and service manuals for each equipment item. For each set, provide manufacturer's original printed copies only. Photocopies not acceptable.

I. Record Drawings in AutoCAD R2000 format

1. Quantity:

- a. Review sets: as for shop and field drawings.
- b. Record set:
  - 1) Three (3) blueprints.
  - 2) One CD with applicable .DWG files as full scale
- c. Content: All drawings required under "Field and Shop Drawings". Show as installed condition.

2.00 – PRODUCTS

2.01 GENERAL

- A. Quality of Products: Material and equipment specified herein have been selected as the basis of acceptable and desired quality of performance and have been coordinated to function as components of the specified system. Where a particular material, device, piece of equipment of system is specified directly, the current manufacturer's specification for the same shall be considered to be part of these specifications, as if completely contained herein in every detail. Each material, device, or piece of equipment provided hereunder shall comply with all of the manufacturer's published specifications for that item.
- B. Quantity: Provide quantity as shown on contract drawings, the schedule or as otherwise defined herein.
- C. Preference: Owner desires system to be furnished and installed as specified herein.
- D. Substitutions: Comply with SECTION 16010 -GENERAL CONDITIONS.
- E. Provide complete: Provide all auxiliary and incidental materials and equipment necessary for the operation and protection of the work of this section at, if specified in full herein.
- F. Provide new: All materials provided under the work of this section shall be new, shall be the manufacturer's latest design/model, and shall be permanently labeled with the manufacturer's name, model number and serial number.
- G. Similar: Similar devices shall be of the same manufacturer, unless specifically noted otherwise in these specifications.

- H. Continuous Use: All active circuitry shall be solid state and shall be rated for continuous use. All circuit components shall be operated in full compliance with the manufacturer's recommendations and shall contain sufficient permanent identification to facilitate replacement.

## 2.02 MANUFACTURERS

### A. NETWORKING HARDWARE

- 1. System design is based on products as manufactured by Cisco, 3Com or BayNetworks Substitutions must be pre-approved according to Section 16010 and general conditions.

### B. SYSTEM SPECIFICATIONS

#### 1. LOCAL AREA NETWORK

- a. The Local Area Network shall be based on and support IEEE 802.3 functional standards for EtherNet Local Area Networking. This shall include IEEE 802.3 100/1000BASE-T and 100/1000BASE-T for station microcomputers, and IEEE 802.3 100/1000BASE-F or 100/1000BASE-F (FIORL) synchronous technology for fiber optic repeater interconnection.
- b. The main distribution frame (MDF) and all intermediate distribution frames (IDF's) shall support one EtherNet segment per network.
- c. System shall be sufficient to support use at full capacity without user-perceptible delays in network response time.
- d. System shall be sufficient to support any combination of system features at full capacity. System shall allow reconfiguration of backbone to allow Customer maximum flexibility and implementation of options in case of need when future services are identified and added.

### C. LAN CONFIGURATION

- 1. System hubs are required in DESIGNATED zones so that every data drop on site can be serviced by a hub.
- 2. Each system hub shall allow for growth, without the need to add an additional hubs to 125% of the current data drop count for the area of the campus that it serves even though all those drops will not be connected at initial installation.
- 3. Each designated location shall utilize a system hub as per the specification.
- 4. Each hub location shall utilize fiber optic transceiver module for connection to the fiber optic backbone or horizontal distribution (where fiber is utilized as the backbone or horizontal media).
- 5. Each hub location shall utilize 100/1000BASE-T(RJ45), 100/1000BASE-T (RJ45), unshielded twisted pair ports for connection to the UTP CAT 6 LAN cable plant or 100/1000BASE-2 ports for connection to the ThinLAN cable plant. The quantity of initially installed 100/1000BASE-T/100/1000BASE-2 ports shall be per the needs indicated and requirements of this specification and contract drawings.
- 6. The initially active 100/1000BASE-T, 100/1000BASE-T locations shall be connected to the system Hubs via CAT 6 UTP patch cords and patch panels. If Telco style 100/1000BASE-T modules are utilized in the

system Hub then CAT 6, Telco-to RJ45 patch panels shall be installed with the appropriate cable to the hub for full connectivity.

## 2.03 MATERIALS AND EQUIPMENT

### A. SYSTEM HUBS

1. The Local Area Network shall be created from a family of intelligent, or "smart," switches, hubs and related products. The product family shall consist of various hubs; numerous plug-in EtherNet, FDDI, and internetworking modules for these hubs, and network management software. These products shall enable the customer to create a large-scale facility network that is flexible, reliable, and manageable.
2. The System shall have port switching technology that shall offer remote network configuration and management capabilities.
3. The System's network management shall support network analysis, identify specific network problems, and correct or self-heal problems dynamically. The system's network management shall not be a passive traffic monitoring tool.
4. System hubs shall have the following parameters and features:
  - a. Modular Multi-Media Chassis.
  - b. Supports SNMP Based Network Management System.
  - c. Supports Inband and Out of Band Network Management.
5. Specific EtherNet features required:
  - a. Supports Shielded/Unshielded Twisted Pair, Coax, AUI & Synchronous Fiber.
  - b. Supports Internal EtherNet Terminal Servers for TCP/IP.
  - c. Supports Fiber Links Up to 2.0 Kilometers.
6. System hub shall be provided in 12, 24, or 48 port versions. The system hub shall be able to be mounted in a rack and installed from the front.
7. Transceiver slots for connection of twisted pair 100/1000Base-T, Thin LAN or fiber optic FOIRL.
8. The unit shall include and Intel I960 RISC-based processor, 1 Mbytes of RAM and 256Kbytes of flash EEPROM
9. Complete workgroup security including: intruder prevention, auto port disabling, network management alarm, eaves drop prevention, authorized managers list and password protection
10. Provisions for added SNMP management module.
11. Intelligent error monitoring, intelligent segmentation recovery, auto-segmentation, fault isolation and integrity.
12. Support for SNMP/IP and IPX multi-vendor management with SNMP browsers.
13. The unit shall be UL rated and meet FCC Part 15 Class A emissions standards.
14. The unit shall be provided with a lifetime limited, 5 year on site warranty.
15. The system hub must be capable of implementation to include all of the following features
  - a. A single-port FOIRL module shall be available to provide FOIRL-based EtherNet connections through the system hub. The module shall comply with the IEEE FOIRL and 100/1000BASE-FL and 100/1000BASE-FL standards which ensures interoperability with other vendors' FOIRL-compliant devices. In addition, users in a FOIRL environment shall be able to take advantage of the



- system hub benefits such as multi-channel architecture, port redundancy, and fault tolerance.
- b. The FOIRL module shall achieve point-to-point connections longer than the 1 kilometer specified by the IEEE FOIRL specification by use of high power optics.
  - c. A FOIRL transceiver shall be available to link a network station to EtherNet 100/1000BASE-FL LANs using fiber-optic cable. The FOIRL transceiver shall attach directly to the AUI port on the network station eliminating the need for an AUI cable.
    - 1) The FOIRL transceiver shall comply with the IEEE 802.3 100/1000BASE-FL draft standard and offers low-light level detection for error-free transmission.
- 16) An EtherNet transceiver module shall be available to provide AUI connectivity to the system hubs.
- 17) An EtherNet BNC module shall be available to provide a single connection to thin-wire EtherNet segments up to 185 meters in length.
- a. The BNC module shall be fully compliant with the IEEE 100/1000BASE-2 standard. All thin wire segments shall be able to be terminated either internally or externally.
- B. Approved Suppliers
- 1. The following vendors have been pre-approved to supply product under this contract:
    - a. Cisco
    - b. 3Com
    - c. Bay Networks
    - d. Others submit in accordance with substitution requirements.

### 3.00 – EXECUTION

#### 3.01 GENERAL

- A. Provide installation logs supporting building infrastructure.
- B. Configure and cross connect all ports as required for complete end to end system.

#### 3.02 DRAWING DETAILS (Shop Drawings)

- A. Show wall elevation and wire details on shop drawings. Show equipment function, make and model and wire routing and terminations within rack or cabinet.
- B. Show as-built location of all devices on shop drawings.
- C. Provide 3 sets of bound operation and maintenance manuals, including submittal materials, and record of field changes. Provide complete as-built wiring diagrams in AutoCAD2000 format. Provide CD files and original tracings (E size) in format of construction drawings. Input all cabling information into ACS system and provide a detailed printed report with as-builts.

#### 3.03 QUALITY CONTROL

A. Evidence of Experience and Qualifications

1. Show that the contractor who will perform the work has a minimum of 5 years experience successfully installing system of the same type and design as specified herein. Include the names, locations, and points of contact of at least two similar installations of the same type and design as specified herein where the installer has installed such systems. Indicate the type of each system and certify that each system has performed satisfactorily in the manner intended for a period of not less than 12 months.
2. Show that the instructor, who will train staff, operating and maintenance personnel, has received a minimum of a CNE/MCE training from a factory training center, and 2 years experience in the installation of systems of the type specified. Submit training certification in equipment submittals, title section training and certifications.

3.04 TESTING

GENERAL

1. Testing shall be performed in the presence of the owner.
  - a. Testing shall include verification of:
    - 1) Server operation and configuration
    - 2) NOS installation, configuration and operation
    - 3) HUB insulation and operation
    - 4) Cable Plant
2. All test equipment shall bear current calibration stickers or dated certificates.
3. Printed test results along with as-built drawings shall be assembled into a 3 ring project binder and delivered to the consultant for verification and final acceptance prior to start of warranty.

3.05 COMMISSIONING

A. General

1. The contractor shall guarantee all equipment and wiring free from inherent mechanical and electrical defects for one year from the date of final acceptance by District.
2. Acceptance shall consist of the following:
  - a. Burn-in period.
    - 1) The system shall be accepted for start of warranty upon successful completion and testing of the system.
    - 2) Burn-in period shall be a 30 day time frame to allow the system to operate free of defects, grounds, programming faults, etcetera.
    - 3) The 30-day burn-in shall begin the day of acceptance by owner.
    - 4) The burn-in period shall be 30 days of continuous use without system trouble, false alarm, open, short or ground condition present.
    - 5) Should the system fail for any reason during the burn-in period, the contractor shall respond immediately upon notification by owner's personnel and correct said deficiencies.
    - 6) Upon correction and restoration, the burn-in period shall be re-set to "0" and the 30 day count shall begin again.
    - 7) Warranty shall commence upon day 31 of successful burn-in

period

b. Final Test

- 1) Before the installation shall be considered completed and acceptable by the awarding authority, a test on the system shall be performed as follows:
  - a) The contractor's job foreman, in the presence of a representative of the manufacturer, and a representative of the owner shall operate every network device to ensure proper operation and correct configuration at the file server location.
  - b) When the testing has been completed to the satisfaction of both the contractor's job foreman and the representatives of the manufacturer and owner, a notarized letter co-signed by each attesting to the satisfactory completion of said testing shall be forwarded to the District.
  - c) The contractor shall leave the data network system in proper working order, and, without additional expense to the owner, shall replace any defective materials or equipment provided by him under this contract within one year (365 days) from the date of final acceptance by the consultant.

B. As Built Drawings, Testing, and Maintenance Instructions

1. A complete set of reproducible as-built drawings in AutoCAD R2000 format (CDs and sheets) showing installed wiring, color coding, and wire tag notations for exact locations of all installed equipment, specific interconnections between all equipment, and internal wiring of the equipment shall be delivered to the owner upon completion of system acceptance.
2. Operating and Instruction Manuals
  - a. Operating and instruction manuals shall be submitted prior to testing of the system. Four (4) complete sets of operating and instruction manuals shall be delivered to the owner upon completion.
  - b. Provide necessary training and/or schooling to designated owner personnel at no additional cost to District. Training shall be on site.

C. Testing Frequency Instructions

1. Complete, accurate, step-by-step testing instructions giving recommended and required testing frequency of all equipment, methods for testing each individual piece of equipment, and a complete troubleshooting manual explaining how to test the primary internal parts of each piece of equipment shall be delivered to the District upon completion of the system.
2. Maintenance instructions shall be complete, easy to read, understandable, and shall provide the following information:
  - a) Instructions on replacing any components of the system, including internal parts.
  - b) Instructions on periodic cleaning and adjustment of equipment with a schedule of these functions
  - c) A complete list of all equipment and components with information

as to the address and phone number of both the manufacturer and local supplier of each item.

- d) User operating instructions shall be provided, prominently displayed on a separate sheet located next to the control.

END OF SECTION

1.00 GENERAL1.01 SCOPE

- A. Requirements of the General Conditions, Special Conditions and Division I apply to work of this section.
- B. Furnish all labor, materials, services, equipment and appliances required to perform all work to complete the Contract, including but not limited to these major items:
  - 1. Complete emergency telephone intercom system including concrete foundations.
  - 2. All auxiliaries required for a complete and operable system.
- C. Additional Work to be Provided
  - 1. Supervise installation of power supply location by Electrical Subcontractor and verify suitability for emergency phone system equipment.
  - 2. Contractor shall furnish the emergency phone system equipment (2-unit per floor, 1-unit in Lot G, east of the parking structure and 1-unit in Lot SP-X, south of the parking structure – 10 units total). Contract is for District - Furnished, Contractor Installed (DFCI) installation.
  - 3. Contractor shall coordinate with the District for scheduling, transport and responsibility of the equipment to / at the site.
  - 4. Contractor shall coordinate power supply required, and provide the necessary conduit, wiring and j-boxes as provided under the work of other sections.
  - 5. All power conduits and wiring shall be furnished and installed by the electrical section to each emergency phone location.
  - 6. The Contractor shall cooperate with the equipment installer and coordinate his work with the work of the emergency phone equipment installer.
  - 7. Any additional conduit with wire or conduit modifications necessary for a completely operable installation of the emergency phone system.
  - 8. Coordinate for the placement of pipe bollard protection around the emergency phone equipment.
  - 9. Coordinate that District furnished equipment and completed installation is in compliance with CBC / Title 24 requirements.

1.02 RELATED WORK IN OTHER SECTIONS

- A. Section 03300: Concrete and Concrete Finishes
- B. Section 05500: Miscellaneous Metal
- C. Division 16: Electrical

1.03 SYSTEM DESCRIPTION

- A. The unit shall be an easily identifiable, vandal resistant communications device that is Americans with Disabilities Act (ADA) compliant, multi-functional, freestanding, and constructed of heavy steel. The unit shall be aesthetically pleasing and virtually impervious to damage, and shall include a high quality,

vandal resistant, hands-free communications device, a powerful strobe light, and a vivid blue beacon that serves to identify the unit from a great distance.

- B. The communication system shall be designed so that a single touch on the communications device button shall immediately and automatically dial a preprogrammed number. This shall simultaneously activate the blue strobe light, and an optional peripheral device such as a remote preset for closed circuit television (CCTV). Immediately after establishing the phone connection with the receiving party, the communications device shall be capable of sending a signal identifying the specific unit being activated. The strobe shall continue to flash, drawing attention to the location until the receiving party terminates the call
- C. It shall not be possible to gain entry to the unit or to remove any component from the unit without a specially designed wrench provided for the purpose.

#### 1.04 SUBMITTALS

- A. Provisions: Comply with Section 01340.
- B. Complete material list, including the names of all equipment manufacturers proposed.
- C. Complete system circuit schematic diagrams and shop drawings, which show clearly how the individual equipment items and components relate to each other and how they are interconnected.
- D. Before final acceptance of the work, deliver to the District's representative copies of an "Operating and Maintenance" manual in flexible binder covering all equipment.
- E. Each manual shall include all instructions necessary for the proper operation and servicing of the system, complete circuit schematic diagram of the system, wiring schedule for all system interconnecting circuits and conductors, and schematic diagrams for components, where applicable. Schematic diagrams shall describe replacement parts. In addition, a copy of the approved system parts shall be included in each manual.

#### 1.05 REQUIREMENTS

- A. Provide all equipment and materials as hereinafter specified. Coordinate with the District for the desired options whether indicated herein or not, available prior to bidding the project and/or installation of the units.
- B. System installation shall be by a manufacturer approved qualified electronics equipment installation organization that can show proof of having satisfactorily engineered and installed similar systems of equal scope within the past five (5) years.
- C. All equipment and component parts shall carry continuously, without undue heating or change in rated values, the loads connected thereto and rated output loads where such are specified. All equipment shall be properly fused.
- D. Provide only new and unused materials, manufactured within 18 months prior to installation and listed by Underwriters' Laboratories.

## 1.06 WARRANTY

The unit shall be warranted by the manufacturer (parts and labor) for a period of five (5) years, against failure of function or finish of the unit, phone, strobe light or housing. Lenses shall be covered not to yellow, haze, crack or become brittle with the passage of time, within the warranty period. Interior electronics shall be warranted for a period of two (2) years.

## 2.00 PRODUCTS

### 2.01 MANUFACTURE

Products specified herein, are as manufactured by Talk-A-Phone Company, Chicago, IL, Model ETP-MT/R with ETP 400 speaker phone

### 2.02 DESIGN REQUIREMENTS

#### A. Construction

1. The unit shall be a concentric steel cylinder (bollard), triangular or rectangular tube with a .25 inch wall thickness, and a height of +/- 9 feet.
2. Tamper resistant fasteners shall be used. It shall not be possible to enter the unit or remove any component without a special computer designed bit-wrench designed for this purpose. These bit-wrenches are supplied only by the manufacturer of the unit. All other types of fasteners shall not be acceptable due to the abundance of non-proprietary tools available for their removal.
3. The unit shall have an internal anchor base plate that is fully welded to the base unit. The base plate shall be fabricated of .75-inch thick A-36 grade steel plate, and shall have a 5-inch diameter center hole for electrical conduit access, as well as four oblong holes on an 8 inch circular bolt pattern for the anchor bolts. Provide a fully engineered foundation design including sealed and signed calculations and plans for review by the District's Project Manager.
4. The unit shall have an access opening for anchor mounting and electrical wiring that is near the base of the unit.
5. The opening shall have a cover plate, flush with the unit, whose wall thickness shall be the same as base. The cover plate shall fit precisely into the opening, have a weather resistant gasket to prevent water from entering the unit, and shall be held in place by tamper resistant fasteners as supplied by the manufacturer.
6. There shall be two lens openings cut into the face of the unit 180 degrees apart, with the bottom of the openings to be approximately 14 inches from the top of the unit. The corners of the cuts shall be uniformly rounded, and the edges of the cuts shall be straight and free of burrs and other visual imperfections. The four edges of each opening shall form a square when viewed in elevation from the front or rear of the unit.
7. A heavy lens made of clear, Lexan XL type polycarbonate shall be inserted into the unit and mechanically and chemically fastened to the interior. The lens shall be fully sealed with silicon around its entire edge to render the installed lens water, insect, and vandal resistant. The lens shall be treated so that it will be virtually impervious to damage from ultra-violet radiation, aging, cracking, yellowing or breaking.

8. A dome top assembly shall enclose the top and shall consist of a cover plate, a gasket, a blue strobe light, and a Lexan type polycarbonate dome cover with a passive vent.
9. The cover plate shall be cast of high quality, high-density iron that shall be free of defects. The upper surface of the cover plate shall have two rings, one within the other, into which the dome cover shall fit.
10. A cylindrical, transparent dome that is six inches tall with a 12.50-inch outer diameter shall cover the top of the cover plate. The dome shall be made of clear Lexan XL type polycarbonate, and shall be sloped so that water does not pool on top of the unit. A passive vent shall be installed on the top of the dome that allows air movement to prevent moisture buildup.
11. The dome shall be placed over the blue strobe light, and shall fit within the concentric rings in the cover plate. It shall be attached to the cover plate by means of three 10-24 by 1-inch size tamper resistant fasteners, and then sealed with silicone around the outside edge of the dome where it meets the cover plate to provide a weather, insect, and vandal resistant seal.
12. A gasket shall be placed between the dome top assembly and the bollard, and shall provide a weather resistant seal when the assembly is properly installed on top of the post. The assembly shall then be attached by means of tamper resistant, stainless steel and countersunk fasteners.
13. A second opening shall be cut into the face of the unit at a point beginning 38.5 inches above the bottom. The opening shall be 26 inches high at the forward edge, and 24 inches high at the rear edge. The lower edge of the opening shall be sloped from the rear to the front at an angle 35 degrees from the horizontal. The upper horizontal edge of the opening shall constitute an arc of 160 degrees in the face of the unit, and the sides of the opening shall be parallel and the same length.
14. The opening shall be totally enclosed by a 7 gauge steel plate that shall have two openings to allow for a communications device and a flat panel that shall be recessed into the faceplate. The faceplate shall be seam welded so that the faceplate and the base appear to be one unit.
15. The flat panel measuring 11.75 inches high by 8.50 inches wide shall be mounted directly above the communications device. An optional directory panel or an optional custom plate can be placed in this area.

B. Mounting: The freestanding unit shall be mounted onto four bolts that are set in concrete foundations. Standard 3/4 x 24 inch galvanized anchor bolts with galvanized nuts and washers shall be used as supplied. Unit shall mount one-half inch above the concrete to allow air movement.

C. Electrical

1. All electrical components shall have quick-disconnect terminals for easy service or removal. All wiring shall be concealed within the bollard and shall not be visible from the outside of the unit.
2. The unit shall require 120 VAC and draw a maximum of 3 amperes under normal operation. The entire unit shall be surge protected.
3. The speakerphone shall require 20 mA loop current at the unit, with a maximum loop resistance of 100 ohms. A 22 to 26 AWG shielded twisted pair cable shall be used. Longer cable runs shall require the heavier gauge cable.

D. Lights

1. Strobe light: A strobe light shall be located at the top of the unit. The



strobe light shall generate approximately 1,000,000 candlepower and have a flash rate of no less than 60 flashes per minute. A deep blue polycarbonate prismatic refractor that distributes the light in a horizontal pattern, making the flash bright and visible even at great distances shall cover the strobe.

2. The strobe light shall be automatically activated when the "PUSH FOR HELP" button on the communications device is touched, and shall continue to flash until the answering party deactivates the unit. The strobe cannot be turned off at the unit itself.
3. Area light/beacon: A high intensity discharge (HID) 70-watt, high-pressure sodium area light shall be located under a reflective disk that is situated within the bollard near the top of the unit. The area light shall be centered between the lenses, and shall be partially surrounded by a heavy-gauge, deep blue, translucent, prismatic refractor made of Lexan type polycarbonate.
4. Reflectors shall direct the light of the lamp outward and downward from the unit. This shall create a pool of light around the unit, making persons standing near the unit visible to passersby and/or to a responding officer. The area light shall always be illuminated.
5. Faceplate light: A lighting device shall be concealed within the unit above and directly forward of the communications device. This lamp will direct light onto the communications device faceplate, and shall be protected by a Lexan type polycarbonate lens.

E. Communications

1. The unit shall have a high quality, vandal resistant and ADA compliant speakerphone communications device.
2. Standard Speakerphone:  
The speakerphone shall have one 1.5-inch piezoelectric button labeled "PUSH FOR HELP", one 3/8-inch diameter red light emitting diode (LED) labeled "Call Being Placed", and one 3/8-inch diameter green LED labeled "Call Received". The speakerphone shall have an internally mounted electronics enclosure, auxiliary power, and shall be capable of playing up to two digitally stored voice messages upon activation. The electronics enclosure shall be capable of using interchangeable faceplates: a single-button faceplate, a two-button faceplate, or a two-button faceplate with keypad. The speakerphone shall be programmable from a remote location and have a three number dialing capability per button. Battery backup shall be rated for 16 hours of active talk time and 32 hours of standby. Line powered phone devices, DIP switch programming, and push-to-talk devices are not acceptable.
3. The speakerphone shall have the following standard features:
  - Three number dialing capability up to 16 digits each.
  - Programmable from a remote location.
  - Remote electronics mounting.
  - Three inputs.
  - Two output relays.
  - Remote speaker volume adjustment.
  - Silent monitoring.
  - Capable of playing up to two digitally stored voice messages.
  - Programming option to set the number of times voice message(s) are played.
  - Capable of using interchangeable faceplates.
  - Three dialing options.
  - Re-playable message(s) on demand.
  - Output sound level >80 dB at 1 meter for normal conversation.
  - Waterproof 3.5-inch speaker.
  - Waterproof microphone.

- Tone or pulse dialing capability.
- Programmable passwords.
- Programmable conversation time.
- Capable of notification when AC power has been off for 15 minutes.
- Operating temperatures of -40°F to +150°F (-40° to +65°C).
- Conformal coated speakerphone electronics to withstand harsh environments.
- Capable of playing messages simultaneously to the unit and to the call center.
- Complies with Part 68 of the FCC rules for the United States.

F. Finish

1. The unit shall be finished with a coating process known to be highly graffiti resistant and UV resistant.
2. Substrate preparation shall be as required to comply with applicable ASTM impact and adhesion standards.  
D2794 Direct and Reverse Impact  
D523 Gloss @ 60 degrees  
D3359B Cross Hatch Adhesion  
B117 Salt Spray Resistance
3. The polyurethane finish shall be a multi-coat system available in 10 standard colors and custom colors as specified by the user and approved by the manufacturer.
4. The primer coat and finish coat shall each have a minimum coverage thickness of 2.0 mils.
5. Other types of protective finishes are not acceptable.

G. Graphics

1. The graphics shall be a durable engineering grade reflective vinyl for high visibility and legibility.
2. The standard graphics text shall be "Emergency" and shall be available in 30-inch lengths. Standard colors shall be "reflective white", "reflective blue", and "reflective black".

H. Options: The unit shall be capable of accepting an integrated overhead camera mount that accepts a 1½ NPT dome camera supplied by others. The overhead camera mount shall be designed to be available and ordered with the CB I unit or as a retrofit to installed CB I units.

3.00 EXECUTION

3.01 VERIFICATION OF CONDUITS

Equipment supplier and installer shall verify the adequacy / location of conduit runs shown on the contract drawings for emergency phone system equipment communications and power. If the layout indicated is not adequate for the proposed operation or is not in compliance with the manufacturers requirements shall be brought to the Contractor's attention. Costs associated with modifications to the structure, conduit and / or electrical power or operation signal / function supply shall be assumed by the Contractor at no additional contract cost to the District.

3.02 INSTALLATION

- A. The equipment to be installed as the work of this contract will require certain items to be placed within the concrete structure. Requirements of the work of this Section include supervision of the related work of other sections that effects the installation and wiring of all equipment furnished under this Section.
- B. Unless directed, specified or indicated otherwise, install materials, equipment, etc., in strict accordance with the manufacturer's recommendations, the approved shop drawings, the Architect's instructions, the requirements specified herein and in accordance with the California and National Electrical Codes.

3.03 OPERATION

Contractor shall instruct the District's personnel in the operation and maintenance of the emergency phone system equipment installed as the work of this Section.

END OF SECTION



## 1.00 – GENERAL

### 1.01 SCOPE OF WORK

- A. Provide a complete, tested, Cable Distribution system for Data Processing and Networking systems (local area network), Telecommunications (voice), Audio (paging), Entry Access Control and Monitoring (security) and Closed Circuit Video Surveillance systems (CCTV) as follows:
1. The data distribution system shall include fully terminated fiber optic backbone and CAT-5e STP station cables and specialty data distribution cables and terminations as shown in the contract drawings. All fiber optic trunk cabling will be installed into utility conduit loops around the park in fiber inner-duct. Station cabling will be installed in conduits and office furniture provided by others. This work includes all backbone, horizontal distribution, station cabling and specialty stations/horizontal distribution cabling for the Administration, Point of Sale, Audio, Security, Irrigation and CCTV systems. The contractor shall be responsible to provide and install all cabling, wiring, cabinets, racks, data frames, cable tray, wire management, power distribution, blank panels, structural bracing, inner ducting, termination panels (fiber and UTP), complete testing and certification, along with all as built documentation as set for in these specifications.
  2. The voice distribution shall include fully terminated multi pair trunk cabling and CAT-5e STP station cabling along with specialty outdoor cabling and terminations for food carts and retail carts as indicated on the contract drawings. Contractor shall be responsible to provide and install all cabling, wire management, backboards, equipment cabinets, ladder racking, station cabling, specialty cabling, boxes, outlet terminations, splicing (as needed). All voice cabling underground shall use a rated OSP cable. All above ground cabling in conduit may use a CMP rated cable. Conduits and pathways will be installed by others and will be in place prior to the start of wire/cable installation. Complete testing and certification, along with all as built documentation as set for in these specifications.
  3. The entry access control and monitoring will utilize a segment of the fiber optic backbone, feeding terminal controllers and I/O boards (FBO) monitoring various security and equipment functions throughout the park. Distribution cabling from controllers and I/O boards are copper cables (coordinate requirements with security contractor) which will provide monitoring to point sensors, motion sensors, equipment, fire protection systems and alarm monitoring. Cabling will be installed into existing underground and above ground conduits. The contractor will be required to provide and install all cabling, terminations, connections, wire management and incidentals for a complete cabled system. Cabling underground shall utilize an OSP rated cable. Cabling above ground shall use a CMP or CL2 or plenum/tray rated cable depending on the application. Complete testing and certification, along with all as built documentation as set for in these specifications.
  4. Fiber Optic Riser Cables: Individual 6-fiber, 8-fiber, 12-fiber, 18-fiber, 24-fiber or 48-fiber optical cables shall be installed from the termination enclosure in the new IT Room to fiber optic termination enclosures in

each new DATA IC Communications Closets at each cluster attraction area as shown on the plans.

- B. Provide system design services (development of specific details consistent with the contract documents) as required to complete shop drawings for data cable systems including detailed documentation for owner's review and detailed documentation of as-built conditions.
- C. Data concentrators, local area network controllers, and data terminal equipment will be furnished by others under separate contract. The contractor shall coordinate with other system vendors where appropriate to facilitate equipment backboard installation, scheduling, protection of equipment, and access to the project site in order to provide District a complete project in a timely manner.
- D. The successful cabling contractor shall attend a mandatory pre-construction meeting with individuals deemed necessary by District prior to the start of work.
- E. Raceway Systems Specifications required for voice, data, audio, video systems cables may be found in Electrical Specifications.
- F. The successful bidder will not be determined by price alone, but by a rating system to include a combination of price, qualifications, training procedures and proposed documentation package.
- G. All unused conduits or interducts shall have metered pull strings.

#### 1.02 DESIGN

- A. Floor Plans: Furnish floor plans for review showing outlet locations with an indication of outlet type and proposed label. Floor plans shall be coordinated with architectural and electrical power plans and shall be produced at the same scale as the contract documents (see part 1.4, Submittals).
- B. Terminal Elevations: Furnish details showing terminal block and backboard elevations including all cable terminals, spaces for equipment, equipment racks, and station cable routing. Communications equipment closets (intermediate distribution frames - MC) shall be arranged to maximize the utility and growth potential available in spaces shown on the floor plans. Terminal elevations shall be based on detail elevations included in the contract documents and shall show additional detail as indicated herein.
- C. Outlet Locations: Provide as shown.
- D. Terminal Schedules: Furnish terminal outlet schedules showing terminal block position for all station cabling. Terminal outlet schedules shall show proposed labels for all 4-pair STP horizontal cables at station outlets along with patch or 110 frame locations.

#### 1.03 LOCAL AREA NETWORK (overview, electronics FBO – REFERENCE ONLY)

- A. The Local Area Network shall be based on and support IEEE 802.3 functional standards for Ethernet Local Area Networking. This shall include IEEE 802.3

10/100BASE-T for station microcomputers, and IEEE 802.3 10/100BASE-FX(FIORL) synchronous technology for fiber optic repeater interconnection.

- B. The main distribution frame (MDF) and all intermediate distribution frames (IDF's) shall support up to 12 Ethernet segments (Administrative Network, POS, Security, Audio, Irrigation and Lighting).
- C. System Switches (FBO) shall be sufficient to support use at full capacity without the need to add Switch chassis. System shall be sufficient to support use at full capacity without user-perceptible delays in network response time.
- D. System shall be sufficient to support any combination of system features at full capacity. System shall allow reconfiguration of backbone to allow Customer maximum flexibility and implementation of options in case of need when future services are identified and added.
- E. LAN CONFIGURATION
  - 1. Each building or group of buildings supports an IDF that is a switch location. System Switches are required in DESIGNATED locations so that a switch can service every data drop.
  - 2. Each system switch shall allow for growth, without the need to add an additional switch, to 150% of the current data drop count for the area that it serves even though all those drops will not be connected at initial installation.
  - 3. Each designated location shall utilize a system switch as per the specification.
  - 4. Each switch location shall utilize Fiber Optic-Transceiver module for connection to the Fiber Optic backbone (where fiber is utilized as the backbone media).
  - 5. Each switch location shall utilize, 10/100BASE-T (RJ45) shielded twisted pair ports for connection to the UTP Category 5 LAN cable plant. The quantity of initially installed 100BASE-T ports shall be per the needs indicated and requirements of this specification.
  - 6. The initially active 10/100BASE-T locations shall be connected to the system switches via Category 5 STP patch cords and patch panels.

#### 1.04 SUBMITTALS

- A. Project Initiation: Within fourteen (14) days of Notice to proceed, the Low Voltage Contractor shall furnish the following in a single consolidated submittal:
  - 1. The name of the person who will act as the low voltage Contractor's official contact with the Contractor/Consultant.
  - 2. Electrical Permits. The Contractor shall obtain all required permits and provide copies to Consultant.
  - 3. Complete manufacturer's product literature for all cable, cross-connect blocks, cable supports, cable labels, outlet devices and other products to be used in the installation. In addition, whenever substitutions for recommended products are made (pre-approved prior to bid by Consultant), samples and the manufacturer's supporting documentation demonstrating compatibility with other related products should be included.
  - 4. A time sealed Construction Schedule using PERT/CPM indicating general

project deadlines and specific dates relating to the installation of the cable distribution system. At a minimum, this Construction Schedule shall include the following milestones:

- a. Start of Communications space construction.
- b. Start of Fiber Optic cable terminations.
- c. Start of 4- pair STP and related termination hardware station cable installation.
- d. Start of Level 5e or 6e STP and Fiber Optic backbone cable testing.
- e. Start of Audio Cabling and related termination hardware and testing.
- f. Start of Security and CCTV Cabling and related hardware and testing.
- g. Final inspection.

B. Shop Drawings (within twenty-eight (28) days of notice to proceed).

#### 1.05 SUBMITTALS

A. In addition to the requirements of Division 1, submit all materials for approval arranged in same order as Specifications, individually referenced to Specification paragraph and drawing number. Submit number required in Division 1 plus three (3) copies of 8 1/2" x 11" material and 2 prints plus one reproducible of drawings in 30" x 42" size, minimum. Submit 8 1/2" x 11" items bound in volumes and 30" x 42" drawings in edge-bound sets.

B. Progress Schedule: Include duration and milestones for the following:

1. All submittals specified.
2. Completion of equipment buyout.
3. Completion of equipment receipt at fabrication shop.
4. Shop fabrication.
5. Shop testing.
6. Shipment to site.
7. Installation.
8. Field testing.
9. Training.
10. First event date.

C. Manufacturer's Product Data:

1. List of Materials: For each item, include:
  - a. Manufacturer.
  - b. Model number.
  - c. Listing: UL, City Lab or none.
  - d. Quantity.
2. Manufacturer's Product Data: in sequence of List of Materials, Data sheet for each item, including all accessories, marked for proposed product.

D. Field and Shop Drawings:

1. Resubmit: for coordination reference complete with corrections from previous submittal.
  - a. List of Materials.
  - b. Manufacturer's Product Data.



2. Field (installation) Drawings: Collate in sequence:
  - a. Drawing index/symbol sheet.
  - b. Floor plans. At scale of Contract Documents. Show:
    - 1) Devices with circuit number.
    - 2) Rough-in.
    - 3) Mounting height.
    - 4) Conduit size.
    - 5) Wire type.
    - 6) Wire fill.
  - c. Sections/Elevations. At scale of Contract Documents.
    - 1) Mounting location reference.
  - d. Enlarged Plans. At scale of Contract Documents or larger as required for trade coordination. Show:
    - 1) Refer to 'floor plans'.
    - 2) Architectural features.
    - 3) Rack cabinets.
    - 4) System furniture.
    - 5) Clearances.
  - e. System conduit riser drawing, show:
    - 1) Terminal cabinets.
    - 2) Coordination with floor plans.
    - 3) Wire runs not shown on floor plans.
    - 4) Wire type.
    - 5) Wire fill.
  - f. Mounting details
    - 1) Stamped and signed by consultant licensed in jurisdiction for work of this type.
    - 2) Show loads, strength of connections, etc.
    - 3) Show calculations - on drawings or in bound volume for review by authorities having jurisdiction.
    - 4) Provide details for:
      - (a) Racks.
      - (b) Ladder racking
      - (c) Mounting/attachment
  - g. Installation details as required.
    - 1) Terminal cabinets: terminations.
  - h. Wire run sheets (if used) Show:
    - 1) Wire Number.
    - 2) Source.
    - 3) Designation.
    - 4) Signal Type.
    - 5) Wire type.
    - 6) Operating level or voltage (if applies).
3. Shop (Fabrication) Drawings: Collate in sequence:
  - a. Drawing Index/symbol sheet (if separate set from Field Drawings).
  - b. System functional drawings. Submit separate drawing for each system/subsystem. Show:
    - 1) Equipment: Function, make, model.
    - 2) Wire number.
    - 3) Wire Type.
    - 4) Shield condition at both ends (float, ground, location of ground).

- 5) Connector wiring details, each type.
  - 6) Audio: Polarity, operating level.
  - 7) Provide drawings for the following systems:
    - (a) Control.
    - (b) Audio.
    - (c) Coordinated grounding scheme.
  - c. Equipment rack elevations. All racks scaled at one-inch equals one foot (1" = 1' 0"), or larger. Show:
    - 1) Equipment: Function, make, model.
  - d. Rack wiring drawings for, each rack:
    - 1) Power strip: receptacles, circuiting.
    - 2) Equipment.
    - 3) Grounding.
    - 4) Wiring, all systems.
    - 5) Wiring harness scheme
  - e. Fabrication details submit for:
    - 1) Receptacles.
    - 2) Panels.
    - 3) Special mounting provisions.
    - 4) Custom enclosures, indicate:
      - (a) Construction and bracing
    - 5) Legends/engraving details. Half or full size:
      - (a) Receptacles.
      - (b) Panels.
      - (c) Equipment.
    - 6) Jackfield, terminations and cross connect details, Front elevation, full size.
      - (a) Layout.
      - (b) Text of designations.
- E. Samples: Samples for approval by owner
1. Of all finishes/materials which will be visible to the public, including:
    - a. Receptacles and controls with associated trim plate
    - b. Each type of information outlet, faceplate, etc.
  2. For other items, provide at least two of each as a sample.
- F. Shop and Field Test Reports
1. Schedule: Submit test reports in timely manner relative to project schedule such that District may conduct verification of submitted test data at owner's option, without delay of progress.
    - a. Shop test report: Submit prior to shipping completed system to project site.
    - b. Field test report: Submit following system completion and prior to and as condition precedent to District's acceptance of the work of this section.
  2. Test Reports: include:
    - a. Time and date of test.
    - b. Personnel conducting test.
    - c. Test Object.
    - d. Procedure used.
    - e. Test equipment, including serial and date of calibration
    - f. Results of test - numerical or graphical presentation.

3. Verification of Submitted Test Data: owner may elect to verify some or all test data submitted. Retest in presence of designated observer(s) at reasonable convenience of District Provide technician familiar with work of this section. Provide all test equipment.
- G. Reference Data for Operation, Maintenance and Repair
1. In addition to the requirements of Division 1, submit one (1) additional set. Submit in three post binders (not ring binder) with tabs.
  2. Index.
  3. Systems operating instructions.
  4. Reduced set of system Record Drawings.
  5. Key schedule.
  6. Maintenance and spare parts schedules.
  7. Shop and Field Test Reports.
  8. Equipment manuals. Collate alphabetically by manufacturer. Provide manufacturer's original operation, instruction and service manuals for each equipment item. For each set, provide manufacturer's original printed copies only. Photocopies not acceptable.
- H. Record Drawings in AutoCAD R2000 format
1. Quantity:
    - a. Review sets: as for Shop and Field Drawings.
    - b. Record set:
      - 1) Three (3) blueines.
      - 2) One (1) mylar.
      - 3) CD with applicable .dwg file
  2. Format: Record Set.
    - a. Pencil, permanent ink or permanent photographic process.
    - b. Front face only of Mylar at least 3.0 mils thick.
    - c. Appliqué film or lettering prohibited.
    - d. Suitable for microfilming.
  3. Content: All drawings required under "Field and Shop Drawings". Show "as installed" condition.
- I. Shop Drawings. The contractor shall submit scaled drawings of all IC/MC backboard layouts showing hardware 110 frame placements prior to new installations. The name of the building, room #, title of room IC/MC, shall be included. The contractor must show dimensions for LAN network equipment backboard space. Coordinate with owner/consultant on any backboard discrepancies.
- J. Proposed Contractor Category 5e or 6e STP, and fiber optic cable test result forms.
- K. As a condition for project acceptance, the contractor shall submit the following for review and approval:
1. Complete manufacturers product literature and samples (if requested) for all pre-approved substitutions to the recommended products made during the course of the Project.
  2. An exceptions list of deviations (in materials, construction and

- workmanship) from those specified in this section and shown on the Project Drawings. District will review this list and declare each item as either an approved exception, or as one the contractor must correct.
3. Inspection and Test Reports: During the course of the project the contractor shall maintain an adequate inspection system and shall perform such inspections to insure that the materials supplied and the work performed conform to contract requirements. The contractor shall provide written documentation, which indicates materials acceptance testing was conducted as outlined in Part 3 below. The contractor shall also provide documentation, which indicates that all cable termination testing was completed and that all irregularities were corrected prior to job completion for owner/consultant analysis.

#### 1.06 SYSTEM INSTALLATION REQUIREMENTS

- A. System installer must have a BICSI RCDD on staff. Copy of certification must be submitted at time of bid.
- B. The data cable system installer shall be a firm normally employed in the low voltage cabling industry with a reference list of five (5) projects and contact names to confirm successful Category 5e or 6e STP and Fiber Optic cable plant projects.
- C. District reserves the right to exercise its discretion to require the Contractor to remove from the project any such employee of owner's to be deemed incompetent, careless or insubordinate.
- D. A fifteen (15) year manufacturer warranty shall be provided by the selected low voltage installer. This warranty shall include defects in material and workmanship. The warranty period shall begin at the date of District's acceptance of the work. Quality and workmanship evaluation shall be made solely by District'/consultant and designated representatives.
- E. The selected low voltage installer must be licensed and bonded.
- F. All clean up activity related to work performed will be the responsibility of the Low Voltage Communication Contractor and must be completed daily before leaving the facility.

#### 1.07 REGULATORY REQUIREMENTS

- A. All work shall be performed in accordance with the latest revisions of the following standards and codes:
  1. Uniform International Conference of Building Officials
  2. Building Code (ICBO); Regional Office
  3. BICSI
- B. Other References:
  1. TIA/EIA- 569 Commercial Building Standard for Telecommunication Pathways and Spaces.
  2. TIA/EIA-568-A Commercial Building Wiring Standard
  3. EIA-455-171-D Standard Test Procedures for Fiber Optic Cables

4. TIA/EIA-4750000-B Generic Specification for Fiber Optic Connectors
  5. TIA/EIA-475E000 Sectional Specification for Fiber Optic Connectors Type BFOC/2.5
  6. TIA/EIA-604-X Fiber Optic Connector Intermateability Standards (FOCIS)
  7. Leviton Telcom Category Compliant Design Criteria dated 1995 or Later
  8. Leviton Telcom CCS Installation Training dated 1995 or later
- C. Governing Codes and Conflicts: If the requirements of this section or the Project Drawings exceed those of the governing codes and regulations, then the requirements of this section and the Drawings shall be construed to permit work not conforming with all governing codes and regulations.

## 1.08 ABBREVIATIONS and DEFINITIONS

- A. MC - Main Cross-connect often co-located in the building Entrance Facility (E) and/or Equipment Room (ER) and consisting of riser cable terminals, utility service cable terminals, PBX terminals, and various other equipment.
- B. IC - Intermediate Cross-connect usually residing in a Telecommunications Closet (TC) and consisting of station wire terminals, riser cable terminals, and various equipment. Used to connect the first and second level backbone cables in a two-tier star wiring topology.
- C. HC - Horizontal Cross-connect usually residing in a telecommunications closet and consisting of station wire terminals, riser cable terminals, and various equipment. Used to connect the first or second level backbone cables to the horizontal or work area cables.
- D. PBX - Private Branch Exchange, a telephone switch.
- E. PDS - Premises Distribution System, a common term used for the cable, terminals, and miscellaneous equipment comprising telephone and data transmission systems.
- F. STP - Shielded Twisted Pair (telecommunications/data station cables)

## 2.00 – PRODUCTS

### 2.01 GENERAL WIRING

- A. The inside/outside wiring plant shall be installed per requirements of these specifications utilizing materials meeting all applicable TIA/EIA standards.
- B. Materials shall be as listed or shall be equivalent products of other manufacturers meeting the intent and quality level of the TIA/EIA568 specification. In some cases specific materials are called out to maintain a uniformity of application across all installations. The Contractor shall maintain the same material uniformity for all buildings.
- C. All installed wire shall be tested and labeled 100% good after installation by the installer.

- D. All products shall be new, and brought to the job site in original manufacturer's packaging. Electrical components (including innerduct) shall bear the Underwriter's Laboratories label. All communications cable shall bear flammability testing ratings as follows:
1. Communications Cable.
  2. Plenum rated Communications Cable.
  3. Riser rated Communications Cable.
- E. Initial Cable Inspection: The Contractor shall inspect all cable prior to installation to verify that it is identified properly on the reel identification label, that it is of proper gauge, containing the correct number of pairs, etc. Note any buckling of the jacket, which would indicate possible problems. Damaged cable, or any other components failing to meet specifications shall not be used in the installation.
- F. Quantity: Provide quantity as shown on Contract Drawings, the Schedule or as otherwise defined herein.
- G. Preference: Owner desires system to be furnished and installed as specified herein.
- H. Substitutions: Comply with GENERAL CONDITIONS.
- I. Provide Complete: Provide all auxiliary and incidental materials and equipment necessary for the operation and protection of the Work of this Section at, if specified in full herein.
- J. Provide New: All materials provided under the Work of this Section shall be new, shall be the manufacturer's latest design / model, and shall be permanently labeled with the manufacturer's name, model number and serial number.
- K. Similar: Similar devices shall be of the same manufacturer, unless specifically noted otherwise in these specifications.
- L. Continuous Use: All active circuitry shall be solid state and shall be rated for continuous use. All circuit components shall be operated in full compliance with the manufacturer's recommendations and shall contain sufficient permanent identification to facilitate replacement.
- M. CABLE PLANT REQUIREMENTS
1. The cable plant shall be a star configured, unshielded twisted pair system capable of supporting data rates of 1Ghz.
  2. The drop cable shall run from intermediate wiring closets (IDF's) to each office, work station, attraction, food service and retail location as well as other miscellaneous locations as shown on the prints.
  3. The trunk fiber optic cable shall run between the main distribution frame (MDF) and each switch (IDF) location as indicated on the project drawings.
  4. The cable plant shall meet EIA/TIA-568 "Commercial Building Telecommunications Wiring Standard" and the maximum length of any STP data drop shall NOT exceed 100 meters including patch cables and future jumper cables at each information outlet location

5. Every switch location shall have one 24 strand multi-mode/single (12mm, 12sm) mode hybrid fiber optic cable (dedicated) from the MDF for LAN service, UON.

N. CABLE PLANT SUPPLIERS

1. The wire provided for all voice trunk runs shall be UTP Category 5e cable UON (OSP rated for below grade use)
  - a. Recommended suppliers: Berk-Tek, Essex, Belden, Lucent, Avaya.
2. The wire provided for all data and voice outlets shall be one four pair STP Category 5e or 6e cable per jack, UON (OSP rated for below grade use).
  - a. Recommended suppliers: Berk-Tek, Essex, Belden, Lucent
3. The wire provided for all security monitoring sensors shall be 2 pair #22 for point sensors and 4 pair #22 plus 1 pair #20 for powered motion sensors.
  - a. Recommended suppliers: West Penn, Belden, Atlas, Mohawk
4. The wire provided for all security camera locations shall be RG58/U coaxial cable with 100% shield or fiber optic cabling. power cabling for cameras shall be #18 Ga. min. cabled constriction. All cabling below grade shall be rated for the application.
  - a. Recommended suppliers: West Penn, Belden, Atlas, Mohawk

2.02 CABLING SPECIFICATION

A. STATION WIRING-DATA

1. The wire provided for all data outlets shall be one 4-pair STP Category 5e cable per jack, UON
  - a. The Category 5e or 6e, 4-pair UTP cable, must be Performance Level Tested. Each 1000' spool must be individually tested with test results affixed.

B. DROP CABLE SPECIFICATION

1. All data drop cabling shall be EIA/TIA 568, 569 and TSB-36 Category 6e certified.
2. All data drop cabling shall be 4-pair shielded twisted pair, PVC rated (OSP rated for underground use), Category 6e certified cable. Untwisted cable shall not be used. This includes even short pieces of flat cable for jumpers, etc.
3. All data drop cabling shall also be guaranteed by the cable manufacturer to support data rates to 1Ghz. The bidder must include in writing in the form of press release, newsletter, or cut sheet verification of cable capabilities.

C. STATION WIRING- VOICE

1. The wire provided for all voice outlets shall be one 4-pair STP Category 6e cable per jack, UON
  - a. The Category 6e, 4-pair UTP cable, must be Performance Level Tested. Each 1000' spool must be individually tested with test results affixed.
2. DROP CABLE SPECIFICATION
  - a. All voice drop cabling shall be EIA/TIA 568, 569 and TSB-36 Category 6e certified.

- b. All voice drop cabling shall be 4-pair shielded twisted pair, PVC rated (OSP rated for underground use), Category 6e certified cable. Untwisted cable shall not be used. This includes even short pieces of flat cable for jumpers, etc.
- c. All voice drop cabling shall be 24 AWG shielded twisted pair cable. All cabling for a single copper conductor shall have a maximum DC resistance of 28.6 ohms per 1000 feet at 20 degrees Celsius. All cabling shall have a maximum DC resistance unbalanced of 5 percent. All cabling will have a maximum mutual capacitance of a pair of 17 picofarads per foot. All cabling shall have a maximum pair-to-ground capacitance unbalanced of 1000 picofarads per 1000 feet.
- d. All voice drop cabling shall have an impedance (ohms) of the following values:

0.064	125±15%
0.128	115±15%
0.256	110±15%
722 kHz	102 + 15%
1.0-100.0 MHz	100 + 15%

- e. All voice drop cabling shall have a maximum attenuation (dB per 1000 feet at 20 degrees Celsius) of the following values:

1.0 MHz	2.0
4.0 MHz	4.1
8.0 MHz	5.8
10.0 MHz	6.5
16.0 MHz	8.2
20.0 MHz	9.3
25.0 MHz	10.4
31.25 MHz	11.7
62.5 MHz	17.0
100.0 MHz	22.0
155.0 MHz	28.1
200.0 MHz	32.4
310.0 MHz	41.8
350.0 MHz	44.9

- f. All voice drop cabling shall have a minimum Near-End Crosstalk coupling loss for any pair combination at 20 degrees Celsius shall be greater than the value determined by using the following formula for all frequencies in the range of:

0.772 MHz to 100MHz for a length of 1000 feet:

$$\text{NEXT (F)} > \text{NEXT (0.772)} - 15 \log (F/0.772)$$

- g. All voice drop cabling shall also be guaranteed by the cable



manufacturer to support data rates to 350Mhz. The bidder must include in writing in the form of press release, newsletter, or cut sheet verification of cable capabilities.

- h. Provide components consistent with the quality of KRONE part number TN5ETR-BLRB (blue) or approved equal, UL Subject 444, (UL)- C(UL) Type MPR/CMR/CMG, ICEA S-90-661, NEC 800 Type CMR TIA/EIA-568-A Cat 5 Horizontal Cable Requirements, ISO/IEC 11801 Category 5, TIA/EIA-568-A-5 Cat 5e Enhanced Horizontal Cable Requirements certified.

### 2.03 STATION HARDWARE-DATA

- A. Flush mount jacks shall be high quality Category 6e, 8-position modular jack with twisted lead-frame construction and 110 style terminations terminated with a high impact 110 termination tool. Jacks shall provide dual color code to allow both T568A and T568B wiring on the same jack, and shall provide a cutting ledge to automatically trim wires during termination. Jacks shall meet TIA/EIA-568-A requirements for Category 6e connecting hardware as manufactured by KRONE or Avaya.
- B. Faceplates shall match manufacturer for 8-position modular jack outlets at all locations.
- C. All data connecting hardware shall be EIA/TIA TSB-40 Category 6e certified.
- D. All data connecting hardware shall be modular jack panels with RJ45 jacks on the front and 110 style insulation displacement connectors (IDC) for termination of drop cable on the back.
- E. All modular jacks shall be eight position jacks with pin/pair assignments utilizing EIA/TIA T568B.
- F. All modular jacks shall be made continuous to the B-pin modular jack via a printed wiring board interconnection.
- G. The connecting blocks shall be KRONE IDC style or approved equal.
- H. The outlets faceplates shall be KRONE or approved equal in 4-6-8 port configurations. Supply 1 - 8 conductor modular data jacks and cables as a minimum per location.

### 2.04 STATION HARDWARE-VOICE

- A. Flush mount jacks shall be high quality Category 6e, 8-position modular jack with twisted lead frame construction and 110 style terminations terminated with a high impact 110 termination tool. Jacks shall provide dual color code to allow both T568A and T568B wiring on the same jack, and shall provide a cutting ledge to automatically trim wires during termination. Jacks shall meet TIA/EIA-568-A requirements for Category 6e connecting hardware as manufactured by KRONE.
- B. Faceplates shall match manufacturer for 8-position modular jack outlets at all locations.

- C. All voice connecting hardware shall be EIA/TIA TSB-40 Category 6e certified.
- D. All wiring voice connecting hardware shall be modular jack panels with RJ45 jacks on the front and 110 style insulation displacement connectors (IDC) for termination of drop cable on the back.
- E. All modular jacks shall be eight position jacks with pin/pair assignments utilizing EIA/TIA T568B.
- F. All modular jacks shall have a maximum attenuation corresponding with the table below. They shall approximate value of an equivalent of a 2 meter cable of the same category, or any pair within a connector of the following values:

1.0Mhz	0.1
4.0	0.1
8.0	0.1
10.0	0.1
16	0.2
20	0.2
25	0.2
31.25	0.2
62.5	0.3
100	0.4

- G. All modular jacks shall have a maximum NEXT corresponding with the table below:

1.0Mhz	>65
4.0	>65
8.0	62
10.0	60
16	56
20	54
25	52
31.25	50
62.5	44
100	40

- H. The connecting blocks shall be KRONE IDC style or approved equal.
- I. The outlets faceplates shall be KRONE or approved equal in 4-6-8 port configurations. Supply 1 - 8 conductor modular data jacks and cables as a minimum per location.

## 2.05 MC(MDF) /IC (IDF) /HC STATION TERMINATION HARDWARE-data & VOICE

- A. Patch Panels
  - 1. Category 6e STP Termination Hardware. The Category 5e data station cable shall be terminated on Category 5e STP, 8-position modular jack patch panels with circuit board construction in all IC/MC locations. The panels will have rolled upper and lower edges for rigidity and will provide

front and rear side labeling visible after the cables and cords are installed. The 8-position modular jack patch panels shall be either wall mounted or rack mounted with cable management panels per communication detail sheets. The contractor is responsible for all wall brackets, patch panels, and cable management panels for all IC/MC/HC layouts and equipment rack configurations.

2. Products: Category 5e STP patch panels (T568B wired, TIA/EIA-568).
3. Cable management brackets must be provided at each rear section of the patch panel to facilitate cable routing and maintain proper bend radius of cables leading to the termination point.
  - a. Recommended Product: Krone
4. Cord or Patch Cable Manager: The cord manager shall have five (5) rings and provide the capability to organize and contain up to forty-eight (48) patch cords on the front of the panel. The front of the panel shall provide five (5) high capacity 1.5" x 4" horizontal distribution rings to reduce stress on stored cables to retain optimal cable geometry. All distribution rings shall have radiused edges to protect cables from nicks and tears. The cable manager shall be a minimum of two (2) RU high, and shall fit a standard 19" EIA rack rails.
5. Provide patch panels as required to terminate all indicated station outlets as shown on the project drawings
6. Patch panels shall be provided at all EER locations indicated.
7. Supply patch panels in rack mount versions with a minimum of 24-32 \ ports.
8. The patch panels shall exhibit the following minimum characteristics:
  - a. EIA 19" rack mountable
  - b. 110 rear termination
  - c. Modular jacks are circuit board mounted
  - d. supports 568A and 568 wiring
  - e. removable front labels
  - f. requires 3.0" rack space. min.
9. The patch panel shall meet TSB-40 standards.
10. Supply patch panel with full compliment of CAT-6e data patch cables. CAT-6e patch cables shall be configured as follows:
  - a. Color: Yellow
  - b. 24,36,48,60 & 72" in length
  - c. RJ45 each end with strain relief boots
  - d. stranded copper wire
11. Acceptable vendors for patch panels which are pre-approved for this project are:
  - a. KRONE

## 2.06 MC(MDF) /IC (IDF) /HC TERMINATION HARDWARE-VOICE TRUNK CABLING

- A. Main Cross Connect Base
  1. The cross-connect shall provide Category 5e compliant 110 termination capable of supporting voice, security, and Category 5e data applications, including high megabit and shared-sheath applications when used with Power Sum rated cabling. The 110 panels shall mount to walls or backboards in a mounting-frame style unit, which provides additional cable access and horizontal cord management. The units shall be UL listed, CSA certified, TIA/EIA-568-A and Category 5e compliant, and

made in the USA. The mounting frames shall support up to three 100-pair wiring bases, with the capability to accept extension units to create higher densities of up to 900 pairs per tower. The mounting frames shall be made of 16 gauge steel; wiring bases and blocks shall be made of fire-retardant plastic rated UL 94V-0, with provision for TIA/EIA-606 compliant labeling. A one-year limited product warranty and a 15-year performance guarantee shall be provided by the manufacturer. A lifetime warranty against defects in material and workmanship shall be provided by the manufacturer for this unit when it is installed in a certified system.

**B. Main Cross Connect Extension**

1. The cross-connect shall provide Category 5e compliant 110 termination capable of supporting voice, security, and Category 5e data applications, including high megabit and shared-sheath applications when used with Power Sum rated cabling. The 110 panels shall mount to walls or backboards in a mounting-frame style unit, which provides additional cable access and horizontal cord management. The units shall be UL listed, CSA certified, TIA/EIA-568-A and Category 5e compliant, and made in the USA. The mounting frames shall support up to three 100-pair wiring bases, with the capability to accept extension units to create higher densities of up to 900 pairs per tower. The mounting frames shall be made of 16 gauge steel; wiring bases and blocks shall be made of fire-retardant plastic rated UL 94V-0, with provision for TIA/EIA-606 compliant labeling. A one-year limited product warranty and a 15-year performance guarantee shall be provided by the manufacturer. A lifetime warranty against defects in material and workmanship shall be provided by the manufacturer for this unit when it is installed in a certified system.

**C. 100 Pair IDC 110 Terminations**

1. The cross-connect shall provide Category 5e compliant 110 termination capable of supporting voice, security, and Category 5e data applications, including high megabit and shared-sheath applications when used with Power Sum rated cabling. The 110 panels shall mount to 19" distribution frame or hinged wall mount bracket. They shall be UL listed, CSA certified, TIA/EIA-568-A and Category 5e compliant, and made in the USA. Panels shall support 100, 200 or 300 pair densities with provision for TIA/EIA-606 compliant labeling, and be made of 16 gauge steel, with bases and blocks made of fire-retardant plastic rated UL 94V-0. A one-year limited product warranty and a 15-year performance guarantee shall be provided by the manufacturer. A lifetime warranty against defects in material and workmanship shall be provided by the manufacturer for this unit when it is installed in a certified system.

**D. Horizontal Cord Manager**

1. The horizontal 110 cord managers shall mount to a wall or backboard, or onto 300 pair mounting-frame basic or extension units, providing the capability to organize and contain patch cords between rack mount 110 wiring bases. The cord managers shall comply with TIA/EIA-568-A and -606 requirements, and be made of fire-retardant plastic rated UL 94V-0. A one-year limited product warranty and a 15-year performance guarantee shall be provided by the manufacturer. A lifetime warranty

against defects in material and workmanship shall be provided by the manufacturer for this unit when it is installed in a certified system.

- E. 110 Connector Blocks
  - 1. The 110 connector blocks shall support termination for voice, security, and Category 5 data applications, including high megabit and shared-sheath applications when used with Power Sum rated cabling. The blocks shall be Category 5 compliant, UL listed, CSA certified, and TIA/EIA-568-A compliant. They shall be made of fire-retardant UL 94V-0 plastic with solder-plated insulation displacement connectors, and must securely seat wires on 110 wiring bases, providing a gas-tight IDC connection that can withstand 200 reterminations. A one-year limited product warranty and a 15-year performance guarantee shall be provided by the manufacturer. A lifetime warranty against defects in material and workmanship shall be provided by the manufacturer for this unit when it is installed in a certified system.
  
- F. 110 Patch Cords and Plug Assemblies
  - 1. Provide 110 Patch Cord and Plug Assemblies and patching cables as needed to cross connect all cabled stations/ports in system. Supply compliment of various length cables to cross connect as required.
  - 2. Provide spares as follows:
    - a. 10 - 36"
    - b. 10 - 48"
    - c. 10 - 60"
    - d. 10 - 72"
    - e. 10 - 84"

## 2.07 DATA DISTRIBUTION EQUIPMENT RACK

- A. Provide equipment racks and/or frames in locations indicated on the drawings. Racks shall be equipped as detailed on the drawings and as hereafter specified.
  
- B. MC/IC/HC locations provide IMRAK 7' tall equipment racks (or as indicated), or equivalent.
  
- C. FREE STANDING CABINETS:
  - 1. Provide 19" or 24" EIA floor mount cabinets with bracing brackets and floor mounting accessories as required to support cabling infrastructure with 19" EIA patch panels, data switches and light interface guides along with ancillary equipment.
  - 2. Provide IMRAK 1400 or ZERO XA series as manufactured by VERO ELECTRONICS or pre-approved equal.
  - 3. The cabinet shall incorporate a Plexiglas, locking front door assembly and solid rear door with lock.
  - 4. Provide with required horizontal and vertical cable management for all racks/cabinets, panels and hardware as required to facilitate complete installation.
  
- D. Jumper Management Panels
  - 1. The rack mount hardware shall incorporate in-rack and interbay jumper

management techniques. One or both methods may be used as required. In-rack management panels shall be available to provide jumper storage and routing to the connector housings and electronic switches. Additionally, in-rack panels are required for installations where interbay storage methods are not feasible (i.e. already installed lineup where footprints are already specified). Interbay storage is recommended for large slack storage requirements and multiple out of bay patching.

2. In-Rack jumper management panels shall be available in 1-RMS, 2-RMS and 3-RMS sizes and shall have removable front covers to conceal and protect the jumpers when installation is complete. The front of the jumper management panel cover shall be flush with the front door of the connector housing.
  3. Jumper management panels shall be designed to maintain a 1.5 inch minimum bend radius when transitioning between routing panels and frame verticals or connector housings and shall be finished with a wrinkled black powder coat for durability. All fasteners shall be black chromated to match the housing.
  4. The vertical jumper routing area shall have vertically adjustable cable retaining rings. The adjustable routing rings shall include a swing out door for ease in jumper routing. The sides of the adjustable routing rings shall have radius guides to provide minimum bend radius control. The rear side of the vertical routing area shall also provide cable retaining rings that hold data and power cables close to the rack to eliminate accidental snags from maintenance personnel.
  5. Slack storage spools shall be provided when jumper slack storage is required in-rack.
  6. Slack storage shall be available using both in frame and interbay storage panels. The storage panels shall be functional both individually and combined.
  7. The Interbay Storage panel shall provide both front and rear jumper routing distribution and storage. The interbay storage panel shall be designed to integrate with an EIA standard 7 foot tall equipment rack. The interbay panel shall have a footprint of 6 inches in width and shall have a removable cover that is flush with the front doors of the connector housings when installed. The panel shall be finished with a wrinkled black powder coat for durability. All fasteners shall be black chromated to match the housings.
  8. Wall-mountable hardware shall have a means to transition between the connector housing and cable trough or tray.
- E. Distribution Rack Grounding: Provide grounding kit similar to IBM Part # 4716804 for each IC and MC. Rack shall be grounded using stranded # 6 AWG insulated copper conductor. Provide all required bonding material and hardware and bond to building grounding electrode subsystem at building electrical service entrance.

## 2.08 UNDERGROUND VOICE TRUNK CABLING

### A. GENERAL

1. Underground voice trunk cabling shall be installed as indicated on the contract drawings and as called for in these specifications.
2. All UTP voice trunk cabling shall be installed in underground conduit and

- manhole infrastructure without splicing.
3. The trunk cabling shall be installed free of defects and in accordance with AT&T outside plant installation manuals.
  4. The cabling shall exhibit the following properties:
    - a. 6, 12, 25, 50, 100, 200 pair configurations
    - b. PIC ALPETH Filled FOAM SKIN "DEPIC"
    - c. RE-89 Listed
    - d. FlexGel filling compound
    - e. Electrical properties:
      - 1) Mutual Capacitance - nF per mile = 83 +/-4
      - 2) Unbalanced Capacitance - pF per 1000' = 100
      - 3) Pair to Ground Capacitance - pF per 1000' = 800
      - 4) DC Conductor Resistance - ohms per 1000' = 27.5
      - 5) Resistance Unbalance - 1.5 ohms
      - 6) Min. Dielectric Strength (kV) = 3.0
      - 7) Insulation Resistance - megohm per mile = 10,000
      - 8) Nominal Attenuation - dB per mile = 13.4
      - 9) Far End Crosstalk - dB per 1000' = 73
      - 10) Near End Crosstalk - dB per 1000' = 66

## 2.09 FIBER OPTIC CABLE SPECIFICATIONS

### A. BACKBONE CABLING FIBER OPTIC CABLE PLANT

1. Outdoor Tight Buffered Hybrid Fiber Optic Cable
  - a. Outdoor Cable is designed for backbone interbuilding (outside plant) applications. The cable shall be designed for use outdoors and provide excellent protection from the elements.
  - b. The cable shall meet the requirements of the National Electrical Code, Article 770, TIA/EIA 568A "Commercial Building Telecommunications Wiring Standard", ICEA-83-596-1988 Insulated Cable Engineers Association Standard for Fiber Optic Premises Distribution Cable Publication S-83-596, December 1988, ANSI X3.166-1990 Fiber Data Distributed Interface (FDDI), Token Ring Physical Layer Medium Dependent (PMD), and a combination of Bellcore Generic Requirements for Optical Fiber and Fiber Optic Cable (GR-20-CORE)
  - c. A tight buffered construction shall be used. The cable shall be constructed Core Locked indoor/outdoor PVC out jacket. The fillers, if used, shall be combined and covered with a medium density jacket to provide excellent environmental protection.
2. Multimode Fibers (24 per cable)
  - a. Multimode fibers in the cable shall contain 50 micron graded index multimode fibers. These fibers are located inside the buffer tubes. Multimode fibers shall meet the specifications defined by the Multimode Optical Fiber Specifications.
  - b. Fiber Identification
    - 1) The fibers within each buffer tube shall be distinguishable from each other by means of color coding. The color coding sequence shall be blue, orange, green, brown, slate, white, red, black, yellow, violet, rose and aqua.
  - c. Stranding member using a reverse oscillating lay (SZ) stranding

- method with counter helically applied non-hydroscopic binder tapes.
3. Single Mode Fibers (12 per cable)
    - a. Single Mode Fibers in the cable shall contain 9 micron graded index multimode fibers. These fibers are located inside the buffer tubes. Single mode fibers shall meet the specifications defined by the Single Mode Optical Fiber Specifications.
    - b. Fiber Identification
      - 1) The fibers within each buffer tube shall be distinguishable from each other by means of color coding. The color coding sequence shall be blue, orange, green, brown, slate, white, red, black, yellow, violet, rose and aqua.
    - c. Stranding member using a reverse oscillating lay (SZ) stranding method with counter helically applied non-hydroscopic binder tapes.
  4. Strength Member
    - a. The primary strength member shall consist of aramid yarns applied around the fibers.
  5. Cable Jacket
    - a. A black jacket made of medium density polyethylene (MDPE) shall be extruded around the cable core and aramid yarn. The jacket shall have two co-extruded tracer stripes located 180° apart for identification. The tracers shall be MDPE jacket material.
    - b. The cable jacket shall be designed for easy removal, with readily available tools. The design shall permit jacket removal without damage to the optical fibers.
    - c. The cable jacket shall be printed with manufacturer name, sequential length marking, the number and type of fiber and the appropriate cable type marking according to NEC Section 770.
  6. Minimum Bend Radius
    - a. The minimum static bend radius shall be 10 times the cable outside diameter. The minimum dynamic bend radius shall be 20 times the cable outside diameter.
    - b. The average increase in attenuation shall no be greater than specified by GR 20-CORE depending on the type of fiber used, single-mode or multimode. No mechanical damage shall occur to the cable jacket.
  7. Impact Resistance
    - a. The average increase in attenuation shall no be greater than specified by GR-20-CORE depending on the type of fiber used, single-mode or multimode. No mechanical damage shall occur to the cable jacket.
    - b. Testing shall be done in accordance with EIA-455-25A (Impact Testing of Fiber Optic Cables and Cable Assemblies). Optical Attenuation changes shall be measured following the procedures of EIA-455-20 (Measurement of Change in Optical Transmittance). The cable specimen shall be subjected to 25 impacts of 4.3 N.M.
  8. Compressive Strength
    - a. A representative sample of the cable shall withstand a minimum



- compressive load of 440 N/mm (250 lbf/in) for armored cable, and 220 N/cm (125 lbf/in) for non-armored cable applied uniformly over the length to the compression plate.
- b. The average increase in attenuation shall not be greater than specified by GR- 20-CORE depending on the type of fiber used, single-mode or multimode.
  - c. Testing shall be done in accordance with EIA-455-41 (Compressive Loading Resistance of Fiber Optic Cable).
9. Tensile Strength
- a. The average increase in attenuation at the rated tensile load of the cable shall not exceed than specified by GR-20-CORE depending on the type of fiber used, single-mode or multimode.
  - b. The maximum dynamic (short term) tensile load rating will be 600 lbs. (2700 Newton's). The maximum static (long term) tensile load rating shall be 135 lbs. (600 Newton's).
  - c. Testing shall be done in accordance with EIA-455-33A (Fiber Optic Cable Tensile Loading and Bending Test).
10. Cable Twist
- a. The average increase in attenuation shall no be greater than specified by GR 20-CORE depending on the type of fiber used, single-mode or multimode. No mechanical damage shall occur to the cable jacket.
  - b. Testing shall be done in accordance with EIA-455-85 (Fiber Optic Cable Twist Test). The test length (L) shall be a maximum of 4 meters.
11. Cable Cycling Flexing
- a. The average increase in attenuation shall not be greater than specified by GR 20-CORE depending on the type of fiber used, single-mode or multimode. No mechanical damage shall occur to the cable jacket
  - b. Testing shall be performed in accordance with EIA-455-104 (Fiber Optic Cable Cyclic Test). The cable shall be flexed for 25 cycles at 30 cycles/minute.
12. Outer Jacket Yield Strength
- a. The yield strength and ultimate elongation of the outer cable jacket shall be tested in accordance with EIA-455-89A (Fiber Optic Cable Jacket Elongation and Tensile Strength).
13. Jacket Shrinkage
- a. The maximum cable jacket shrink back shall be less than 5%.
  - b. Testing shall be done in accordance with EIA-455-86 (Fiber Optic Cable Jacket Shrinkage)
14. Temperature
- a. The cable shall maintain optical and mechanical integrity over the following temperature ranges:
    - 1) Operation:-40° C to +85° C
    - 2) Installation-40° C to +70° C
    - 3) Storage:-40° C to +75° C
15. Cable Reels
- a. The cable shall be shipped on non-returnable wooden reels designed to prevent damage to the cable during shipment and installation. Wooden lagging boards will be fastened across the reel flanges.

- b. Each reel should be clearly marked to indicate the direction in which it should be unrolled to prevent loosening of the cable on the reel
- 16. Reel Covering
  - a. A covering shall be placed between the flanges over the exposed cable. The covering shall be weather resistance and shall limit solar heating of the cable.
  - b. The cable ends shall be securely fastened. The end attachments shall prevent the escape of any filling compound and shall prevent the entry of moisture.
- 17. Reel Identification
  - a. Each reel of cable shall be stenciled or have a data sheet attached (Packaged in a waterproof wrapping) containing the following information:
    - 1) Reel identification number
    - 2) Measured attenuation of cable
    - 3) Length of Cable
- 18. Quality Control
  - a. Each master reel shall be tested to ensure fiber integrity, attenuation, and cable length. Multimode fibers shall be tested at both 850 and 1300 NM. Single mode fibers shall be tested at both 1300 and 550 NM. Each master reel will be given a unique identification and the test results documented. The manufacturer shall maintain documentation such that the cable history may be traced to the individual fibers used in construction of the cable.
- 19. Test Report
  - a. A test report shall be included with each reel of cable. This test report will include the cable description, unique reel identification, measured length of the cable in meters and feet, attenuation measurements at wavelengths tested and the manufacturer name and address.
- 20. Provide components consistent with the quality of Optical Cable Corporation DX Series certified.

## 2.10 FIBER OPTIC CABLE TERMINATIONS

- A. Fiber Optic Cable shall be installed in innerduct. Outside gel filled fiber cable shall be installed in conduit or UL approved plenum innerduct. Non-riser rated gel filled cable must be terminated within 50' of building entrance per BICSI Standards.
- B. Terminations shall be performed by a manufacturer trained and certified technician for optical fiber connections.
- C. Fiber Optic connectors shall be:
  - 1. SC connectors for all single mode terminations.
  - 2. ST connectors for all multimode terminations.
- D. Fiber Optic couplings shall be as provided by on in fiber patch panels and shall be either multi-mode or single mode ST as required for the application.

Terminations shall be made in a controlled environment. The contractor may choose to have the cables assembled off-site, although testing must be completed with the cable in its final installed condition.

## 2.11 DATA-MC/DATA-IC/DATA-HC FIBER OPTIC CABLE TERMINATIONS

- A. Optical Fiber Connectors.
  - 1. Products: 3M Corporation, AMP or Lucent ST connectors.
  - 2. Optical Fiber Termination Enclosures used in the DATA-MC/DATA-IC/DATA-HC rooms shall provide termination panels for ST or SC type connectors and be of sufficient size and capacity to terminate 100% of the fiber count of the inside or outside fiber optic cables. Patch panels must be wall or 19" rack mountable depending on IC/MC/HC applications. Provide all termination accessories, enclosures, and testing for a complete fiber optic distribution system.
    - a. Products: KRONE 36 port panels
- B. Optical Fiber Patch Panels
  - 1. The patch panel shall provide 36 fiber couplings in 3.0" of vertical rack space. These couplings shall be pre-installed in a single bulkhead. The patch panel shall have removable front and rear doors as well as a removable lid. There shall be vertical and horizontal ingress/egress features in the form of slots in the top, bottom and sides of the panel, both front and rear. All ingress/egress slots shall be covered with a self-adhesive UL 94V-0 rated grommet material. All ingress/egress slots shall have a strain relief post with a slot capable of holding a tie wrap. The panel shall provide strain relief in the form of a grounding lug and multiple tie-wrap points. The panel must have mounting ears that allow mounting on 19" or 23" hole centers in either a mid- or flush-mount configuration. The panel shall have dual, adjustable plastic cable management rings made of high impact UL 94V-0 rated self-extinguishing plastic. The patch panel shall be capable of having a slide feature attached to it to allow the entire box to be moved in and out of the rack. A port identification label/card shall be provided. The panel shall be made of 16 gauge steel, painted black. A one-year limited warranty shall be provided by the manufacturer. A lifetime warranty against defects in material and workmanship shall be provided by the manufacturer for this unit when it is installed in a certified system.
  - 2. Approved Supplier: KRONE

## 3.00 – EXECUTION

### 3.01 GENERAL

- A. The contractor shall avoid penetration of fire-rated walls. Sleeving shall be installed for access where necessary.
- B. Any penetration through fire rated walls (including those in sleeves) will be resealed with an Underwriter Laboratories (UL) approved sealant. Use 3M Firestop material. Contractor shall also seal all floor, ceiling, and wall penetrations in fire or smoke barriers and in the MC, IC's and wiring closets.

- C. Cable Lubricants: Lubricants specifically designed for installing communications cable may be used to reduce pulling tension as necessary when pulling cable into conduit. After installation, exposed cable and other surfaces must be cleaned free of lubricant residue.
  - 1. Recommended Products:
    - a. Twisted-pair cable: Dyna-Blue, American Polywater.
    - b. Optical fiber cable: Optic-Lube, Ideal
- D. Pull Strings: Provide pull strings in all new conduits, including all conduits with cable installed as part of this contract. Pull test is not to exceed 200 lbs.
- E. The Contractor shall replace any damaged ceiling tiles that are broken during cable installation.
- F. The Contractor shall replace or rework cables showing evidence of improper handling including stretches, kinks, short radius bends, over-tightened bindings, loosely twisted and over twisted pairs at terminals, and sheath removed too far (over 2").
- G. All cable shall be continuous and splice-free for the entire length of run between designated MDF, IDF, pull boxes or terminations.
- H. Terminate all cable in designated MDF, IDF, Jacks and/or designated equipment backboards. No terminations or splices shall be permitted in pull boxes, underground or any non-designated termination point.
- I. Provide service loop of cables at all junction and termination cabinets or boxes and backboards.
- J. Maintain consistent absolute signal polarity at all connectors, patch points and connection points accessible in the system.
- K. Provide identification labels on each cable ends, backboard, wall jack and installation log in accordance with EIA/TIA 606. Cable labels shall be imprinted or type written style and shall be attached in a manner as to allow easy viewing along the length of the wire/cable. Acceptable systems are PANDUIT, BURNDY or approved equal. Submit to Consultant for approval of method.
- L. Provide installation logs supporting building infrastructure.
- M. Dress or harness all wire and cable to prevent mechanical stress of electrical connectors. No wire or cable shall be supported by a connection point. Provide service loops where harnesses of different classes cross, or where hinged panels are to be interconnected.
- N. Configure and cross connect all ports as required for complete end to end system.
- O. Strap or secure cables every 5 feet. Do not strap to lighting, ceiling grid, etc.
- P. Cables shall be routed in corridors whenever possible to avoid unencumbered

access to cables.

- Q. Cables shall be placed as a minimum of 12" from 208-240VAC power and 18" from 480 power.
- R. Maintain 18" clearance between light fixtures incorporating ballast operation.
- S. Cables shall be installed to preclude damage and not come in contact with sharp edges of building, wireways or casework/furniture.
- T. Maintain minimum bend radius per drawing details.
- U. Cables shall be a minimum of 30" from heating, steam valves etc.
- V. All conduits shall have bushings in place prior to cable installation.
- W. All installation shall be coordinated with Consultant for Milestone verification.

### 3.02 LABELS

- A. The labeling plan shall be developed by the Contractor and approved by owner. The Contractor will label all outlets following the detailed shop drawing design, using permanent/legible typed or machine engraved labels approved by owner. Terminals in the HC's/IC's/MC's shall be labeled by the contractor using designation strips designed for 110 hardware or as applicable to terminal hardware. All copper/fiber terminal for riser cables in the HC and/or IC shall correspond to terminal numbering in the MC.
- B. The labels on HC/IC station terminal blocks shall be numerically sequential. Outlets shall be labeled to match the labels on the corresponding terminal block position. Labels shall include a room number component and a sequential extension. The room number component shall reflect the numbering system utilized for existing door labels or room numbers as selected by owner. For example, the third outlet in room 25 (starting on the left side of the door and working clockwise around the room) is labeled: "25.3."
- C. A floor plan clearly labeled with all outlet jack numbers shall be included in the as-built plans.
- D. All labels shall correspond to as-built and to final test reports.

### 3.03 STATION WIRING INSTALLATION

- A. The low voltage Contractor's RCDD shall supervise the installation of communications cable. All Category 5e and Fiber Optic cable shall be installed by individuals trained in low voltage data cable system installation. All Category 5e (4) pair STP cable must be handled with care during installation so as not to change performance specifications. The Contractor shall not over-tighten tie wraps or over-bend the Category 5e STP cable.
- B. Exposed station wire will only be run with owner approval. Approval will be

granted only when no other option exists. When station wire must be run surface to a single outlet, surface raceway shall be used to cover the cable.

- C. All wiring and associated hardware shall be placed so as to make efficient use of available space in coordination with other uses. All wiring and associated hardware shall be placed so as not to impair the use or capacity of other building systems, equipment, or hardware placed by others (or existing). All wiring, and associated support structures and hardware shall be placed so as not to impair owner's efficient use of their full capacity.
- D. All wiring placed in ceiling areas must be tied or clamped. When wire is placed in ceiling areas or other non-exposed areas, fasteners shall be placed at intervals no greater than 60" and preferably on 48" centers. Cable sag between supports shall not exceed 12". Attaching wire to pipes or other mechanical items is not permitted. At all runs of twenty or more cables, provide rings at 60" (maximum) centers to hang cable. Communications cable shall be routed to avoid light fixtures (18" minimum spacing), sources of heat (12" minimum spacing) and power feeder conduits (12" minimum spacing). Communications cabling must be spaced a minimum of 120" (10') from bus duct.

### 3.04 STATION HARDWARE

- A. Eight (8)-position modular jack pin assignments:
- B. Pin connections for data station 8-position modular jacks and patch panels shall match TIA/EIA-568-A modular jack recommendation T568B that is both 10/100BaseT compatible.
- C. Pin connections at data jack panels shall match pin connections at outlets with straight through wiring.
- D. Terminations at telephone terminal blocks (where required to maintain existing station cable) shall match following pair sequence for T568B:
  - 1. Pair 1, Pins 5 and 4, White-Blue, Blue (/White).
  - 2. Pair 2, Pins 1 and 2, White-Orange, Orange (/White).
  - 3. Pair 3, Pins 3 and 6, White-Green, Green (/White).
  - 4. Pair 4, Pins 7 and 8, White-Brown, Brown (/White).

### 3.05 BACKBOARD CABLING/EQUIPMENT RACK CONFIGURATION

- A. Cable installation in the Entrance Room and Communications Closet must conform to the Project Drawings. All cabling shall be routed so as to avoid interference with any other service or system, operation, or maintenance purposes such as access boxes, ventilation mixing boxes, network equipment mounting access hatches to air filters, switches or electrical panels, and lighting fixtures. Avoid crossing areas horizontally just above or below any riser conduit. Lay and dress cables to allow other cables to enter the conduit/riser without difficulty at a later time by maintaining a working distance from these openings. Provide a minimum of 36" for a service loop to the patch panel.
- B. Cable shall be routed as close as possible to the ceiling, floor, or corners to insure that adequate wall or backboard space is available for current and future

equipment and for cable terminations. Cables shall not be tie-wrapped to existing electrical conduit or other equipment. Minimum bend radius shall be observed.

- C. Lay cables via the shortest route directly to the nearest edge of the backboard from the mounted equipment or block. Lace or tie-clamp all similarly routed cables together, and attach by means of clamps screwed to the outside edge(s) of the backboard vertically and/or horizontally, then route via "square" corners over a path that will offer minimum obstruction to future installations of equipment, backboards, or other cables.
- D. Do not over-tighten cable ties or binding on Category 5e station cable. Observe Category 5e cable bend radius.

### 3.06 PROTECTION OF WORK SPACE AND AREA - SITE SAFETY

#### A. SIGNS, BARRICADES, MARKING TAPE

- 1. Always protect open and confined spaces with standard construction guards and warning devices.
- 2. Place approved warning lights or reflector signs near areas where work is performed below grade in vaults or manholes. Area shall be barricaded to prevent staff access to work area. Warning lights, barricades and signs shall be placed:
  - a. One-half hour before sunset or anytime vision is impaired by fog, haze, etc.
  - b. Signs and lights must remain in place until the work is completed.
  - c. When below grade work is being performed and work area is left uncovered and unattended, the contractor shall place warning signs with flags, boundary warning tape and cones in the direction of approaching pedestrian or vehicle traffic.
  - d. When work is located near a curve in walkway/roadway or near a top of hill, place additional warning devices to give sufficient warning to approaching pedestrian or vehicular traffic.
  - e. Work located in public or private intersections, on public or private surface streets or where traffic is heavy additional precautions shall be deemed necessary and the contractor is to provide for public and staff safety at all times.
- 3. Materials, tools, vehicles and equipment shall be placed and positioned to cause minimal interference with traffic. Materials, tools, vehicles and equipment shall be configured and arranged on the site and in the work area to minimize hazards to traffic, staff or personnel.
- 4. Provide protection around all pull lines and/or cable.
- 5. When equipment, vehicles, tools, materials must be left at the site, unattended, it shall not be secured to posts, poles, furniture, buildings, fencing, or fire hydrants.

#### B. WORK SPACE BELOW GRADE

- 1. Confined spaces below grade (manholes, handholes, vaults, tunnels, etc.) are required to be tested for hazardous gas prior to entering. Confined spaces shall not be entered until LOCAL SAFETY procedures have been followed to entering below grade work space.
- 2. If a hazardous substance is detected in the confined work space, the

contractor shall immediately notify owner and consultant and the appropriate gas utility company.

3. Report all trapped or unconscious victims to 9-1-1 and owner.
4. Open flame of any type is not allowed into below grade or confined work spaces.
5. Below grade work spaces shall be ventilated in accordance with LOCAL SAFETY guidelines prior to commencement of work.
6. Use only approved lighting in below grade/confined work spaces.
7. Contractor shall take extreme caution and care while working in existing below guard confined spaces to prevent damage to existing lines, wires, cables, circuits, etc.

C. **WORK SPACE ABOVE GRADE**

1. Contractor shall protect work area as defined in SIGNS, BARRICADES and MARKING TAPE.

3.07 INSPECTION

A. Conformance to the installer practices covered above are to be verified when completed. In some cases, the customer may inspect before acceptance. The following points are to be examined:

1. Is the design documentation complete?
2. Have all terminated cables been tested per the specifications?
3. Is the cable type suitable for its pathway?
4. Have the pathway manufacturer's guidelines been followed?
5. Have the installers avoided excessive cable bending?
6. Have potential EMI sources been considered?
7. Is cable fill correct?
8. Are hanging supports within 60" (5')?
9. Does hanging cable exhibit some sag?
10. Are telecommunications closet terminations compatible with applications equipment?
11. Have station jack instructions been followed?
  - a. Jacket removal point.
  - b. Termination positions.
  - c. Pair terminations tight with minimal pair distortions.
  - d. Twists maintained up to termination.
12. Have patch panel instructions been followed?
  - a. Cable dressing first.
  - b. Jackets remain up to the connecting block.
  - c. Pair terminations tight and undistorted.
  - d. Twists maintained up to the connecting block.
13. Are the correct outlet connectors used (568B)?
14. Is the jacket stripped back only as much as is needed, not to exceed 2" from the connection?

3.08 QUALITY CONTROL

A. Evidence of Experience and Qualifications

1. Show that the installer who will perform the work has a minimum of 5 years experience successfully installing system of the same type and design as specified herein. Include the names, locations, and points of



contact of at least two similar installations of the same type and design as specified herein where the installer has installed such systems. Indicate the type of each system and certify that each system has performed satisfactorily in the manner intended for a period of not less than 12 months.

2. Show that the instructor, who will train staff, operating and maintenance personnel, has received a minimum of a CNE/MCE training from a factory training center, and 2 years experience in the installation of systems of the type specified. Submit training certification in equipment submittals, title section training and certifications.

### 3.09 INSTALLATION TESTING

#### A. SYSTEM TESTING REQUIREMENTS-STATION

1. District's Consultant shall be notified one week prior to any testing so that the testing may be witnessed.
2. Before requesting a final inspection, the Contractor shall perform a series of end-to-end installation performance tests. The Contractor shall submit for approval a proposal describing the test procedures, test result forms, and timetable for fiber optic and all copper plant wiring.
3. Acceptance of the simple test procedures discussed below is predicated on the Contractor's use of the recommended products (including but not limited to twisted pair cable, cross-connect blocks, and outlet devices specified in the Products paragraph) and adherence to the inspection requirements and practices set forth. Acceptance of the completed installation will be evaluated in the context of each of these factors.
4. At a minimum, the Contractor shall test:
  - a. All station drop cable pairs from HC/IC/MC termination patch panels to outlet device 8-position modular jacks.
  - b. Each wire/pair shall be tested at both ends for the following (utilizing the attached test results forms):
    - 1) Termination order.
    - 2) Polarity (pair reversals).
    - 3) Continuity.
    - 4) Shorts.
    - 5) Grounds.
    - 6) NEXT (near end crosstalk) from both directions.
    - 7) Cable length (record all length).
    - 8) Wire Map
    - 9) Length
    - 10) Impedance
    - 11) Resistance
    - 12) Capacitance
    - 13) Attenuation
    - 14) Active ACR
    - 15) INJ NEXT Loss
    - 16) INJ Active ACR
  - c. Testing shall be made utilizing a hand cable tester as manufactured by Fluke, Microtest or Wavetek.
  - d. All test equipment shall bear current calibration stickers or dated certificates.
  - e. Printed test results along with as-built drawings shall be

assembled into a 3-ring project binder and delivered to the Consultant for verification and acceptance

5. When errors are found, the source of each error shall be determined, corrected, and the cable re-tested. All defective components shall be replaced and retested. Defective components not corrected shall be reported to owner/consultant with explanations of the corrective actions attempted.
6. Test records shall be maintained using the test results forms outlined below. The form shall record closet number, riser pair number or outlet ID, outcome of test, indication of errors found (e.g., a, b, c, d, or e) cable length, re-test results after problem resolution and signature of the technician completing the tests. See Appendix to electrical specifications for testing form.
7. Test results for each 4- pair, Category 5e or 6e, STP cable must be submitted with identification to match labels on all patch panel ports and 8-position modular jacks, and identification to match as-builts associated with that cable
8. Owner will observe and verify the accuracy of test results submitted.

**B. SYSTEM TESTING REQUIREMENTS - CABLE PLANT**

1. All data drop cables shall be tested for continuity and polarity between station jack, IDF and MDF.
2. All data trunk cables shall be tested for continuity and polarity between IDF and MDF, using a portable handheld Analyzer. Certify tests in writing.
3. All testing shall be performed in accordance with EIA/TIA building standards and shall be done in the presence of the Consultant.
4. Transmission measurements shall be taken at random to ensure overall system compliance. Tests shall be conducted as follows:
  - a. Using a network analyzer, coax cables, baluns, UTP test leads and impedance matching terminations perform the following:
    - 1) refer to TIA/EIA/TSB-40
  - b. Log all tests in acceptance testing manual. Record and document the following for each cable and circuit.
    - 1) Continuity
    - 2) polarity
5. All testing equipment shall have current calibration stickers firmly affixed to the testing equipment. All calibrations shall be traceable to the National Standards Bureau.
6. Provide printed test data for CAT-5e certification for LAN service.
7. Testing shall be performed in the presence of owner and consultant.
8. Testing shall include verification of:
  - a. Cable Plant

**3.10 FIBER OPTIC TESTING SPECIFICATIONS**

- A. All testing shall be performed by trained personnel.
- B. For all installed fiber optic cable EIA 455-171 Method D procedures will be adhered to. (Bi-directional).
- C. Connector loss shall not exceed .5 dB per termination.

- D. The fiber optic cable shall not exceed 1.5 db per kilometer tested at 1300 nm and 1500 nm for single mode cable.
- E. The fiber optic cable shall not exceed 4 db per kilometer tested at 850 nm and 2 db per kilometer tested at 1300 nm for multimode 62.5/125 fiber.
- F. The Contractor is responsible for obtaining minimum loss in fiber connections and polishing per manufacturer's specifications.

#### 4.00 – WARRANTY SERVICE & CLOSE OUT

##### 4.01 MINIMUM WARRANTY

- A. The cabling system shall meet the performance requirements of the ANSI/TIA/EIA-568-A standard (Annex E) and TIA/EIA Telecommunications Systems Bulletin 67. The warranty on the material, services, and operation of the cabling system to this specification must be for a period of at least 15 years. The connecting hardware shall have a lifetime extended warranty against defects in material and workmanship.
- B. The warranty must include the following statements regarding the cabling system:
  - 1. "Will support and conform to TIA/EIA-568-A specifications covering ANY CURRENT OR FUTURE APPLICATION which supports transmission over a properly constructed horizontal cabling system premises network which meets the channel and/or basic link performance as described in TIA/EIA-568-A AnnexE and TIA/EIA-TSB-67."
  - 2. "Will be free from defects in material or faulty workmanship"
  - 3. The contractor shall guarantee all equipment and wiring free from inherent mechanical and electrical defects for one year from the date of final acceptance by Consultant.

##### 4.02 COMMISSIONING

- A. General
  - 1. Acceptance shall consist of the following:
    - a. Burn-in period.
      - 1) The system shall be accepted for start of warranty upon successful completion and testing of the Consultant.
      - 2) Burn-in period shall be a 30-day time frame to allow the system to operate free of defects, grounds, programming faults, etc.
      - 3) The 30-day burn-in shall begin the day of acceptance by Consultant.
      - 4) The burn-in period shall be 30 days of continuous use without system trouble, false alarm, open, short or ground condition present.
      - 5) Should the system fail for any reason during the burn-in period, the contractor shall respond immediately upon notification by owner's personnel and correct said deficiencies.

- 6) Upon correction and restoration, the burn-in period shall be re-set to "0" and the 30 day count shall begin again.
  - 7) Warranty shall commence upon day 31 of successful burn-in period
- b. Final Test
- 1) Before the installation shall be considered completed and acceptable by the awarding authority, a test on the system shall be performed as follows:
  - 2) The contractor's job foreman, in the presence of a representative of the manufacturer, and a representative of the owner shall operate every network device to ensure proper operation and correct configuration at the file server location.
  - 3) When the testing has been completed to the satisfaction of both the contractor's job foreman and the representatives of the manufacturer and owner, a notarized letter co-signed by each attesting to the satisfactory completion of said testing shall be forwarded to owner.
  - 4) The contractor shall leave the data network system in proper working order, and, without additional expense to owner, shall replace any defective materials or equipment provided by him under this contract within one year (365 days) from the date of final acceptance by the Consultant

#### 4.03 PROJECT CLOSE OUT

- A. Operating and Instruction Manuals
1. Operating and instruction manuals shall be submitted prior to testing of the system. Four (4) complete sets of operating and instruction manuals shall be delivered to owner upon completion.
  2. Provide necessary training and/or schooling to designated District's personnel at no additional cost to District. Training shall be at District's designated location, by factory-trained personnel.
- B. Testing Frequency Instructions
1. Complete, accurate, step-by-step testing instructions giving recommended and required testing frequency of all equipment, methods for testing each individual piece of equipment, and a complete troubleshooting manual explaining how to test the primary internal parts of each piece of equipment shall be delivered to owner upon completion of the system
  2. Maintenance instructions shall be complete, easy to read, understandable, and shall provide the following information:
    - a. Instruction on replacing any components of the system, including internal parts.
    - b. Instructions on periodic cleaning and adjustment of equipment with a schedule of these functions
    - c. A complete list of all equipment and components with information as to the address and phone number of both the manufacturer and local supplier of each item.
    - d. User operating instructions, shall be provided prominently displayed on a separate sheet located next to the control.

3. District shall be furnished with all programming disks for each installation as well as hard copy printouts. Provide necessary training and/or schooling to designated owner's personnel at no additional cost to District. Training shall be at owner's designated location, by factory-trained personnel.
4. Staff of District maintenance shall be thoroughly instructed in the use of the System. Training shall include a minimum of three (1) hour sessions, to be scheduled at District's designated time.
5. Maintenance instruction shall be performed in the same manner as described above. Training shall include a minimum of three (1) hour sessions, to be scheduled at District's designated time.

#### 4.04 DRAWING DETAILS (AS-BUILTS)

- A. Show wall elevation and wire details on shop drawings. Show equipment function, make and model and wire routing and terminations within rack or cabinet.
- B. Show as-built location of all devices on as-built drawings.
  1. Provide 3 sets of bound operation and maintenance manuals, including submittal materials, and record of field changes. Provide complete as-built wiring diagrams in AutoCAD R2000 format. Provide disk files and original tracings (E size) in format of construction drawings.
- C. As-Built Drawings, Testing, and Maintenance Instructions
  1. A complete set of reproducible as-built drawings in AutoCAD R2000 format (CDs and sheets) showing installed wiring, color coding, and wire tag notations for exact locations of all installed equipment, specific interconnections between all equipment, and internal wiring of the equipment shall be delivered to owner upon completion of system acceptance.

END OF SECTION



1.00 - GENERAL1.01 WORK INCLUDED

- A. Pushbutton and selector switches.
- B. Control stations.
- C. Relays.
- D. Time delay relays.
- E. Control power transformers.
- F. Control panels.

1.02 RELATED WORK SPECIFIED ELSEWHERE

Control Cabinets: Section 16130.

1.03 REFERENCES

- A. NEMA ICS 1 - General Standards for Industrial Control Systems.
- B. NEMA ICS 2 - Standards for Industrial Control Devices, Controllers and Assemblies.
- C. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.
- D. NEMA ST 1 - Standard for Specialty Transformers (Except General Purpose Type).
- E. NFPA 70 - National Electrical Code.

1.04 SUBMITTALS

- A. Submit under provisions of Section 0100.
- B. Shop Drawings: Submit to NEMA ICS 1 indicating control panel layouts, wiring connections and diagrams, dimensions, support points.
- C. Product Data: Provide for each component showing electrical characteristics and connection requirements.
- D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.05 QUALIFICATIONS

Manufacturer: Company specializing in manufacturing the products specified in

this section with minimum three years documented experience, and with service facilities within 100 miles of project.

## 1.06 REGULATORY REQUIREMENTS

- A. Conform to requirements of NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.

## 2.00 - PRODUCTS

### 2.01 MATERIAL AND FABRICATION

- A. Contactors:
  - 1. Mechanically and Electrically Held Contactors: Open type, 120V coil, number of poles and ampere rating as indicated. Factory wired and installed in lighting panelboard compartment.
    - a. Square D Co. Class 8903.
- B. Time Switch:
  - 1. Intermatic time switch as shown on the drawings.
- C. Photo-Control With Time Delay:
  - 1. Rated for 1000W load or 1800 VA, sp-st, in weatherproof enclosure.
  - 2. General Electric Co. Cat. No. CR174H651, or equal.
- D. Control Relays:
  - 1. 120 VAC coil, 10A rated contacts with number of poles indicated. Square D Co. Class 8501 Type X.
  - 2. 48 VDC coil, 10A rated contacts. Square D Co. Class 8501 Type KDP-12.
  - 3. 24 VDC coil, 10A rated contacts, plug-in Type 3PDT. Square D Co. Class 8501 Type KDP-13 with NR62 socket.
  - 4. Pneumatic Time Delay Relay: Square D Co. Class 9050 Type B.
- E. Control Units, Such as Push Buttons, Pilot Lights, Selector Switches: Heavy duty, oil tight - Square D Co. Class 9001.
  - 1. Push buttons, standard, full guard. Red for stop, green for start.
  - 2. Pilot lights, transformer type, with color caps as indicated.
  - 3. Selector switches, 3 position (Hand-Off-Automatic) manual return.
  - 4. Legend Plates: Standard, with legends as indicated.

### 2.02 LABELING AND IDENTIFICATION

- A. Provide engraved plastic nameplates with 1/4-inch minimum height letters indicating circuit designation of panel or device controlled on controls which are individually enclosed.
- B. Secure nameplates with at least two screws or rivets. Cementing and adhesive installation not acceptable.

END OF SECTION



**1.00 - GENERAL****1.01 WORK INCLUDED**

Motor control; including molded case circuit breakers or fusible disconnects, magnetic starters and other control devices.

**1.02 SUBMITTALS**

Submit in accordance with Section 16000.

**1.03 RELATED WORK SPECIFIED ELSEWHERE**

- A. Motor Rated Switches: Section 16170.
- B. Control Units: Section 16901.
- C. Control Section: Division 15.

**2.00 - PRODUCTS****2.01 MATERIAL AND FABRICATION**

- A. Motor Control Centers:
  - 1. Provide factory assembled motor control centers consisting of one or more, minimum: 19 inch wide by 16 inch deep, dead front, dead rear, vertical sections bolted together.
  - 2. Full voltage, non-reversing starter, unless otherwise indicated.
  - 3. Conform with NEMA Class 1, Type B wiring for starter unit control.
  - 4. Provide two normally open and one normally closed auxiliary contacts on each except where more contacts are indicated.
  - 5. Provide full length copper bussing including areas indicated as space only.
  - 6. Provide a horizontal copper ground bus drilled and tapped every 10 inches for 1/4-20 machine screws.
  - 7. Provide an individual control transformer with the secondary fused and grounded for each starter. Size as required for the control devices indicated plus 25% spare capacity minimum.
  - 8. Provide a 3-position selector switch (hand-off-auto), manual return, for each starter unless otherwise indicated.
  - 9. Provide a transformer type push-to-test green pilot light energized by an auxiliary contact.
  - 10. Provide approved pull apart terminal blocks or control circuit disconnect switch for all external wiring connections.
  - 11. Identify all internal control wiring with manufacturers wire numbering or control wire numbering when indicated, at all terminal points and connections.
  - 12. Allen-Bradley, GE or Square-D Co.
- B. Combination Motor Starters:
  - 1. Full voltage, non-reversing starters unless otherwise noted and magnetic trip

only circuit breakers, or fusible disconnects in NEMA 1 enclosure for dry areas and NEMA 3R where indicated weatherproof, sized as indicated. Provide current limiters where indicated.

2. Provide two normally open and one normally closed auxiliary contacts on each starter, except where contacts are indicated.
3. Provide an individual control transformer with the secondary fused and grounded for each starter. Size as required for the control devices indicated plus 25% spare capacity minimum.
4. Provide a 3-position selector switch (hand-off-auto), manual return, for each starter unless otherwise indicated.
5. Provide a transformer type push-to-test green pilot light energized by an auxiliary contact.
6. Identify all internal control wiring with manufacturers wire numbering or control wire numbering when indicated, at all terminal points and connections.
7. Combination Starter and Circuit Breaker: Square-D Co. Class 8539, GE or Allen-Bradley.
8. Combination Starter and Disconnect: Square-D Co. Class 8538, GE or Allen-Bradley.

C. Motor Manual Starters:

1. Single Phase:
  - a. For fractional HP motors, single unit with toggle operator, in NEMA 1 enclosure for dry areas and NEMA 3R where indicated weatherproof.
  - b. Number of poles as indicated.
  - c. Provide overload protection.
  - d. Square-D Co. Class 2510, GE or Allen-Bradley.
2. Three Phase:
  - a. For integral horsepower motors, single unit 3-pole with toggle operator in NEMA 1 enclosure for dry areas and NEMA 3R where indicated weatherproof.
  - b. Square-D Co. Class 2510, GE or Allen-Bradley.

D. Magnetic Motor Starters (Individually Mounted):

1. Non-reversing, in NEMA 1 enclosure for dry areas and a NEMA 3R enclosure where indicated weatherproof.
2. Provide start-stop push button on door otherwise indicated.
3. Square-D Co. Class 8536, GE or Allen-Bradley.

### 3.00 - EXECUTION

#### 3.01 INSTALLATION

- A. Bolt all sections of the control centers together tightly and secure to floor with anchor bolts after setting assembly plumb and level.
- B. Secure units to structures to withstand wire-pulling strains.
- C. Use motor nameplates data for selection of heater elements in motor starters, except where power factor correction is used. Size heater elements accordingly.

#### 3.02 LABELING AND IDENTIFICATION

- A. Provide engraved plastic nameplates on all electrical distribution equipment shown

on the single line diagram.

- B. Provide motor control center and source feed designation on nameplates with 3/8" minimum lettering for the motor control center name and 1/4" height lettering for the source feed designation.

EXAMPLE: MCC-A  
FED FROM: DHA-1

- C. Provide engraved plastic nameplates with 1/4-inch minimum height letters indicating circuit designation at branch overcurrent devices in motor control centers.
  - 1. Circuit designation and load served at branch overcurrent devices in motor control centers and combination starters.
  - 2. Circuit designation and load served at manual motor starters and individually mounted magnetic motor starters.
- D. Secure nameplates with at least two screws or rivets. Cementing and adhesive installation is not acceptable.

END OF SECTION

