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RIO HONDO COMMUNITY COLLEGE
Pico Rivera Educational Center
DSA #03-116946
Bid Package Number 2047

BIDDER’S CHECK LIST

THE FOLLOWING ITEMS MUST BE SUBMITTED WITH YOUR BID PROPOSAL

A. ________ Bid Proposal
B. ________ Bid Securities
C. ________ List of Subcontractors
D. ________ Site Visit Certification
E. ________ Non-Collusion Declaration
F. ________ Verification of Contractor and Subcontractors’ DIR Registration
G. ________ Drug-Free Workplace Certification
H. ________ Prime Bidder Certification of DVBE Participation
I. ________ Statement of Bidder’s Qualifications (financial documents will not be disclosed by the District nor become a matter of public record)

All information or responses of a Bidder in its Bid Proposal and other documents accompanying the Bid Proposal shall be complete, accurate and true; incomplete, inaccurate or untrue responses or information provided therein by a Bidder may be grounds for the District to reject such Bidder’s Bid Proposal for non-responsiveness.

Note: Please include this check list when submitting the above items.
Notice to Contractors Calling for Bids

Notice is hereby given that the RIO HONDO COMMUNITY COLLEGE DISTRICT ("District") of Los Angeles County, California, acting by and through its Governing Board ("Board"), will receive up to, but not later than 10:00 AM May 12, 2016 in the Purchasing Office, sealed bids for the award of a contract for the procurement of the following:

**Bid# 2047**  
Pico Rivera Educational Center

The project consists of renovations to existing courtyard, replace and reconfigure courtyard paving, landscaping, and lighting. Repainting of exterior and interior surfaces of existing modular buildings. Remove existing carpet in all modular buildings. Rehabilitate existing modular building access ramps. Replacement of existing modular restroom building with new PC preapproved restroom building at the same location. Replacement of existing shade structure with new PC preapproved shade structure. Demolish and reinstall some existing perimeter fencing. Installation of new monument signs.

Bids received after the time specified above or after any extensions due to material changes shall be returned unopened. All bids shall be made and presented on a form furnished by the District. Bids shall be received in the office of the Director, Contract Management and Vendor Services, and shall be opened publicly read aloud at the above stated time and place.

Each bid must conform with and be responsive to the contract documents, copies of which are on file and may be obtained at the Mandatory Pre-Bid Meeting and Job Walk or on line at: [http://www.riohondo.edu/finance-and-business/doing-business-with-rhc/current-or-recent-bids-and-rfps/](http://www.riohondo.edu/finance-and-business/doing-business-with-rhc/current-or-recent-bids-and-rfps/). Each bid shall be accompanied by (1) the security referred to in the contract documents; (2) the list of proposed subcontractors; (3) the Non-collusion Affidavit; and (4) a list of three similar jobs the contractor has completed in the last three years.

A Mandatory Pre-Bid Meeting and Job Walk will be conducted on April 26, 2016 at 10:00 AM beginning at the El Rancho Adult School, 9515 Haney Street, Pico Rivera, CA 90660. Because the Mandatory Pre-Bid Meeting and Job Walk is mandatory, the Bid Proposal submitted by a Bidder whose representative(s) did not attend the entirety of the Mandatory Pre-Bid Meeting and Job Walk will be rejected by the District as being non-responsive. Parking permits are required for parking in campus parking lots. Doors to the meeting will be shut 10 minutes after the published time of the Mandatory Pre-Bid Meeting and Job Walk and any bidder arriving later than this time will be rejected by the District as being non-responsive.

The District has obtained from the Department of Industrial Relations the general prevailing rate of per diem wages and the general prevailing rate for holiday and overtime work for the Los Angeles County Area for each trade, craft, classification, or type of work needed to execute the contract. Holiday rates shall be paid as specified in the collective bargaining agreement applicable to each particular trade, craft, classification, or type of work employed on the project.

Copies of schedules of rates so determined are 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) and are on file and available at the District Office noted above. In accordance with Section 1773.2 of the California Labor Code, the Contractor shall post a copy of the determination of prevailing rate of wages at each jobsite. The schedule of per diem wages is based upon a working day of (8) eight hours. The rate for holiday and overtime work shall be at time plus one-half. The Contractor and any subcontractor(s) shall pay not less than the specified prevailing rates of wages to all workers employed by them in the execution of the contract. In accordance with provisions of the Public Contract Code Section 22300, substitution of eligible and equivalent securities for any monies withheld to ensure performance under this contract will be permitted at the request and expense of the Contractor.

No bidder may withdraw their bid for a period of (90) ninety days after the date set for the opening of bids.

The District reserves the right to reject any and all bids or to waive irregularities in any bid.

Rio Hondo Community College District is an “Equal Opportunity” employer. Qualified Disabled Veteran Business Enterprises (DVBE), Minority Business Enterprises (MBE), and Woman Owned Business Enterprises (WBE) are encouraged to participate in this project.

**Myeshia Armstrong**  
Vice President, Finance and Business  
Rio Hondo Community College District  
City of Whittier, County of Los Angeles, State of California  
562-463-7099

**Publish:**  
April 19, 2016 and April 26, 2016  
- Pasadena Star News  
- San Gabriel Valley Tribune  
- Whittier Daily News
SECTION 00010

NOTICE TO CONTRACTORS CALLING FOR BIDS

DISTRICT: RIO HONDO COMMUNITY COLLEGE DISTRICT

PROJECT IDENTIFICATION: Pico Rivera Educational Center Project

PROJECT NO: Bid No. 2047

BIDS DUE BY: May 12, 2016 at 10:00 AM

SUBMIT BIDS TO: Rio Hondo Community College District
3600 Workman Mill Road, Room A-103
Whittier, California 90601
Telephone (562) 463-7099
Myeshia Armstrong
Vice President, Finance and Business

BID AND CONTRACT DOCUMENTS AVAILABLE: On line at: http:\www.riohondo.edu or at the mandatory bidder’s conference and job walk.

MANDATORY PRE-BID JOB WALK LOCATION: El Rancho Adult School
9515 Haney Street, Pico Rivera, CA 90660

JOB WALK DATE/TIME: April 26, 2016 at 10:00 AM

NOTICE IS HEREBY GIVEN that Rio Hondo Community College District, acting by and through its Board of Trustees, hereinafter the “District” will receive up to, but not later than the above-stated date and time, sealed Bid Proposals for the Contract for the Work generally described as: Pico Rivera Educational Center Project

1.01 Submittal of Bid Proposals. All Bid Proposals shall be submitted on forms furnished by the District. Bid Proposals must conform with, and be responsive to, the Bid and Contract Documents, copies of which may be obtained from the District as set forth above. Only Bid Proposals submitted to the District prior to the date and time set forth above for the public opening and reading of Bid Proposals shall be considered.
1.02 **Bid and Contract Documents.** Bidder may obtain, at no cost to the Bidder’s, the Bid and Contract Documents at the location stated above.

1.03 **Bid Proposal.** Each Bid Proposal shall consist of:
   A. Bid Proposal
   B. Bid Security
   C. List of Subcontractors
   D. Non-Collusion Affidavit

   All information or responses of a Bidder in its Bid Proposal and other documents accompanying the Bid Proposal shall be complete, accurate and true; incomplete, inaccurate or untrue responses or information provided therein by a Bidder may be grounds for the District to reject such Bidder’s Bid Proposal for non-responsiveness.

1.04 **Job-Walk.** The District will conduct a **ONE TIME ONLY MANDATORY PRE-BID JOB WALK** for the Work to be held at the location, date and time stated above. It is mandatory for the Prime contractor to attend the job-walk.

1.05 **Prevailing Wage Rates.** The Project is subject to the provisions of Labor Code §§1720 *et seq.* and regulations set forth in Title 8 §§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 the Project. Pursuant to Labor Code §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. Pursuant to Labor Code §1773, the Director of the Department of Industrial Relations has determined the generally prevailing rates of wages in the locality in which the Work is to be performed. Copies of these determinations, entitled “PREVAILING WAGE SCALE”, are maintained at the District’s offices located at 3600 Workman Mill Road, Whittier, CA 90601, 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). The Contractor awarded the Contract for the Work shall post a copy of all applicable prevailing wage rates for the Work at conspicuous locations at the Site of the Work.

1.06 **Contractors License Classification.** In accordance with the provisions of California Public Contract Code §3300, the District requires that Bidders possess a valid and Current Class B California Contractors License at the time that the bid for the work is submitted.

1.07 **Contract Time.** Substantial Completion of the Work shall be achieved within **FIFTY-NINE (59) CALENDAR DAYS** after the date for commencement of the Work as set forth in the Notice to Proceed issued by the District. Failure to achieve Substantial
Completion within the Contract Time will result in the assessment of Liquidated Damages.

1.08 **Bid Security.** 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 Bid Security in the form and in the amount required shall render such Bid Proposal to be non-responsive and rejected by the District.

1.09 **No Withdrawal of Bid Proposals.** No Bidder shall withdraw its Bid Proposal for a period of **Ninety (90) days** after the award of the Contract by the District’s Board of Trustees. During this time, all Bidders shall guarantee prices quoted in their respective Bid Proposals.

1.10 **Substitute Security.** In accordance with the provisions of California Public Contract Code §22300, substitution of eligible and equivalent securities for any monies withheld by the District to ensure the Contractor’s performance under the Contract will be permitted at the request and expense of the Contractor. The foregoing notwithstanding, the Bidder to whom the Contract is awarded shall have **thirty (30) days** following action by the District’s Board of Trustees to award the Contract to such Bidder to submit its written request to the District to permit the substitution of securities for retention. The failure of the Bidder to make such written request to the District within said thirty (30) day period shall be deemed a waiver of the Bidder’s rights under California Public Contract Code §22300.

1.11 **Waiver of Irregularities.** The District 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.

1.12 **Award of Contract.** The Contract for the Work, if awarded, will be by action of the District’s Board of Trustees to the responsible Bidder submitting the lowest responsive Bid Proposal. If the Bid Proposal requires Bidders to propose prices for Alternate Bid Items, the District’s selection of Alternate Bid Items, if any, for determination of the lowest priced Bid Proposal and for inclusion in the scope of the Contract to be awarded shall be in accordance with this Notice and the Instructions for Bidders.

1.13 **Inquiries and Clarifications.** This document is for informational purposes and shall not relieve the Bidder of the requirements to fully familiarize itself with all the factors affecting the Project and his Bid. The Bidder is advised that all inquiries and clarifications about the Bid Documents, Drawings, Specifications, etc., shall be submitted to the District in writing on or before **1:00 PM - May 2, 2016.** The District will respond at its earliest possible opportunity but no later than **May 9, 2016.**

RIO HONDO COLLEGE
PICO RIVERA EDUCATIONAL CENTER

NOTICE TO CONTRACTORS CALLING FOR BIDS

PAGE 3 OF 4
communication by either party with regard to this matter is invalid. Inquiries shall be sent to:

Myeshia Armstrong
Vice President, Finance and Business
Rio Hondo Community College District,
3600 Workman Mill Road, Whittier, CA 90601
or by Fax at (562) 908-3462.

1.14 **Delivery.** It is the bidder’s responsibility to deliver their bid prior to the time stated for opening of bids. The bidder should plan their delivery schedule to arrive early taking into consideration accident, breakdown, freeway congestion, traffic delays, check-in at the parking control booth, parking, etc. The District will not consider or take into account any excuse by the bidder for delivery of its bid after the time stated for the bid opening. Late bids will be returned to the bidder unopened.

**END OF SECTION**
SECTION 00100

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).

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 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 **NOT USED**

1.05 **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.

1.06 **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.

1.07 **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. The submission of a Bid Proposal shall be deemed prima facie evidence of the Bidder’s full compliance with the requirements of this section.
1.08 **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.

1.09 **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.

1.10 **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) 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 District, a copy of which will be sent to each Bidder who attends the non 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.

1.11 **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 ten (10) 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 District, a copy of which will be sent to each Bidder who attends the non 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.

1.12 **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 non 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. All addendums will be posted to the district website.

http://www.riohondo.edu/facilities/RFQ/index.htm
1.13 **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.

1.14 **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.

1.15 **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.

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; (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 contracts, by way of example only, the following information will be considered: (a) the administrative, consultant or other cost overruns incurred by the District on previous contracts with the Bidder; (b) the Bidder's compliance record with contract general conditions 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 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.

1.16 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). Any Bidder’s failure to comply with the District’s request may render 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 encouraged 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 is not a basis for adjustment of the Contract Price or the Contract Time.

1.17 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.
1.18 **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.

1.19 **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.

1.20 **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.

1.21 **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.

1.22 **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 1.22 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 at 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. Notwithstanding any other provisions of the Call for Bids or these Instructions for Bidders, in the event that the Job Walk is designated in the Call for Bids as being mandatory, the District will not consider the Bid Proposal of any Bidder who has obtained the Bid and Contract Documents, pursuant to Call for Bids, after the date and time set forth therein for such mandatory Job Walk; any Bid Proposal submitted by any such Bidder shall be deemed non-responsive, rejected and returned unopened to the Bidder submitting the same.

1.23 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.

1.24 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.
1.25 **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 the Contract, identifying the Bidder to whom the District intends to award the Contract and the date/time/place of the District’s Board of Trustees meeting at which award of the Contract will be considered.

1.26 **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 Vice President, Business 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 Vice President, Business or designee, shall review and evaluate the basis of the bid protest. The District’s Vice President, Business 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 Vice President, Business 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 Vice President, Business (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.
1.27 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). 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.

END OF SECTION
TO: RIO HONDO COMMUNITY COLLEGE DISTRICT, a California Community College District, acting by and through its Board of Trustees ("District"), 3600 Workman Mill Road, Whittier, California 90601.

FROM: 

(Name of Bidder as listed on License)

(Address)

(City, State, Zip Code)

(Telephone)

(Fax)

(Email)

(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:

**Bid #2047 – Pico Rivera Educational Center**

for the sum of:

**Total Bid Amount:** $___________________________

(Total Bid Amount in Figures)

______________________________

(Total Bid Amount in Words)

**Allowance Amount:** $90,000.00

(Total Bid Amount in Figures)

______________________________

Ninety Thousand

(Total Bid Amount in Words)

for the sum of:

**Total Bid and Allowance Amount:** $___________________________

(Total Bid Amount in Figures)

______________________________

(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.

<table>
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<th>(initial)</th>
<th>No Addenda Issued</th>
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</thead>
</table>

| (initial) | Addenda Nos. received, acknowledged and incorporated into this Bid Proposal. |

C. **Alternate Bid Items.** 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.

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: Bid Proposal (00210), List of Subcontractors (00215), Non-Collusion Declaration (00220), DIR (00230) and Bid Security (Cash, Cashier’s Check, Certified Check or Bid Bond – 00260), Statement of Bidder’s Qualifications (00240). 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 five (5) working 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; (5) the Certificate of Workers’ Compensation Insurance; and (6) Letter of Assent for Project Labor Agreement. 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 and all Interim Milestones shall be achieved within the Contract Time and Interim Milestones 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:

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<th>License Number:</th>
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<td>Class</td>
<td>Expiration Date</td>
<td>Class</td>
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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.

By: __________________________

(Signature)

(Corporate Seal)

______________________________

(Typed or Printed Name of Bidder’s Authorized Representative)

Title: __________________________
### LIST OF SUBCONTRACTORS
**Bid # 2047 Pico Rivera Educational Center**

<table>
<thead>
<tr>
<th>1. Licensed Name of Subcontractor</th>
<th>2. Address of Office, Mill or Shop</th>
<th>3. Trade or Portion of Work</th>
<th>4. License No.</th>
<th>5. DIR No.</th>
<th>6. $$ Value of Work</th>
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Name of Bidder: _______________________________
Authorized Signature: _________________________

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

RIO HONDO COMMUNITY COLLEGE
PICO RIVERA EDUCATIONAL CENTER PROJECT
STATE OF CALIFORNIA
COUNTY OF ____________________________

I, ____________________________, being first duly sworn, deposes and says that I

___________________________ of ____________________________, 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)

_________________________   ________________________________
(numbers)                    (Area Code and Telephone Number)
VERIFICATION OF CONTRACTOR AND SUBCONTRACTORS’ DIR REGISTRATION

I am the ______________________ of _______________________________ ("Bidder")
                      (Title/Position)                                         (Bidder Name)

Submitting the accompanying Bid Proposal for the work described as Pico Rivera Educational Center Project.

1. The Bidder is currently registered as a contractor with the Department of Industrial Relations ("DIR").

2. The Bidder’s DIR Registration Number is: _____________ . The expiration date of the Bidder’s DIR Registration is _____________, 20____.

3. If the Bidder is awarded the Contract for the Work and expiration date of the Bidder’s DIR Registration will occur: (i) prior to expiration of the Contract Time for the Work; or (ii) prior to the Bidder completing all obligations under the Contract for the Work, the Bidder will take all measures necessary to renew the Bidder’s DIR Registration so that there is no lapse in the Bidder’s DIR Registration while performing Work under the Contract.

4. The Bidder, if awarded the Contract for the Work will remain a DIR registered contractor for the entire duration of the Work.

5. The Bidder has independently verified that each subcontractor identified in the Subcontractors List submitted with the Bid Proposal of the Bidder is currently a DIR registered contractor.

6. The Bidder has provided the DIR Registration Number for each subcontractor identified in the Bidder’s Subcontractors’ List or within twenty-four (24) hours of the opening of Bid Proposals for the Work, The Bidder will provide the District with the DIR Registration Number for each subcontractor identified in the Bidder’s Subcontractors List.

7. The Bidder’s solicitation of subcontractor bids included notice to prospective subcontractors that (i) all sub-tier subcontractors must be DIR registered contractors at all times during performance of the Work; and (ii) prospective subcontractors may only solicit sub-bids from and contract with lower-tier subcontractors who are DIR registered contractors.

8. If any of the statements herein are false or omit material facts rendering a statement to be false or misleading, the Bidder’s Bid Proposal is subject to rejection for non-responsiveness.

9. I have personal first hand-knowledge of all of the foregoing.

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

Executed this ___ day of ______________________, 20___ at ________________________________ .
                      (City and State)

________________________________________
(Signature)

________________________________________
(Name, typed or printed)
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:
   - Treasure/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 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.).

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. 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.

C. 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.

D. 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
E. 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.

F. 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.

G. 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.

H. 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.

I. 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 00250

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 RIO HONDO 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 Bid #2047 Pico Rivera Educational Center Project 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 Ninety (90) 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)

(Attach Attorney-in-Fact Certificate)

________________________________________________________
(Typed or Printed Name)

________________________________________________________
(Address of Surety’s Office where Bond is issued)

________________________________________________________
(Area Code and Telephone Number of Surety)
SECTION 00300
AGREEMENT

THIS AGREEMENT is made this ___ day of ____________, 20___, in the County of Los Angeles, State of California, by and between RIO HONDO 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 all of the Work required in connection with the work of improvement commonly referred to as: BID #2047 Pico Rivera Educational Center Project

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 FIFTY-NINE (59) 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
- Instructions for Bidders
- Bid Proposal
- Subcontractors List
- Non-Collusion Declaration
- DIR
- Bid Bond
- Agreement
- Statement of Bidders Qualifications
- Construction Forms
- Soils Report
- Civil Engineering Survey
- Labor and Material Payment Bond
- Performance Bond
- Certificate of Workers Compensation
- Drug Free Workplace Certification
- General Conditions
- Special Conditions
- Labor Compliance Program
- Drawings
- Specifications
- 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**

RIO HONDO COMMUNITY COLLEGE DISTRICT,
a California Community College District

By: ________________________________
Vice President, Business

**CONTRACTOR**

________________________________________
(Contractor’s License Number)

By: ________________________________
Name: ________________________________
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, along with our respective heirs, executors, administrators, successors and assigns, jointly and severally, unto RIO HONDO 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 resolution of its Board of Trustees, has awarded to the Principal a Contract for the work commonly described as: “Bid# 2047, Pico Rivera Educational Center Project”

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, 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.

RIO HONDO COMMUNITY COLLEGE
PICO RIVERA EDUCATIONAL CENTER PROJECT

LABOR AND MATERIAL PAYMENT BOND
PAGE 1 OF 2
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 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 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 RIO HONDO 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: “Bid# 2047, Pico Rivera Educational Center Project”

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 fifteen (15) 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 fifteen (15) 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 arrange for performance of the Contract promptly by a Contractor other than the Principal, time being of essence to this Bond. 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 stipulates and agrees that no change or adjustment of the Contract Time or Contract Price, alterations, deletions, additions or any other modifications to the Contract Documents, or the Work to be performed thereunder, shall in any way limit, restrict, or otherwise affect the obligations of the Surety under this Bond. Surety waives notice of any change or adjustment of the Contract Time or Contract Price, alterations, deletions, additions or any other modifications to the Contract Documents, 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.
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, __________________________________________, (Name) the ____________________________________________ (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)
SECTION 00417

DRUG-FREE WORKPLACE CERTIFICATION

I, ___________________________ the ___________________________,
of ___________________________, declare, state and certify that:

1.01 I am aware of the provisions and requirements of California Government Code §§8350 et seq., the Drug Free Workplace Act of 1990.

1.02 I am authorized to certify, and do certify, on behalf of Contractor that a drug free workplace will be provided by Contractor by doing all of the following:

A. Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance is prohibited in Contractor's workplace and specifying actions which will be taken against employees for violation of the prohibition;

B. Establishing a drug-free awareness program to inform employees about all of the following:
   1. The dangers of drug abuse in the workplace;
   2. Contractor's policy of maintaining a drug-free workplace;
   3. The availability of drug counseling, rehabilitation and employee-assistance programs; and
   4. The penalties that may be imposed upon employees for drug abuse violations;

C. Requiring that each employee engaged in the performance of the Contract be given a copy of the statement required by subdivision (A), above, and that as a condition of employment by Contractor in connection with the Work of the Contract, the employee agrees to abide by the terms of the statement.

1.03 Contractor agrees to fulfill and discharge all of Contractor's obligations under the terms and requirements of California Government Code §8355 by, inter alia, publishing a statement notifying employees concerning: (a) the prohibition of any controlled substance in the workplace, (b) establishing a drug-free awareness program, and (c) requiring that each employee engaged in the performance of the Work of the Contract be given a copy of the statement required by California Government Code §8355(a) and requiring that the employee agree to abide by the terms of that statement.
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 00520

DISABLED VETERAN BUSINESS ENTERPRISE (“DVBE”) PARTICIPATION GOAL

1. **DVBE Participation Policy.** The District is committed to achieving a Participation Goal for Disabled Veteran Business Enterprises (“DVBEs”). Through the DVBE participation program, the District encourages contractors to ensure maximum opportunities for the participation of DVBEs in the Work of the Contract.

2. **Definitions.**

2.1 **Disabled Veteran.** A "Disabled Veteran" means a veteran of the military, naval, or air service of the United States with at least ten percent (10%) service-connected disability who is domiciled in the State of California.

2.2 **Disabled Veteran Business Enterprise.** A "Disabled Veteran Business Enterprise" ("DVBE") means a business enterprise certified by the Office of Small and Minority Business, State of California, Department of General Services, pursuant to Military and Veterans Code §999, or an enterprise certifying that it is a DVBE by meeting all of the following requirements: (a) it is a sole proprietorship at least fifty-one percent (51%) owned by one or more Disabled Veterans, or in the case of a publicly owned business, at least fifty-one percent (51%) of its stock is owned by one or more Disabled Veterans; or a subsidiary wholly owned by a parent corporation, but only if at least fifty-one percent (51%) of the voting stock of the parent corporation is owned by one or more Disabled Veterans; or a joint venture in which at least fifty-one percent (51%) of the joint venture's management and control and earnings are held by one or more Disabled Veteran; (b) the management and control of the daily business operations are by one or more Disabled Vetera...
4. **Monitoring of DVBE Participation and Submission of Report.**

4.1 **Certification of Participation.** At the time of execution of the contract, the Contractor will provide a statement to the District of anticipated participation of Disabled Veteran Business Enterprises in the contract.

4.2 **Submission of Report.** During performance of the Contract, Contractor shall monitor the Work of the Contract, award of subcontracts and contracts for materials, equipment and supplies for the purpose of determining DVBE participation in the Work of the Contract. Contractor shall report on a monthly basis all DVBE’s utilized in the performance of the Work, the type or classification of the Work performed by each such DVBE and the dollar value of the Work performed by each such DVBE. In addition, upon completion of the Work of the Contract, Contractor shall submit a report to the District in the form attached hereto identifying all DVBEs utilized in the performance of the Work, the type or classification of the Work performed by each such DVBE and the dollar value of the Work performed by each such DVBE. The submission to the District of such report shall be deemed a condition precedent to the District's obligation to make payment of the Final Payment under the Contract Documents. The submission of such report shall be in addition to, and not in lieu of, any other conditions precedent set forth in the Contract Documents for the District's obligation to make payment of the Final Payment. The District reserves the right to request additional information or documentation from the Contractor evidencing efforts to comply with the DVBE Participation Goal.

4.3 **Contract Audit.** Contractor agrees that the District, or its designee, shall have the right to review, obtain and/or copy any and all writings, materials, documents and other records pertaining to the performance of the Contract. Contractor agrees that the District, or its designee, shall have access to any of Contractor’s premises upon reasonable notice, during usual business hours for the purpose of interviewing employees and inspecting and/or copying such writings, materials, documents and other documents which may be relevant to a matter under investigation for the purpose of determining compliance with the DVBE Participation Goal.
CERTIFICATION – PARTICIPATION OF
DISABLED VETERAN BUSINESS ENTERPRISES

I certify that I have read the foregoing SECTION 00520 DISABLED VETERAN BUSINESS ENTERPRISE ("DVBE") PARTICIPATION GOAL and will comply with the requirements as set forth in this contract.

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DVBE PARTICIPATION REPORT

Contractor Name: ________________________________

Project Name: ________________________________

Date: ________________________________

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<tr>
<th>Firm Name of DVBE</th>
<th>Trade/Portion of Work</th>
<th>Value of Work</th>
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Does the cumulative dollar value of the foregoing DVBE participation meet or exceed three percent (3%) of the final Contract Amount, as adjusted by all change orders?

YES ___________ NO ___________

If your response is "NO", please attach to this Report a detailed description of the reasons for your failure to achieve the District's DVBE Participation Goal.
SECTION 00530

GUARANTEE

RIO HONDO COMMUNITY COLLEGE DISTRICT

_____________________________ (Contractor's Name) hereby unconditionally guarantees that the work performed under and pursuant to District’s Contract No. 2047 for the Project known as – “Pico Rivera Educational Center Project” (“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 from the date of completion of the contract, 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 00800
SPECIAL CONDITIONS

PART 1

1.01 Contract Time.

A. 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 within 59 consecutive calendar days from and after the date stated in the Notice to Proceed (Reference Article 7 of the General Conditions).

B. Interim Milestone Completion Dates. Notwithstanding any provision of the Contract Documents to the contrary, Contractor shall sequence and coordinate the work so that portions of the work are completed as required by the Work Segment Plan in accordance with start and completion dates.

1.02 Liquidated Damages.

A. 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.A, above. Liquidated Damages shall be at the rate of $2,000 per day until Work of Construction Segments IA and IB as defined on Section 01010 is achieved.

B. 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 in accordance with the Contract Documents. Liquidated Damages shall be at the rate of $2,000 per day until Final Completion of the Work is achieved.

C. 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 $2,000 per day per Submittal until the required Submittal is submitted.

D. Other Milestone Delays. Refer to Appendix A for project milestones and associated liquidated damages.

E. Cumulative Assessment of Liquidated Damages. If the Contractor fails to timely delivery of the Submittals, fails to achieve Final Completion of the Work Segments as set forth herein, or fails to achieve Substantial or Final Completion of the Work, the Contractor shall be subject to assessment and withholding of 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.
1.03 Insurance

Insurance Provided By District.
Not Applicable.

B. Insurance Provided by Contractors/Subcontractors.
Pursuant to Article 6.12 of the General Conditions, the Contractor, all Subcontractors and Sub-Subcontractors (except Excluded Parties covered under Article 6.18) shall provide and maintain the following insurance coverage’s, with minimum coverage amounts as set forth below:

1. **Workers Compensation Insurance**
   In accordance with limits established by law.

2. **Employers Liability Insurance**
   $2,000,000

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

5. **Aircraft Liability Insurance (if applicable)**
   Per Occurrence $5,000,000
   Aggregate $5,000,000

C. Insurance Provided by Excluded Parties.
Pursuant to Article 6.18 of the General Conditions, the Excluded Parties shall provide and maintain the following insurance coverage’s, 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 $3,000,000

4. **Automobile Liability**
   Bodily Injury/Property Damage Per Occurrence $1,000,000

5. **Aircraft Liability Insurance (if applicable)**
   Per Occurrence $5,000,000
   Aggregate $5,000,000
D. **Pollution Legal Liability Insurance.**

Pursuant to Article 6.21 of the General Conditions, the Excluded Parties shall provide and maintain the following insurance coverage's, with minimum coverage amounts as set forth below:

<table>
<thead>
<tr>
<th>Coverage</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td>Per Occurrence</td>
<td>$5,000,000</td>
</tr>
<tr>
<td>Aggregate</td>
<td>$5,000,000</td>
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</table>

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 one (1) set of reproducible specifications with plans which can be downloaded of the website at

http://www.riohondo.edu/facilities/RFQ/index.htm

Website above is the official record of the bid documents. Contractor is responsible for downloading all drawings, specifications, addendum etc from the above mentioned website.

1.05 **Mark-ups on Changes to the Work.**

A. In the event of Changes to the Work, pursuant to Article 9 of the General Conditions, the mark-up for all overhead (including home and field office overhead), general conditions costs and profit, shall not exceed five percent (5%) of the direct actual costs if the General Contractor performed the work, five percent (5%) if the sub-contractor performed the work, as determined in accordance with Article 9.4 of the General conditions. Sub-contractor overhead and profit shall / will not exceed Five percent (5%) for self performed work and Five percent (5%) for work preformed by others. The foregoing limitation on mark-ups shall apply regardless of the number of Subcontractors, of any tier, performing any portion of such Change to the Work. In addition to the foregoing, Contractor may add a bond premium fee of the actual direct cost of the bond for such Change, not to exceed two percent (2%), of the actual direct costs for performance of the Change and the maximum allowable mark-up for overhead, general conditions and profit.

B. **Deleted Work:** All deductive change order(s) must be prepared pursuant to Contract Documents. Deductive Change Orders must be at a fair cost value to the district and shall credit back all mark-ups to the district along with the actual scope of work. General contractor and all subcontractors shall not be entitled to any profit and overhead on the deducted work.

1.06 **Inclement Weather Days.**

Pursuant to Article 7.4.1 of the General Conditions, the number of Rain Days (including inclement weather) for this Contract is **10-days**. Include a critical path activity entitled “Remaining Inclement Weather Days” on the initial Contract schedule. This activity shall have an initial duration of seven (7) work days and shall be the last activity in the schedule prior to the activity entitled “Completion”. All predecessor activities must pass through the
Inclement Weather day’s activity. The Contractor shall request use of the Inclement Weather Day when a critical path activity has been delayed due to inclement weather. This request must occur in the same month as the inclement weather delay and must be approved by a Change Order. Inclement Weather Delays to non-critical activities will not be considered. If, at completion, there are inclement weather days still remaining, the Completion date shall not be adjusted. If at or near completion, additional inclement weather days are required, the completion date shall be adjusted accordingly by processing a Change Order for a non-compensable time extension.

1.07 District’s Construction Manager.

Del Terra
13181 Crossroads Prkwy, N., Ste 540
City of Industry, CA 91746

PART 2

2.0 Construction operations, phasing, execution and Special Provisions

This Section supersedes other general conditions where applicable.

2.1 Project Limits.

The Contractor will limit its operations to the area included in the Contract Documents. All contractor lay-down, construction work and operations will be limited to the area as directed by the Construction Manager, Approved by Rio Hondo Program Management Team.

2.2 Hours of Operation

Work will be coordinated with Construction Manager & College for minimum disruption to College operations and shall be performed during normal business working hours; Monday to Friday from 6:00 AM to 6:00 PM. All off-hour work or weekend work must be approved by the College through the Construction Manager at least two days in advance.

2.3 Construction Traffic Route

Contractor to use pre-determined construction traffic routes as approved by the College.

2.4 Progress Schedule; Contractor Responsibility for Construction Schedule

CONTRACTOR shall be responsible for the preparation, submittal and maintenance of Construction Schedules required by the Contract Documents according but not limited to Section 01320, CONSTRUCTION PROGRESS DOCUMENTATION as included in Division 01 of the Bid Documents. All pertinent provisions of the General Conditions apply.
2.5 Phasing

A Work will be performed in such a manner as to minimize impact to normal college operations. Any phase/segment shall be required to be completed according to the approved Milestones Schedule.

B Contractor shall submit a “work to complete” list to the Construction Manager 5 calendar days before the scheduled end of any phase. The Construction Manager and the Architect will comment and add items to the list as necessary. The contractor shall complete the “work to complete” list within 3 days after having received the list from the Construction Manager. The contractor shall request a punch list walk 5 days prior to the scheduled end of any phase/segment.

C During the performance of this contract, the college and facilities operations will be ongoing and will remain under normal operations. Work will be permitted during school hours, provided that safe access to and exits from buildings are maintained while facilities remain in use. Temporary fencing with green windscreen shall be erected by the contractor to segregate work areas from all other campus areas.

D Contractor shall commence performance of the Contract upon the date specified in the Notice to Proceed and shall furnish sufficient labor, equipment, material, extra shifts and overtime to achieve the required milestones as indicated on Section 01010.

2.6 Allowances

The bidders shall include within the base bid the following allowances. The allowances shall be identified as separate line items in the Contractor’s schedule of values. The allowances are to be used at the College’s sole discretion for work not otherwise shown and/or specified in the construction documents. Work performed under the allowances shall be performed only as directed in writing by Program Management Team, through the Construction Manager. Any and all unused allowance amounts shall be credited to the College by change order and reflected in the Contractor’s final application for payment without any compensation for overhead and profit.

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<tr>
<th>No.</th>
<th>Description</th>
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<tr>
<td>1</td>
<td>Unforeseen Conditions</td>
<td>$90,000.00</td>
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Total $90,000.00

2.7 Ancillary Project Conditions

Contractor shall provide an itemized scope and work plan to include field notes and shop
drawings to accomplish each of the ancillary projects listed on Exhibit I above. Estimates of costs must be provided prior to commencement of work. The work will be tracked on a time and materials basis.

Owner reserves the option to assign work to others with a Not to Exceed amount of 1% of contract value and at no more than 5% overhead and profit markup on assigned subcontractor. Any allowances not used can be assigned to other allowances or deleted in this contract at no penalty to the College.

2.8 Coordination with other Onsite contractors/trades

A. Contractor shall coordinate operations included in various sections of the Contract Documents to help ensure efficient and orderly completion of the work.

B. Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and help ensure orderly progress of the work. Such administrative activities include, but are not limited to, the following:
   1. Preparation of schedules.
   2. Installation, relocation and removal of temporary facilities.
   3. Progress meetings.
   4. Project coordination activities.

C. Coordinate all work with other onsite contractors.

2.9 Security

Contractor is responsible for Work and Site security from start of construction, date of NTP, to Substantial Completion, whichever comes later. Contractor's responsibility includes assessment of security needs within and around Site Boundaries and employment of qualified personnel as may be necessary at no additional costs to the College. In case the security personnel is not used all such costs will be credited back to the college at prevailing wages.

2.10 Protection of Persons and Property

A. The Contractor shall be responsible for all damages to persons or property that occur as a result of its fault or negligence in connection with the prosecution of this Contract and shall take all necessary measures and be responsible for the proper care and protection of all materials delivered to and from the site and work performed until completion and final acceptance by the College. All work shall be solely at the Contractor's risk, with the exception of damage to the work caused by "acts of God" as defined in Public Contract Code Section 7105(b)(2).

B. Contractor shall take, and require all subcontractors to take, all necessary precautions for the safety of workers on the site and shall comply with all applicable federal, state, local and other safety laws, standards, orders, rules, regulations, and building codes to prevent accidents or injury to persons on, about, or adjacent to premises where Work is being performed and to provide a safe and healthful place of employment. In addition to meeting all requirements of OSHA, Cal-OSHA, state, and local codes. Contractor shall furnish, erect and
properly maintain at all times, as directed by the College or Program Manager or required by conditions and progress of work, all necessary safety devices, safeguards, construction canopies, signs, audible devices for protection of the blind, safety rails, belts and nets, barriers, lights, and watchmen for protection of workers and the public, and shall post danger signs warning against hazards created by such features in the course of construction.

C. The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations, and notifying owners and users of adjacent sites and utilities.

D. Requirements for Existing Sites.

The Contractor shall (unless waived by the College in writing):

(a) When performing construction on existing sites, become informed and take into specific account the maturity of the students on the site. Contractor shall perform Work which may interfere with school routine before or after school hours, enclose working area with a substantial barricade, and arrange Work to cause a minimum amount of inconvenience and danger to students and faculty in their regular school activities. The Contractor shall comply with specifications and directives of the College regarding the timing of certain construction activities in order to avoid unnecessary interference with school functioning.

(b) Provide substantial barricades around any shrubs or trees indicated to be preserved.

(c) Deliver materials to building area over route designated by the College through the Construction Manager.

(d) Take preventive measures to minimize objectionable dust, noise, or other disturbances.

(e) Take preventive measures to prevent disturbing or covering any survey markers, monuments or other devices marking property boundaries or corners. If such markers are disturbed by accident, they shall be replaced by an approved land surveyor or civil engineer and all maps and records required therefrom shall be filed with the County and local authorities, at no cost to the College. All filing and plan check fees shall be paid by Contractor.

(f) Provide to the College on request, the Contractor's written safety program and safety plan for each site.

E. Covering and Cleaning: Cover and protect the College's property within the project limits, as required to prevent soiling or damage by dust, dirt, water, fumes, or otherwise as deemed necessary by the College or Program Manager.

F. Repair or replace any damage to existing structures, improvements and equipment caused by Contractor's operations, at Contractor's expense.

G. Repair or replace damaged work with new materials, to restore the damaged areas and surfaces equal to and matching, the conditions which existed prior to damage, or at start of the work of this Contract, at no cost to the College.
H. Prior to start of work, Contractor, College and Construction Manager shall conduct an on-site inspection of existing conditions and the Contractor shall clearly document and report damaged conditions to the College. Items not reported to the College at time of inspection will be assumed to be result of Contractor’s work, whose responsibility it will be to repair or replace those items. Contractors shall include, along with his report to the College, digital, dated photographs.

2.11 Landscape Repair and Additional Scope

A. Patch all grass areas damaged by construction vehicles and equipment. Re-sod or hydro-seed the area to its previous condition or better under the direction of the Construction Manager or College Maintenance Department. Do not use grass seeds. Replace any sprinklers or irrigation material damaged by construction activities. Upon completion of Work, Contractor shall restore grass areas to its previous conditions before start of construction operations. Prior to commencement of work, Contractor is to identify damaged and non-operational irrigation and landscape elements and report to the Construction Manager.

B. Fire-Hydrant Protection: Contractor shall protect all Fire Hydrants in the site vicinity from any kind of damage due to construction activity.

C. Contractor shall provide Construction traffic control including flagmen as necessary during deliveries. Contractor to provide flagmen and other traffic control personnel at any other location as may be deemed necessary by the construction manager-for safety of all students, staff and visitors. Contractor will follow pre-determined route for access and exit to the campus and shall direct/park all haul vehicles as directed by the Rio Hondo Program Management Team.

END OF SECTION
# GENERAL CONDITIONS

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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/Engineer and the Division of the State Architect.

1.9 District. The "District" refers to Rio Hondo Community College District and its authorized representatives, including the Construction Manager, the Program Manager, 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 Construction Manager. The Construction Manager, if any, is the individual or entity designated as such in the Special Conditions. The Construction 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 Construction 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.

**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 Construction 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, in conjunction with the Construction Manager, 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 of Submittals will be conducted promptly so as not to delay or hinder the progress of the Work or the activities of the Contractor, the District or the District's separate contractors while allowing sufficient time, in the Architect's reasonable professional judgment, to permit adequate review of Submittals. The foregoing notwithstanding, the Architect's review and return of Submittals will conform with the time limits and other conditions, if any, set forth in the Specifications or the Submittal Schedule if the Submittal Schedule is required by other provisions of the Contract Documents. The Architect’s review and return of Submittals will require a minimum of fourteen (14) 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 in conjunction with the Construction Manager 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 District’s Construction Manager. Communications between separate contractors, if any, shall be through the District’s Construction Manager. All written communications between the Contractor and any Subcontractor, Material Supplier or others directly or indirectly engaged by the Contractor to perform or provide any portion of the Work shall be available to the District, the Construction Manager and the Architect for review, inspection and reproduction as may be requested from time to time. Failure or refusal of the Contractor to permit the District, the Construction Manager or Architect to review, inspect or reproduce such written communications may be deemed a default of Contractor hereunder.

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 immediately, but no later than three (3) calendar days, 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. 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 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.

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

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; 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
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 Construction 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.

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.

4.4.6 **Conferences and Meetings.** A material obligation of the Contractor under the Contract Documents is the attendance by the Contractor's supervisory personnel for the Work and the Contractor's management personnel as required by the Contract Documents or as requested by the District. The Contractor's personnel participating in conferences and meetings relating to the Work shall be authorized to act on behalf of the Contractor and to bind the Contractor. The Contractor is solely responsible for arranging for the attendance by Subcontractors, Material Suppliers at meetings and conferences relating to the Work as necessary, appropriate or as requested by the District.

4.4.6.1 **Pre-Construction Conference.** The Contractor's representatives (and representatives of Subcontractors as requested by the District) shall attend a Pre-Construction Conference at such time and place as designated by the District. The Pre-Construction Conference will address items such as the Contractor's access to the Site,
review of construction procedures and requirements and other matters pertaining generally to construction of the Work.

4.4.6.2 Progress Meetings. Progress meetings will be conducted on regular intervals (weekly unless otherwise expressly indicated elsewhere in the Contract Documents. The Contractor's representatives and representatives of Subcontractors (as requested by the District) shall attend Progress Meetings. Progress Meetings will be chaired by the Architect or the Construction Manager and will generally include as agenda items: Site safety, field issues, coordination of Work, construction progress and impacts to timely completion, if any. The purposes of the Progress Meetings include: a formal and regular forum for discussion of the status and progress of the Work by all Project participants, a review of progress or resolution of previously raised issues and action items assigned to the Project participants, and reviews of the Progress Schedule and Submittals.

4.4.6.3 Special Meetings. As deemed necessary or appropriate by the District, Special Meetings will be conducted with the participation of the Contractor, Subcontractors as requested by the District and other Project participants.

4.4.6.4 Minutes of Meetings. Following conclusion of the Pre-Construction Conference, Progress Meetings and Special Meetings, the Construction Manager will prepare and distribute minutes reflecting the items addressed and actions taken at a meeting or conference. Unless the Contractor notifies the Architect and the Construction Manager in writing of objections or corrections to minutes prepared hereunder within five (5) dates of the date of distribution of the minutes, the minutes as distributed shall constitute the official record of the meeting or conference. If the Contractor timely interposes objections or notes corrections, the resolution of such matters shall be addressed at the next scheduled Progress Meeting.

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 or other writing by the Contractor providing an identification of the portion of the Drawings or the Specifications pertaining to the Submittal, with each
Submittal numbered consecutively for ease of reference along with the following information: (i) date of submission; (ii) project name; (iii) name of submitting Subcontractor; and (iv) 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.

**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 alternate 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 Architect's decision shall be final regarding the approval or disapproval of the Contractor's proposed substitutions or alternatives. In the event a substitution or alternative is approved by the District and purchase, fabrication and/or installation or such approved substitution or alternative shall be less expensive than the originally specified item, the Contract Price shall be reduced by the actual cost savings realized by the Contractor's furnishing and/or installation of such approved substitution or alternative. The Contractor shall be solely responsible for all costs and fees of the Architect, of the Architect's consultant(s) and/or governmental agencies to review and/or approve any proposed substitution or alternative. The Contractor shall be solely responsible for any increase in the cost of any approved substitution or alternative or any Work affected by such alternative or substitution. The foregoing notwithstanding, all requests for the Architect's review and approval of any proposed substitution or alternative and all engineering, construction, dimension and performance data substantiating the equivalency of the proposed substitution or alternative shall be submitted by Contractor not later than thirty-five (35) days following the date of the District's award of the Contract to Contractor by action of the District's Board of Trustees; any request for approval of proposed alternatives or substitutions submitted thereafter may be rejected summarily. The foregoing process and time limits shall apply to any proposed substitution or alternative regardless of whether the substitute or alternate item is to be provided, furnished or installed by Contractor, any Subcontractor, any Sub-Subcontractor, Material Supplier or Manufacturer.

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 District has implemented an Injury and Illness Prevention Program (“IIPP”) in accordance with the provisions of Labor Code §§ 3201.5 and 6401.7. If the Contractor elected at bid time to adopt the District’s IIPP pursuant to paragraph 4.2.5 of the Instructions for Bidders, Contractor shall perform the Work in accordance with the provisions of the District’s IIPP. If at bid time the District determined that the Contractor’s IIPP was instituted in accordance with Labor Code §§ 3201.5 and 6401.7, the District agrees that such IIPP may be used by the Contractor for the performance of the Work and Contractor shall perform the Work in accordance therewith. Contractor shall be solely responsible for ensuring that all Work of the Project, whether performed by the Contractor, Subcontractors or Sub-Subcontractors or others, is performed in accordance with the agreed upon IIPP for the Project and as 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, and including but not limited to the terms and conditions of the District’s OCIP Procedures Manual (Section 00650 of the Contract Documents).

4.10.2 Contractor’s/Subcontractors’ Safety Coordinators. The Contractor shall designate, and shall require each Subcontractor and Sub-Subcontractor to designate, a responsible member of that entity’s organization at the Site whose duty shall be the prevention of accidents and the implementation and maintenance of safety precautions and programs (“Safety Coordinator”). This person shall be the Contractor's, Subcontractor’s or Sub-Subcontractor’s superintendent unless otherwise designated by the Contractor, Subcontractor or Sub-Subcontractor in writing to the District.

4.10.3 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 District 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.

4.10.4 OCIP Safety Coordinators. In furtherance of the District’s OCIP insurance program, the District may provide one or more OCIP Safety Coordinators for the Project. Such OCIP Safety Coordinators shall be independent contractors retained by the District’s OCIP Administrator and shall be authorized to act on behalf of the District for the purpose of monitoring Contractor’s compliance with applicable safety laws, ordinances, regulations or governmental orders. No act, omission or other conduct on the part of the OCIP Safety Coordinator shall be construed to limit, restrict or relieve the Contractor from Contractor’s sole responsibility for ensuring that all Work of the Project is performed in accordance with applicable laws, ordinances, rules, regulations and lawful orders of public authorities.

4.10.5 Safety Committee Meetings. The Contractor’s Safety Coordinator and the Safety Coordinator of certain major Subcontractors as designated by the District shall form a Safety Committee for the Project. The Safety Committee shall attend Safety Meetings chaired by representatives of the District’s OCIP Administrator. Such meetings will generally include Site safety issues as agenda items. The purposes of the Safety Meetings include providing a formal and regular forum for discussion of safety issues and review of progress or resolution of previously raised issues and action items assigned to the Project participants. Safety meetings will be conducted at regular intervals (monthly unless otherwise expressly indicated elsewhere in the Contract Documents). Following conclusion of each Safety Meeting, the OCIP Administrator will prepare and distribute minutes reflecting the items addressed and actions taken at the meeting. Unless the Contractor notifies the OCIP Administrator in writing of objections or corrections to minutes prepared hereunder within five (5) days of the date of distribution of the minutes, the minutes as distributed shall constitute the official record of the meeting. If the Contractor timely interposes objections or notes corrections, the resolution of such matters shall be addressed at the next scheduled Safety Meeting.

4.10.6 Site Safety Surveys. The OCIP Safety Coordinator, in conjunction with members of the Safety Committee and representatives of the OCIP insurers, shall conduct on-Site surveys to monitor unsafe acts or unsafe conditions as determined by applicable laws, ordinances and regulations. In the event the OCIP Safety Coordinator observes an unsafe act or condition, the OCIP Safety Coordinator shall notify the Contractor’s Safety Coordinator of the observed unsafe act or unsafe condition and recommend that the item be corrected to conform to applicable laws, ordinances and regulations. Such recommendation shall not
include any direction or recommendation concerning the means, methods, techniques, sequences or procedures for correction of the item, such being the sole responsibility of the Contractor. Under no circumstances shall any recommendation, action, direction, omission or other conduct of the OCIP Safety Coordinator result in any adjustment of the Contract Price or Contract Time.

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


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; (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 Construction 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. 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.

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.

4.14.1 The Contractor shall be fully and solely responsible for maintaining and up keeping all areas of the Work and Project Premises, outdoors and indoors, free from flying debris, grinding powder, sawdust, dirt and dust in general as well as any other product, product waste or work waste, that by becoming airborne may cause respiratory inconveniences to persons, particularly to students and District personnel. Additionally, the Contractor shall take specific care to avoid deposits of airborne dust or other elements that may accumulate on top of equipment, on walls, on floors, furniture and/or any other permanent or movable items. Prior to the commencement of any Work, the Contractor shall determine the probabilities of creating such an environment and provide all of the necessary protective equipment and/or items to contain the dust or airborne elements under a complete and secured control. Such protection devices, systems or methods shall be in accordance with the regulations set forth by the EPA and OSHA, and other applicable; State and/or Federal regulations. Additionally, the Contractor shall be the sole party responsible to clean up and remove any and all deposits of dust and other elements. Damages and/or any liability derived from the Contractor's failure to comply with these requirements shall be exclusively the cost of the Contractor, including, without limitation, any and all penalties that may be incurred for violations of local, state and/or federal regulations, and any amounts expended by the District to pay such damages shall be due and payable to the District. The District may also retain or withhold any amounts expended hereunder from progress payments otherwise due Contractor in accordance with the Contract Documents. Contractor shall protect all of the District's property, fixed or movable, and
shall replace any damaged item or part thereof and professionally clean any and all items that might become covered or partially covered to any degree by dust or other airborne elements. If school is in session at any point during the progress of the Project, and, in the District's reasonable discretion, (lying debris, grinding powder, sawdust, dirt or dust from any Work disrupts or disturbs the students or faculty or the normal operation of the school, at the District's request, the Contractor shall schedule the performance of all such Work around normal school hours or make other arrangements so that the Work does not cause such disruption or disturbance. In no event shall Contractor have a right to receive additional compensation or an extension to the Contract Time as a result of any such rescheduling or the making of such other arrangements.

In the event that the Contractor fails to comply with the requirements for dust control, noise control, or any other maintenance or clean up requirement of this Contract, the District shall so notify the Contractor and the Contractor shall be obligated to take immediate action. Should the Contractor fail to respond with immediate and responsive action and not later than twenty-four (24) hours from the District's notification, the District shall have the absolute right to proceed as it may deem necessary to remedy such matter. Any and all costs incurred in connection with such actions shall be the sole responsibility of, and be borne by, Contractor.

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 Construction 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, 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 LCP administrator, the Construction Manager, the District's Inspector, 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 as specified in the Special Conditions or elsewhere in the Contract Documents, for use by the District, the Construction 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 Program Manager 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, initially approved on April 9, 2003. 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 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 Ben Ocasio or Sophia Espinoza of The Solis Group, 234 N. El Molino Avenue, Suite 202, Pasadena, CA 91101, (626) 685-6989.

4.23 Not Applicable

4.24 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.

5.3 Subcontractors' Work. Whenever the Work of a Subcontractor is dependent upon the Work of the Contractor or another Subcontractor, the Contractor shall require the Subcontractor to: (a) coordinate its Work with the dependent Work; (b) provide necessary dependent data and requirements; (c) supply and/or install items to built into the dependent Work of others; (d) make appropriate provisions for dependent Work of others; (e) carefully examine and understand the portions of the Contract Documents (including Drawings, Specifications and Field Clarifications) and Submittals relating to the dependent Work; and (f) examine the existing dependent Work and verify that the dependent Work is in proper condition for the Subcontractor's Work. If the dependent Work is not in a proper condition, the Subcontractor shall notify the Contractor in writing and not proceed with the Subcontractor's Work until the dependent Work has been corrected or replaced and is in a proper condition for the Subcontractor's Work.

ARTICLE 6: INSURANCE; INDEMNITY; BONDS

6.1 Not Applicable
6.2 Not Applicable
6.3 Not Applicable
6.4 Not Applicable
6.12 Insurance Provided by Contractor / Subcontractors. The Contractor shall, for the duration of the Contract, provide and maintain insurance and shall require each Subcontractor and Sub-Subcontractor (except Excluded Parties covered under Article 6.18) to provide and maintain insurance of the type and in the limits as set forth below and in the Supplemental Conditions (“Non-OCIP Insurance”). Except as otherwise provided in Article 6.2.4, the Non-OCIP Insurance is intended to cover employee injury, personal injury, bodily injury and property damage liability for work performed away from the Project Site and for Work of the Project performed after Final Acceptance. Such insurance shall name the parties required to secure same as insureds and shall be in a form and through issuing companies acceptable to the District. Such insurance may be provided in single policy or multiple policies (primary and excess), including an umbrella form. Such insurance shall contain a defense of suits provision and shall provide the coverages set forth in this Article 6.12 under the following conditions:

(a) Notwithstanding any inconsistent statement in the policies obtained by Contractor, Subcontractors or Sub-Subcontractors, or any endorsement or certificate attached thereto, it is agreed that the District, its officers, agents, employees and representatives, the Construction Manager, the Architect, the IOR and the OCIP Administrator, and their respective officers, agents, employees and representatives, are additional insureds (for all coverages except Workers’ Compensation / Employer’s Liability), and that coverage is provided for all operations, uses, occupation, acts and activities of such insureds under the Contract Documents, as may be amended or adjusted, regardless of whether liability is attributable to the insured or a combination of the insured and one or more additional insureds. Upon District’s request, the Contractor, Subcontractors and Sub-Subcontractors shall provide endorsements evidencing such coverage for such additional insureds.

(b) The coverage provided by the policies obtained by Contractor, Subcontractors or Sub-Subcontractors is primary coverage and non-contributing with other insurance, if any, carried by the District, its officers, agents, employees and representatives, the Construction Manager, Architect, IOR or OCIP Administrator, and their respective officers, agents, employees and representatives, as to operations or work away from the Project Site or after Final Acceptance, except for automobile liability which is primary and non-contributing with other insurance carried by the District, Construction Manager, Architect, IOR or OCIP Administrator. All such additional insured endorsements issued thereon shall be so endorsed.
(c) In the event one of the insureds incurs liability to any other of the insureds, these policies shall provide protection for each insured against whom claim is or may be made, including claims by other insureds in the same manner as if separate policies had been issued to each insured.

(d) Notice of occurrences or claims under the policies shall be made to the District's Representative.

6.12.1 Workers’ Compensation/Employer's Liability Insurance. The Contractor shall provide and shall require each Subcontractor and Sub-Subcontractor (except Excluded Parties covered under Article 6.18) to provide Workers’ Compensation/Employer’s Liability insurance in the statutory limits of the workers’ compensation laws of the State of California, including Coverage B – Employers Liability, in an amount not less than that specified in the Supplemental Conditions, for Project-related operations occurring away from the Project Site and for Work of the Project after Final Acceptance.

6.12.2 Commercial General Liability Insurance. The Contractor shall provide and shall require each Subcontractor and Sub-Subcontractor (except Excluded Parties covered under Article 6.18) to provide Commercial General Liability insurance (including products liability for any product manufactured, assembled or otherwise worked upon away from the Project Site) in a form providing coverage not less than that of a Standard Commercial General Liability insurance policy (occurrence form) for all operations of the party required to furnish same, including hazards of operations (including explosion, collapse and underground coverage), elevators, independent contractors, employees as additional insureds, completed operations, with contractual liability coverage (for contracts related to the Work), personal injury liability and excess Employer's Liability, for personal injury, bodily injury and property damage arising out of the Work, for operations away from the Project Site and after Final Acceptance in policies of insurance with limits in an amount not less than that specified in the Supplemental Conditions.

6.12.3 Automobile Liability Insurance. The Contractor shall provide and shall require each Subcontractor and Sub-Subcontractor (except Excluded Parties covered under Article 6.18) to provide Automobile Liability insurance covering all owned, non-owned and hired automobiles, trucks, and trailers of the Contractor, Subcontractors and Sub-Subcontractors. Such insurance shall provide coverage not less than that of the Standard Comprehensive Automobile Liability policy with limits not less than that specified in the Supplemental Conditions for occurrences both at and away from the Project Site.

6.12.4 Aircraft Liability Insurance. If aircraft are used by the Contractor, Subcontractors, Sub-Subcontractors or anyone else on their behalf, such Contractor, Subcontractor, Sub-Subcontractor or other entity shall maintain or cause the operator of the aircraft to maintain aircraft public liability insurance insuring passengers and the general public against personal injury, bodily injury or property damage arising from aircraft owned, used, operated or hired in connection with the work of the Contractor, Subcontractor, Sub-Subcontractor or anyone else, with limits in an amount not less than that specified in the Supplemental Conditions.

6.13 Evidence of Contractor's Non-OCIP Insurance. Concurrently with delivery of the executed Contract, Contractor shall deliver to the District Certificates of Insurance evidencing the
Contractor’s Non-OCIP Insurance coverage required by Article 6.12. 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, and thereupon the District may proceed to exercise any right or remedy provided for under the Contract Documents or at law. Under no circumstances shall Contractor commence Work at the Site without having submitted to the District Certificates of Insurance for all Non-OCIP Insurance provided by the Contractor. Contractor’s failure to timely provide the District with all Non-OCIP Certificates of Insurance shall not result in any adjustment of the Contract Price or Contract Time. The Certificates of Insurance and the insurance policies required by Article 6.12 shall contain a provision that coverage afforded under such polices will not be canceled or allowed to expire without at least sixty (60) days’ prior written notice by registered mail addressed to: Rio Hondo Community College District, 3600 Workman Mill Road, Whittier, California 90601, attention Timothy Connell, Director, Contract Management and Vendor Services. Should any policy of insurance required under Article 6.12 be canceled 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. Upon District’s request, the Contractor shall furnish satisfactory proof of coverage of each type of Non-OCIP Insurance required by the Contract Documents, including copies of the insurance policies or renewals or replacements in form and content acceptable to the District; failure of the Contractor to comply with the District’s request may be deemed to be a default of a material obligation of the Contract Documents.

6.14 Evidence of Subcontractors’ Non-OCIP Insurance. Contractor shall require that every Subcontractor or Sub-Subcontractor (except Excluded Parties covered under Article 6.18) obtain and maintain the policies of insurance set forth in Articles 6.12.1 through 6.12.4 herein. The limits of liability of such policies shall be as set forth in the Supplemental Conditions. Each of the policies of insurance obtained and maintained by a Subcontractor or Sub-Subcontractor hereunder shall conform to the requirements of Article 6.12. Upon request of the District, Contractor shall promptly deliver Certificates of Insurance evidencing that the Subcontractors and Sub-Subcontractors have obtained and maintained policies of insurance in conformity with the requirements of Article 6.12. Failure or refusal of the Contractor to provide the District with such Certificates of Insurance may be deemed to be a material default of Contractor under the Contract Documents.

6.15 No Work at the Site Without Non-OCIP Insurance. Under no circumstances shall any Contractor, Subcontractor or Sub-Subcontractor (except Excluded Parties) commence Work at the Site without having all Non-OCIP Insurance issued and in effect in accordance with the provisions of Article 6.12. Contractor’s failure or refusal concerning Contractor’s obligations in this regard may be deemed by the District to be a default of a material obligation. Under no circumstances shall Contractor’s failure or refusal in this regard result in any adjustment of the Contract Price or Contract Time.

6.16 Additional Insurance. Pursuant to the provisions of Government Code §4420(b)(5), nothing contained in the Contract Documents or otherwise shall prohibit the Contractor, its Subcontractors, any Sub-Subcontractor or any other entity providing or performing Work of the Project from purchasing any additional insurance or coverage which he, she or it believes is necessary to protect such person or entity from any liability arising under the Contract Documents,
the Project or the Work. Any such additional insurance procured by such person or entity shall be at
the procuring party’s sole expense.

6.17 Waivers of Subrogation. Contractor hereby waives, and shall require all Subcontractors
and Sub-Subcontractors to waive, all rights against the District, its officers, agents, employees,
representatives and consultants, Construction Manager, Architect, IOR and OCIP Administrator, and
their respective agents, officers, employees and representatives, for recovery of damages to the
extent those damages are covered by policies of insurance obtained pursuant to Articles 6.12.2
through 6.12.4, inclusive.

6.18 Insurance Provided by Excluded Parties: The Contractor shall require all Excluded
Parties to provide and maintain insurance of the type and limits set forth below and in the
Supplemental Conditions. Such insurance shall name the parties required to secure same as insureds
and shall be in a form and through issuing companies acceptable to the District. Such insurance may
be provided in single policy or multiple policies (primary and excess), including an umbrella form.
Such insurance shall contain a defense of suits provision and shall provide the coverages set forth in
Article 6.18 under the following conditions:

(a) Notwithstanding any inconsistent statement in the policies obtained by Contractor
and/or Excluded Parties, or any endorsement or certificate attached thereto, it is
agreed that the District, its officers, agents, employees and representatives,
Construction Manager, Architect, IOR and OCIP Administrator, and their respective
officers, agents, employees and representatives, are additional insureds (for all
coverages except Workers’ Compensation/Employer’s Liability), and that coverage
is provided for all operations, uses, occupation, acts and activities of such insureds
under the Contract Documents, as may be amended or adjusted, regardless of
whether liability is attributable to the insured or a combination of the insured and one
or more additional insureds. The Contractor shall name, and shall require the
Excluded Parties to name, the District, its officers, agents, employees and
representatives, the Construction Manager, Architect, IOR and OCIP Administrator,
and their respective officers, agents, employees and representatives, as additional
insureds under the policies required pursuant to Articles 6.18.2 through 6.18.4,
inclusive. As to the insurance required by Article 6.18.2, such additional insured
status shall be provided and maintained using ISO additional insured endorsement
CG 20 10 (11/85 edition), or a substitute providing equivalent coverage. The
additional insured status required herein as to Article 6.18.2 shall be maintained on
behalf of all specified parties for a period of ten (10) years after Final Acceptance
of the Work. Upon the District’s request, the Contractor and/or Excluded Party shall
provide copies of all additional insured endorsements procured pursuant to this
Article 6.18.

(b) The coverage provided by the policies obtained by Contractor and/or Excluded
Parties is primary coverage and non-contributing with insurance, if any, carried by
the District, its officers, agents, employees and representatives, the Construction
Manager, Architect, IOR or OCIP Administrator, and their respective officers,
agents, employees and representatives. All such additional insured endorsements
issued thereon shall be so endorsed.
In the event one of the insureds incurs liability to any other of the insureds, these policies shall provide protection for each insured against whom claim is or may be made, including claims by other insureds in the same manner as if separate policies had been issued to each insured.

Notice of occurrences or claims under the policies shall be made to the District's Representative.

6.18.1 Workers’ Compensation/Employer's Liability Insurance. The Contractor shall require all Excluded Parties to provide Workers’ Compensation/Employer’s Liability insurance in the statutory limits of the workers’ compensation laws of the State of California, including Coverage B – Employer’s Liability, in an amount not less than that specified in the Supplemental Conditions, covering operations of the party in connection with the work both at and away from the Project Site.

6.18.2 Commercial General Liability Insurance. The Contractor shall require all Excluded Parties to provide Commercial General Liability Insurance in a form providing coverage not less than that of a Standard Commercial General Liability insurance policy (occurrence form) for all operations of the party required to furnish same, including hazards of operations (including explosion, collapse and underground coverage), elevators, independent contractors, employees as additional insureds, products and completed operations (for five (5) years after Final Acceptance of the Work), with contractual liability coverage (for contracts related to the Work), personal injury liability and excess Employer’s Liability, for personal injury, bodily injury and property damage arising out of the Work in policies of insurance with limits in an amount not less than that specified in the Supplemental Conditions.

6.18.3 Automobile Liability Insurance. The Contractor shall require all Excluded Parties to provide Automobile Liability Insurance covering all owned, non-owned and hired automobiles, trucks and trailers of the Excluded Parties. Such insurance shall provide coverage not less than that of the Standard Comprehensive Automobile Liability policy with limits in an amount not less than that specified in the Supplemental Conditions for occurrences both at and away from the Project Site.

6.18.4 Aircraft Liability Insurance. If aircraft are used by an Excluded Party or anyone else on their behalf, such Excluded Party or other entity shall maintain or cause the operator of the aircraft to maintain aircraft public liability insurance insuring passengers and the general public against personal injury, bodily injury or property damage arising from aircraft owned, used, operated or hired in connection with the work of the Excluded Party or anyone else, with limits in an amount not less than that specified in the Supplemental Conditions.

6.19 Evidence of Excluded Parties’ Insurance. Contractor shall require that every Excluded Party obtain and maintain the policies of insurance set forth in Articles 6.18.1 through 6.18.4 herein. The limits of liability of such policies shall be as set forth in the Supplemental Conditions. Each of the policies of insurance obtained and maintained by an Excluded Party hereunder shall conform to the requirements of Article 6.18. Upon request of the District, Contractor shall promptly deliver Certificates of Insurance evidencing that the Excluded Parties have obtained and maintained policies of insurance in conformity with the requirements of Article 6.18. Failure or refusal of the Contractor
to provide the District with such Certificates of Insurance may be deemed to be a material default of Contractor under the Contract Documents.

6.20 No Work at the Site Without Excluded Parties’ Insurance. Under no circumstances shall any Excluded Party commence Work at the Site without having all insurance issued and in effect in accordance with the provisions of Article 6.18. Contractor’s failure or refusal concerning Contractor’s obligations in this regard may be deemed by the District to be a default of a material obligation. Under no circumstances shall Contractor’s failure or refusal in this regard result in any adjustment of the Contract Price or Contract Time.

6.21 Pollution Legal Liability Insurance. Contractor (if performing or providing any hazardous waste services, abatement or otherwise, of any type or description for the Project) shall provide and maintain, and shall require any other person or entity performing such services to provide and maintain (hereinafter collectively referred to as “Hazardous Waste Contractor”), insurance covering losses caused by pollution conditions that arise from the operations, including the completed operations, of such Hazardous Waste Contractor. Such insurance shall apply to bodily injury and property damage, including loss of use of damaged property or of property that has not been physically injured, cleanup costs and defense, including costs and expenses incurred in the investigation, defense or settlement of claims. The policies of insurance affording these coverages shall be written with limits in an amount not less than that set forth in the Supplemental Conditions. Coverage shall apply to sudden and non-sudden pollution conditions resulting from the escape or release of smoke, vapors, fumes, acids, alkalis, toxic chemicals, liquids or gases, waste materials or other irritants, contaminants or pollutants. The policies of insurance issued hereunder shall be written by an insurer acceptable to the District and shall be endorsed to include as insureds the District, its officers, agents, employees and representatives, Construction Manager, Architect, IOR and OCIP Administrator, and their respective officers, agents, employees and representatives. If coverage is written on a claims-made basis, the Hazardous Waste Contractor shall warrant that any retroactive date applicable to coverage under the policy precedes the effective date of this Contract and that continuous coverage will be maintained, or an extended discovery period will be exercised, for a period of ten (10) years from Final Acceptance of the Work. If coverage is written on an occurrence basis, the District, its officers, agents, employees and representatives, Construction Manager, Architect, IOR and OCIP Administrator, and their respective officers, agents, employees and representatives, shall be named as insureds on the Hazardous Waste Contractor’s pollution legal liability policies for operations, including completed operations, relating to, or arising out of, work for the Project for a period of ten (10) years after Final Acceptance of the Work. At least five (5) working days prior to any Hazardous Waste Contractor’s commencing Work on the Site, Contractor shall provide the District with Certificates of Insurance evidencing the coverage required hereunder.

6.22 Contractor Obligations. Contractor agrees to comply with any and all terms and conditions of the policies of insurance provided by District and to comply with any and all claims handling procedures, loss prevention programs and other programs required by or related to the District’s OCIP as set forth herein. Contractor shall require Subcontractors, Sub-Subcontractors and all others covered by the District’s OCIP insurance policies to so comply. Contractor, its Subcontractors and Sub-Subcontractors shall furnish to the District, its OCIP Administrator, its designee or the insurers under the OCIP policies all information and documentation that such entity may require from time to time in connection with the issuance of policies under this Contract or the administration of the
OCIP in such form and substance as such entity may prescribe and promptly comply with the recommendations of the OCIP insurers. Contractor shall not violate, or knowingly permit to be violated, any conditions of the policies of insurance provided by the District hereunder and shall at all times satisfy the requirements of the insurers issuing them. Contractor shall assure that all OCIP requirements imposed upon and to be performed by the Contractor shall likewise be imposed upon, assumed and performed by each Subcontractor and Sub-Subcontractor. If the Contractor, Subcontractors, Sub-Subcontractors or Excluded Parties should fail to comply with the requirements of this Article 6, the District may withhold payment due to the Contractor or suspend the work at the Contractor's sole expense and without adjustment of the Contract Price or Contract Time until such time as the Contractor, its Subcontractors, Sub-Subcontractors and/or Excluded Parties have performed such obligations to the reasonable satisfaction of the District.

6.23 Indemnity. Unless arising solely out of the active negligence, gross negligence or willful misconduct of the District, the Architect or the Construction 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 Construction 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.

6.24 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 6.24 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.

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 Construction 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. 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 Construction Manager, the Architect and the Contractor 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 the event that the Contractor shall fail or refuse, for any reason, to complete all punch list items within the Contract Time, Contractor shall be subject to assessment of Liquidated Damages in accordance with Article 7.4 hereof. If the Contractor fails or refuses to complete all items of the Work within the Contract Time, 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; 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 (including but not limited to Section 01360 of the Contract Specifications), 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. 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. Review of any Construction Schedules required under the Contract.
Documents and any comments thereto by the District, the Construction Manager and/or the Architect shall not be deemed to be the assumption of construction means, methods or sequences by the District, the Construction Manager or the Architect, all of which remain the Contractor's obligations under the Contract Documents.

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.

7.4.1 Excusable Delays. If Substantial Completion of the Work or completion of an Interim Milestone 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 Approved Construction Schedule or 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 or completion of an Interim Milestone is delayed and such delay is caused by the acts or omissions of the District, the Architect, the Construction 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, Construction 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. 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. 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. 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 any 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.
7.5 **Liquidated Damages.** Should the Contractor neglect, fail or refuse to achieve Substantial Completion of the Work within the Contract Time, as adjusted, or to complete an Interim Milestone or Final Completion in accordance with the times specified or provided for in the Contract Documents, the Contractor agrees to pay to the District the amount of per diem Liquidated Damages set forth in the Special Conditions, not as a penalty but as Liquidated Damages, for every day beyond the Contract Time, as adjusted, Interim Milestone or Final Completion, the Work is achieved. The Liquidated Damages amounts set forth in the Special Conditions 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 delayed completion of the Work. The Contractor and the 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. Liquidated Damages may be deducted from the Contract Price then or thereafter due the Contractor. The Contractor and the Surety shall be liable to the District for any Liquidated Damages exceeding any amount of the Contract Price then held or retained by the District. In the event that the Contractor shall fail or refuse to correct or complete items of the Work noted upon Substantial Completion and the District elects to exercise its right to cause completion or correction of such items pursuant to Article 7.2.3.2 hereof, the District's assessment of Liquidated Damages pursuant to the foregoing shall be in addition, and not in lieu of, the District's right to charge Contractor with the cost of completing or correcting such items of the Work, as provided for under Article 7.2.3.2. The Contractor and the District acknowledge and agree that the provisions of this Article 7.5 are reasonable under the circumstances existing at the time of the Contractor's execution of the Agreement.

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).** 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 accordance with Section 01050 of the Contract Specifications.

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 Construction 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
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 Construction 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) complete and accurate weekly Certified Payrolls of the Contractor and all Subcontractors, of any tier, for laborers performing any portion of the Work for which a Progress Payment is included (if requested);

(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) a current union statement reflecting that the Contractor and any Subcontractor of any tier, are current in the payment of any supplemental fringe benefits required pursuant to any collective bargaining agreement to which the Contractor or any such Subcontractor is a party to or is otherwise bound by (if requested); and

(vi) a certification by the Contractor that it has maintained the Record Documents reflecting the actual as-built conditions of the Work performed (such certification is subject to verification by the District's Inspector prior to approval of the Progress Payment).

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.

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 five percent (95%) 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).

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
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

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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 withhold any Progress Payment or the Final Payment, in whole or in part, or backcharge the Contractor to the extent it may deem advisable to protect the District on account of: (i) defective Work or Work not in conformity with the requirements of the Contract Documents which is not remedied; (ii) failure of the Contractor to make payments when due Subcontractors or Material Suppliers for materials or labor; (iii) claims filed or reasonable evidence of the probable filing of claims by Subcontractors, laborers, Material Suppliers, or others performing any portion of the Work under the Contract Documents for which the District may be liable or responsible including, without limitation, Stop Notice Claims filed with the District pursuant to California Civil Code §3179 et seq.; (iv) a reasonable doubt that the Contract can be completed for the then unpaid balance of the Contract Price; (v) tax demands filed in accordance with California Government Code §12419.4; (vi) inadequate or delinquent payroll records, or violations of requirements to pay prevailing wages, or employment of apprentices; (vii) other claims, penalties and/or forfeitures for which the District is required or authorized to retain funds otherwise due the Contractor; (viii) any amounts due from the Contractor to the District under the terms of the Contract Documents; (ix) the Contractor’s failure to provide any of its obligations under the Contract Documents (including the District’s Labor Compliance Program) or its default under the Contract Documents or its failure to maintain adequate progress of the Work; or (x) the Contractor’s failure to timely provide Certified Payrolls of the Contractor and all Subcontractors, of any tier, in accordance with Articles 8.3.2., 8.4.2. or applicable law. 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.

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.

8.7 Computerized Job Cost Reporting System.

8.7.1 Job Cost Reporting. The Contractor shall maintain a computerized job cost reporting system conforming to the requirements set forth herein. The computer program(s) utilized by the Contractor shall be subject to the review and acceptance by the District. The job cost reporting systems for the Work shall be updated in regular intervals of not more than one (1) calendar month.

8.7.2 Job Cost Reporting System Requirements. The computerized job cost programs utilized by the Contractor shall conform and comply with generally accepted accounting principles applied in a consistent manner and with recognized and generally accepted construction industry accounting standards, guidelines and procedures. The job cost reporting system format and configuration shall follow the general format of the District approved Cost Breakdown and budgets established for each line item shall be traceable to a bid estimate of costs. The job cost reporting systems utilized by the Contractor and applicable Subcontractors shall be capable of: (a) providing overall cost status on a monthly and cumulative basis; (b) providing comparative analysis of the original budgeted costs, actual costs, remaining budget, and projected cost of completion; the job cost reporting system shall be capable of providing comparative analysis for individual line items and the totality of the Work reflected in the job cost report and; (c) tracking adjustments to original budget amounts for Changes to the Work (including, without limitation, issued, pending and potential Change Orders).

8.7.3 Job Cost System Information. Upon request of the District, the Contractor and applicable Subcontractors shall make available written job cost reports and/or provide the District with the electronic files of the then current or requested job cost report. The Contractor's obligations hereunder are material.

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 notwithstan
ding, 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 statement 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 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, the Architect and the District's Inspector, in writing, not more than fifteen (15) 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 determining the cost to the District and the extent of increase to the Contract Price resulting from a Change adding to the Work, the allowance for mark-ups on the costs of the Change for all overhead (including home office and field overhead), general conditions costs and profit associated with the Change 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 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 Architect or Construction Manager; 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 Notice of Changes. If the Contractor should claim that any instruction, request, the Drawings, the Specifications, action, condition, omission, default, or other situation obligates the District to increase the Contract Price or to extend the Contract Time, the Contractor shall notify the District's Construction Manager and the Architect, in writing, of such claim within ten (10) days from the date of its actual or constructive notice of the factual basis supporting the same. The District shall consider any such claim of the Contractor only if sufficient supporting documentation is submitted with the Contractor's notice to the District's Construction Manager and the Architect. 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 such instruction, request, Drawings, Specifications, action, condition, omission, default or other situation. Accordingly, Contractor acknowledges that its failure, for any reason, to give written notice (with sufficient supporting documentation to permit the District's review and evaluation) within ten (10) days of its actual or constructive knowledge of any instruction, request, Drawings, Specifications, action, condition, omission, default or other situation for which the Contractor believes there should an adjustment of the Contract Time or the Contract Price shall be deemed Contractor's waiver, release, discharge and relinquishment of any right to assert or claim any entitlement to an adjustment of the Contract Time or the Contract Price on account of any such instruction, request, Drawings, Specifications, action, condition, omission, default or other situation. In the event that the District determines that the Contract Price or the Contract Time are subject to adjustment based upon the events, circumstances and supporting documentation submitted with the Contractor's written notice under this Article 9.6, any such adjustment shall be determined in accordance with the provisions of Articles 9.4.1 and 9.4.2.

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 Construction 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 Construction 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 Construction Manager
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 Construction 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. 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 be excessive, 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 Construction Manager or the Architect and not by the Contractor.
11.1.4 Additional Tests, Inspections and Approvals. If the Architect, the Construction 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 Construction 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 Construction 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 Construction 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 Construction 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 Construction 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 Construction 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 Construction 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; (iv) 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 term "claims" as used herein shall be as defined in California Public Contract Code §20104(b)(2).

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.

**END OF SECTION**
TECHNICAL SPECIFICATIONS

“FOR BIDDING PURPOSES ONLY”

PICO RIVERA EDUCATION CENTER
9515 Haney Street
Pico Rivera, CA 90660

RIO HONDO COMMUNITY COLLEGE DISTRICT
3600 Workman Mill Road
Whittier, CA 90601
Tel. (562) 908-3441

W+W Project No. 15038.00
March 21, 2016

Contact: Robert Bender, Project Manager
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Tel. (714) 508-1780, ext. 319
TECHNICAL SPECIFICATIONS

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W+W Project No. 15038.00
DSA Application No.
March 21, 2015

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# PICO RIVERA EDUCATION CENTER
# RIO HONDO COMMUNITY COLLEGE DISTRICT

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PART 1 – GENERAL

1.01 PROJECT DESCRIPTION

A. Project consists of replacement of existing modular restroom unit with new unit and new ramp in same location along with removal and replacement of existing shade structure and other site improvements and renovations to existing modular units at Rio Hondo College Pico Rivera Education Center, for Rio Hondo Community College District, Whittier, California, as shown on Contract Documents prepared by Westberg + White, Inc., Architects.
   1. Project also consists of upgrades as necessary to bring buildings into compliance with current Title 24/CBC requirements.

B. Work includes, but is not necessarily limited to:
   1. Removal of existing modular restroom unit and replacement with new pre-checked, pre-approved unit and new ramp in same location.
   2. Removal of existing shade structure and replacement with new pre-checked, pre-approved shade structure.
   3. New gypsum board partitions with new hollow metal doors and frames, and other interior finishes as specified.
   4. Repainting of exterior and interior surfaces of existing modular units.
   5. Interior room signage.
   6. Associated utilities, including plumbing and electrical connections for new modular unit.

C. Site improvements consisting of, but not necessarily limited to:
   1. Reconfiguring and restriping of parking stalls adjacent to courtyard entry for compliance with accessibility requirements.
   2. Removal of existing courtyard paving and replacement with reconfigured paving.
   3. Alterations to landscape planting, irrigation system, and lighting
   4. Rehabilitation of existing ramps at existing units to facilitate and meet current accessibility and fire life/safety code requirements.
   5. Removal or rehabilitation of existing perimeter fencing and provide new fencing of types specified.
   6. Detectable warning surfaces at zero curbs.
   7. Pavement stripping or restriping.
   8. Exterior directional signage.
   9. New Monumental Signs.
   10. New Entry Gate Sign.

1.02 RELATED DOCUMENTS

A. Refer to District’s Division 00 Documents, including General Conditions, and other Division 01 Sections, for additional requirements.

B. Comply with requirements of these specifications and District’s Division 00 documents.
1. Where differences may occur between these specifications and District 00 documents, requirements of District’s Division 00 documents shall govern, unless otherwise directed.

2. Changes to approved documents shall be made by addenda or change order approved by Owner and Architect.

C. Contract Documents are complementary and what is required by one shall be as binding as if required by all.

1. Errors, inconsistencies, or omissions discovered by Contractor shall be reported promptly to Owner and Architect as request for information.

1.03 CONTRACTS

A. Construct Work under single fixed-price contract.

1.04 WORK UNDER SEPARATE CONTRACTS

A. Furnishing and installing of new modular restroom unit and access ramp will be performed by modular contractor.

1. Hook up of utilities to modular unit will be performed under this contract.

B. Furnishing and installing of new shade structure will be performed by shade structure manufacturer or their authorized installer.

1.05 WORK SEQUENCE

A. General: Conform to construction schedule as specified.

1. Construction time shall start as of date specified in initial "Notice to Proceed" from Architect to Contractor and end with date of acceptance of Work by Owner.

B. Construction Schedule: Work will be conducted in single phase and provide least possible interference to activities of Owner's personnel and to permit orderly transfer of personnel and equipment to new facilities.

C. Liquidated Damages: Liquidated damages will be assessed under conditions provided in Agreement.

1.06 CONTRACTOR'S USE OF PREMISES

A. General: During construction period, Contractor shall limit his use of premises to immediate area required for construction operations.

1. Contractor's use of premises is also limited by Owner's right to perform construction operations with its own forces or to employ separate contractors on portions of Project.

B. Contractor shall limit his use of premises for Work and for storage as directed, to allow for:

1. Work by other Contractors.
2. Owner occupancy.
3. Use by Public.

C. Coordinate use of premises under direction of Architect and Owner.
D. Assume full responsibility for protection and safekeeping of products under this contract, stored on Project Site.

E. Move stored products under Contractor's control, which interfere with operations of Owner or separate contractor.

F. Obtain and pay for use of additional storage or work areas needed for operations.

1.07 WORK DURING COLLEGE SESSIONS

A. Work under this contract will be executed in part during regular sessions of College.
   1. Contractor shall cooperate with College authorities in every way to minimize disturbance.

B. In entrance and exit of workers, and in bringing in, storing, and removal of equipment, Contractor shall cooperate with those in authority and prevent interference with functioning of College.
   1. Observe rules and regulations in force and avoid unnecessary dust, mud or accumulated debris, or undue interference with convenience, sanitation or routine of departmental activities.

C. In connecting new utilities to existing, and similar operations, Contractor shall time and coordinate such operations so that there will be no interference with College activities.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01 1100
SECTION 01 2610

CONSTRUCTION DOCUMENT MODIFICATION PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

A. Section specifies administrative and procedural requirements for handling and processing Construction Document Modifications to Contract.

1.02 MINOR CHANGES IN WORK

A. Supplemental instructions authorizing minor changes in Work, not involving adjustment to Contract Sum or Contract Time, will be issued by Architect on AIA form G710 - Architect's Supplemental Instructions.

1.03 CONSTRUCTION CHANGE DOCUMENT APPROVAL REQUESTS

A. Construction Change Documents will not be allowed without Division of the State Architect (DSA) approval.

B. Owner-Initiated Change Requests: Proposed changes in Work that will require adjustment to Contract Sum or Contract Time will be issued by Architect, with detailed description of proposed change and supplemental or revised Drawings and Specifications, when necessary.
   1. Change requests issued by Architect are for information only.
      a. Do not consider them an instruction either to stop Work in progress, or to execute proposed change.
   2. Unless otherwise indicated in change request, within ten days of receipt of change request, submit to Architect for Owner's review, estimate of cost necessary to execute proposed change.
      a. When no estimate of cost is submitted within 10 days it will be assumed to be "no cost change".
      b. Include list of quantities of products to be purchased and unit costs, along with total amount of purchases to be made.
      c. Provide breakdown of labor cost involved with the proposed change.
         1) Where requested, furnish survey data to substantiate quantities.
      d. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
      e. Include statement indicating effect proposed change in Work will have on Contract Time.

C. Contractor-Initiated Change Requests:
   1. When latent or other unforeseen conditions require modifications to Contract, Contractor may propose changes by submitting request for change to Architect.
      a. Contractor shall notify Owner within ten days of occurrence leading to such request or request will be denied and Contractor will not be entitled to additional compensation.
   2. Include statement outlining reasons for change and effect of change on Work.
      a. Provide complete description of proposed change.
b. Indicate effect of the proposed change on Contract Sum and Contract Time.
3. Include list of quantities of products to be purchased and unit costs along with total amount of purchases to be made.
   a. Provide breakdown of labor cost involved with proposed change.
   b. Where requested, furnish survey data to substantiate quantities.
4. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
5. Comply with requirements in Section 01 6000, when proposed change in Work requires substitution of one product or system for product or system specified.

D. Construction Change Document: DSA Form 140 – Application for Approval of Construction Change Document – CCD Category A.
   1. Form will be prepared by Architect for approval by DSA.

1.04 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive:
   1. When Owner and Contractor are not in total agreement on terms of Change Order Proposal Request, Architect may issue Construction Change Directive on AIA Form G714, instructing Contractor to proceed with change in Work, for subsequent inclusion in Contract.
   2. Construction Change Directive will contain complete Construction Change Document and designate method to be followed to determine change in Contract Sum or Contract Time.

B. Documentation: Maintain detailed records on time and material basis of work required by Construction Change Directive.
   1. After completion of change, submit itemized account and supporting data necessary to substantiate cost and time adjustments to Contract.

1.05 CONTRACT CHANGE ORDER PROCEDURES

A. Upon DSA approval of Construction Change Document DSA Form 140, Architect will issue Construction Change Documents for signatures of Owner and Contractor on proper approved form, as provided in General Conditions of the Contract.

PART 2 – PRODUCTS  (Not Applicable)
PART 3 – EXECUTION  (Not Applicable)

END OF SECTION 01 2610
SECTION 01 2976

PROGRESS PAYMENT PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Administrative and procedural requirements governing Contractor's applications for payment.

B. Related Sections:
   1. Section 01 2610: Construction Document Modification Procedures
   2. Section 01 7700: Closeout Procedures
   3. Section 01 7839: Project Record Documents

C. Related Requirements:
   1. Refer to District’s Division 00 Documents, including General Conditions, for requirements related to Contractor's Construction Schedule, Submittal Schedule, and Progress Payments Procedures.

1.02 SCHEDULE OF VALUES

A. Coordinate preparation of Schedule of Values with preparation of Contractor's construction schedule.
   1. Correlate line items in Schedule of Values with other required administrative schedules and forms, including:
      a. Contractor's Construction Schedule.
      b. Application for Payment form.
      c. List of Subcontractors.
      d. List of products.
      e. List of principal suppliers and fabricators.
      f. Schedule of Submittals.
   2. Submit Schedule of Values to Architect at earliest feasible date, but in no case later than fourteen days before date scheduled for submittal of initial application for payment.
   3. Sub-Schedules: Where Work is separated into phases that require separately phased payments, provide sub-schedules showing values correlated with each phase of payment.

B. Format and Content:
   1. Include following project identification on Schedule of Values:
      a. Project name and location.
      b. Name of Architect.
      c. Project number.
      d. Contractor's name and address.
      e. Date of submittal.
   2. Arrange Schedule of Values in tabular form with separate columns to indicate following for each item listed:
      a. Generic name.
      b. Related specification section.
      c. Name of subcontractor.
      d. Name of manufacturer or fabricator.
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RIO HONDO COMMUNITY COLLEGE DISTRICT

PROGRESS PAYMENT PROCEDURES

1. Provide breakdown of Contract Sum in sufficient detail to facilitate continued evaluation of applications for payment and progress reports.
   a. Break principal subcontract amounts down into several line items.

2. Round amounts off to nearest whole dollar; total shall equal Contract Sum.

3. For each part of Work where application for payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of Work.

4. Margins of Cost: Show line items for indirect costs, and margins on actual costs, only to extent that such items will be listed individually in applications for payment.
   a. Each item in Schedule of Values and applications for payment shall be complete including its total cost and proportionate share of general overhead and profit margin.
   b. At Contractor's option, temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown as separate line items in Schedule of Values or distributed as general overhead expense.

5. Schedule Updating: Update and resubmit Schedule of Values when Change Orders or Construction Change Directives result in change in Contract Sum.
   a. Submit along with updated construction schedule prior to monthly progress payment submittal

1.03 APPLICATIONS FOR PAYMENT

A. Each application for payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
   1. Initial application for payment, application for payment at time of Substantial Completion, and final application for payment involve additional requirements.

B. Payment Application Times: Date for each progress payment is 5th day of each month.
   1. Period of construction Work covered by each application for payment is period ending fifteen days prior to date for each progress payment and starting day following end of preceding period.

C. Payment Application Forms: Use AIA Document G702 –Application and Certification For Payment as form for application for payment or approved equal.

D. Application Preparation: Complete every entry on form, including notarization and execution by person authorized to sign legal documents on behalf of Owner.
   1. Incomplete applications will be returned without action.
   2. Entries shall match data on Schedule of Values and Contractor's construction schedule.
      a. Use updated schedules if revisions have been made.
   3. Include amounts of approved Change Orders issued prior to last day of construction period covered by application.

E. Transmittal: Submit five executed copies of each application for payment to Architect by means ensuring receipt within twenty-four hours.
1. One copy shall be complete, including waivers of lien and similar attachments, when required.
2. Transmit each copy with transmittal form listing attachments, and recording appropriate information related to application in manner acceptable to Architect.

F. Waivers of Mechanics Lien: When requested by Architect or Owner, with each application for payment, submit waivers of mechanics lien from every entity who may lawfully be entitled to file mechanics lien arising out of the Contract, and related to Work covered by payment.

G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first application for payment include following:
   1. List of subcontractors.
   2. List of principal suppliers and fabricators.
   3. Schedule of Values.
   4. Contractor's Construction Schedule (preliminary if not final).
   5. Submittal Schedule (preliminary if not final).
   6. Certificates of insurance and insurance policies.
   7. Performance and Payment Bonds

H. Application for Payment at Substantial Completion: Following issuance of Certificate of Substantial Completion, submit application for payment.
   1. Application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of Work.

I. Administrative actions and submittals that shall proceed or coincide with application include:
   1. Occupancy permits and similar approvals.
   2. Warranties/guarantees and maintenance agreements.
   3. Test/adjust/balance records.
   5. Meter readings.
   7. Changeover information related to Owner's occupancy, use, operation and maintenance.
   8. Final cleaning.
   10. Advice on shifting insurance coverage.
   11. Record Drawings and Specifications.
   12. Final progress photographs.
   13. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.

J. Final Payment Application: Administrative actions and submittals that must precede or coincide with submittal of final payment application for payment include following:
   1. Completion of project closeout requirements.
   2. Completion of items specified for completion after Substantial Completion.
   3. Assurance that unsettled claims will be settled.
   4. Assurance that Work not complete and accepted will be completed without undue delay.
   5. Transmittal of required project construction records to Owner.
   6. Proof that taxes, fees and similar obligations have been paid.
   7. Removal of temporary facilities, controls, and services.
8. Removal of surplus materials, rubbish and similar elements.
9. Change of door locks to Owner’s access.

PART 2 – PRODUCTS  (Not Applicable)

PART 3 – EXECUTION  (Not Applicable)

END OF SECTION 01 2976
SECTION 01 3113

PROJECT COORDINATION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:
      a. Coordination.
      b. Administrative and supervisory personnel.
      c. General installation provisions.
      d. Cleaning and protection.

B. Related Sections:
   1. Section 01 3300: Submittal Procedures; product and material submittals.
   2. Section 01 7423: Cleaning; general project cleaning

C. Related Requirements:
   1. Refer to District’s Division 00 Documents, including General Conditions, for requirements related to Contractor's Construction Schedule and Submittal Schedule.

1.02 COORDINATION

A. Coordination: Coordinate construction activities included under various Sections of these Specifications to assure efficient and orderly installation of each part of Work.

B. Coordinate construction operations included under different Sections of Specifications that are dependent upon each other for proper installation, connection, and operation.
   1. Where installation of one part of Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in sequence required to obtain best results.
   2. Where availability of space is limited, coordinate installation of different components to assure maximum accessibility for required maintenance, service and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.

C. Where necessary, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.
   1. Prepare similar memoranda for Owner and separate Contractors where coordination of their Work is required.

D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly progress of Work.
   1. Such administrative activities include, but are not limited to, following:
      a. Preparation of schedules.
      b. Installation and removal of temporary facilities.
      c. Delivery and processing of submittals.
d. Progress meetings.
e. Project Close-out activities.

E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water and materials.
1. Salvage materials and equipment involved in performance of, but not actually incorporated in, Work.
2. Refer to other sections for disposition of salvaged materials that are designated as Owner’s property.

1.03 SUBMITTALS

A. Staff Names: Within fifteen days of Notice to Proceed, submit list of Contractor's principal staff assignments, including Superintendent and other personnel in attendance at Project Site
1. Identify individuals, their duties and responsibilities
   a. List their addresses and telephone numbers.
2. Post copies of list in Project meeting room, temporary field office and each temporary telephone.

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.01 GENERAL INSTALLATION PROVISIONS

A. Inspection of Conditions: Require installer of each major component to inspect both substrate and conditions under which Work is to be performed.
1. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Manufacturer’s Instructions: Comply with manufacturer’s installation instructions and recommendations, to extent that those instructions and recommendations are more explicit or stringent than requirements contained in Contract Documents.

C. Inspect materials or equipment immediately upon delivery and again prior to installation.
1. Reject damaged and defective items.

D. Provide attachment and connection devices and methods necessary for securing Work.
1. Secure Work true to line and level.
2. Allow for expansion and building movement.

1. Arrange joints in exposed Work to obtain best visual effect.
2. Refer questionable choices to Architect for final decision.

F. Recheck measurements and dimensions before starting each installation.

G. Install each component during weather conditions and Project status that will ensure best possible results.
1. Isolate each part of completed construction from incompatible material as necessary to prevent deterioration.
H. Coordinate temporary enclosures with required inspections and tests, to minimize necessity of uncovering completed construction for that purpose.

I. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within industry for particular application indicated.
   1. Comply with requirements of Chapter 11B of CBC for accessible mounting heights of toilet accessories and like items.
   2. Refer questionable mounting height decisions to Architect for final decision.

3.02 CLEANING AND PROTECTION

A. Comply with requirements of Section 01 7423.

B. During handling and installation, clean and protect construction in progress and adjoining materials in place.
   1. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

C. Clean and maintain completed construction as frequently as necessary through remainder of construction period.
   2. Adjust and lubricate operable components to ensure operability without damaging effects.

D. Limiting Exposures: Supervise construction activities to ensure that no part of construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during construction period.

END OF SECTION 01 3113
SECTION 01 3119

PROJECT MEETINGS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Administrative and procedural requirements for project meetings including but not limited to:
      a. Pre-Construction Conference
      b. Progress Meetings
      c. Scheduling Conference

B. Related Sections:
   1. Section 01 3113: Project Coordination

C. Related Requirements:
   1. Refer to various Sections for pre-construction and pre-installation meeting requirements
   2. Refer to District's Division 00 Documents, including General Conditions, for requirements related to Contractor's Construction Schedule.

1.02 PRE-CONSTRUCTION CONFERENCE

A. Schedule pre-construction conference and organizational meeting at Project Site or other convenient location no later than 15 days after execution of Agreement and prior to commencement of construction activities.
   1. Conduct meeting to review responsibilities and personnel assignments.

B. Attendees: Owner, Architect and their consultants, Contractor and his superintendent, major subcontractors, manufacturers, suppliers and other concerned parties shall each be represented at conference by persons familiar with and authorized to conclude matters relating to Work.

C. Agenda: Discuss items of significance that could affect progress including such topics as:
   1. Tentative construction schedule.
   2. Critical Work sequencing.
   3. Designation of responsible personnel.
   4. Procedures for processing field decisions and Change Orders.
   5. Procedures for processing Applications for Payment.
   7. Submittal of Shop Drawings, Product Data and Samples.
   8. Preparation of Record Documents.
   10. Office, Work and storage areas.
   11. Equipment deliveries and priorities.
   12. Safety procedures.
   13. First aid.
   15. Working hours.
1.03 PROGRESS MEETINGS

A. Conduct weekly progress meetings at Project Site.
   1. Coordinate dates of meetings with preparation of payment request.

B. Attendees: In addition to representatives of Owner and Architect, each subcontractor, supplier or other entity concerned with current progress or involved in planning, coordination or performance of future activities shall be represented at these meetings by persons familiar with Project and authorized to conclude matters relating to progress.

C. Agenda: Review and correct or approve minutes of previous progress meeting.
   1. Review other items of significance that could affect progress.
   2. Include topics for discussion as appropriate to current status of Project.
   3. Contractor's Construction Schedule: Review progress since last meeting.
      a. Determine where each activity is in relation to Contractor's Construction Schedule, whether on time or ahead or behind schedule.
      b. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so.
      c. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within Contract Time.
   4. Review present and future needs of each entity present, including such items as:
      a. Interface requirements.
      b. Time.
      c. Sequences
      d. Coordination of Work.
      e. Deliveries.
      f. Off-site fabrication problems.
      g. Access.
      h. Site utilization.
      i. Temporary facilities and services.
      j. Hours of Work.
      k. Hazards and risks.
      l. Housekeeping.
      m. Quality and Work standards.
      n. Construction progress
      o. Progress Schedule and Submittals.
      p. Change Orders.
      q. Documentation of information for payment requests.

D. Meeting Records: Owner or Architect shall record minutes of each meeting and furnish copies within reasonable time to Owner, Contractor, and other attendees.
   1. Unless written objections to contents of meeting minutes is received by Architect within five days of distribution of meeting minutes, it shall be understood and agreed that minutes are true and complete record of meeting.
   2. Schedule Updating: Revise construction schedule after each progress meeting where revisions to schedule have been made or recognized.
      a. Issue revised schedule within seven calendar days of meeting.
PART 2 – PRODUCTS  (Not Applicable)
PART 3 – EXECUTION  (Not Applicable)

END OF SECTION 01 3119
SECTION 01 3300

SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Administrative and procedural requirements for submittals required for performance of Work, including:
      a. Submittal schedule.
      b. Product data.
      c. Shop drawings.
      d. Samples
      e. Verified reports

B. Related Sections:
   1. Section 01 3113: Project Coordination
   2. Section 01 4100: Regulatory Requirements; submittals to regulatory agencies.
   3. Section 01 4200: References; submittals to regulatory agencies.
   4. Section 01 4500: Quality Control: inspection and testing submittals
   5. Section 01 6000: Products Requirements; request for substitution submittals.

C. Related Requirements:
   1. Refer to Division 02 through 33 Sections where more specific submittal Requirements are indicated
   2. Refer to District’s Division 00 Documents, including General Conditions, and other Division 01 Sections, for additional requirements.

D. Administrative Submittals:
   1. Include, but are not limited to:
      a. Permits.
      b. Applications for Payment.
      c. Performance and Payment Bonds.
      d. Insurance Certificates.
      e. Inspection and Test Reports.
      f. Schedule of Values.
      g. Progress Schedule.
      h. Listing or designation of subcontractors.
      i. Record Drawings.

E. Contractor's submittal and Architect's acceptance of Product Data, Shop Drawings, or Samples that relate to construction activities not complying with Contract Documents does not constitute acceptable or valid request for substitution, nor does it constitute approval.

F. Product Data, Shop Drawing and Sample Submittals containing substitutions for specified items will be rejected and returned as not in compliance with Contract Documents.
1.02 SUBMITTAL PROCEDURES AND REQUIREMENTS

A. Coordination:
   1. Coordinate preparation and processing of submittals with performance of construction activities.
   2. Designate in Progress Schedule, or in separate coordinated schedule, dates for submission and dates reviewed shop drawings, product data and samples will be needed for each product.
      a. Identify items requiring long lead times.
      b. Submittals for long lead time items are to be submitted as soon as possible, but not later than fifteen days after Notice of Award of Contract.

B. Timing of Submittals:
   1. Make submittals promptly in accordance with approved schedule, sufficiently in advance of performance of related construction activities, and in such sequence as to not cause delay in Work or in Work of other contractors.
   2. Schedule submissions at least 21 working days before dates reviewed submittals will be needed.

C. Number of Submittals Required:
   1. Number stated in each specification section, or as follows:
      a. Product Data and Shop Drawings: One electronic copy as specified under “Electronic Submittals”.
      b. Samples: Number stated in each specification section or, if not stated, minimum of four.
      c. Warranties, Maintenance Agreements, Industry Standards, and Operation/Maintenance Manuals: Two copies.

D. Submittal Preparation:
   1. Place permanent label or title block on each submittal for identification.
   2. Indicate name of entity that prepared each submittal on label or title block.
   3. Include following information on label for processing and recording action taken:
      a. Project name.
      b. Date.
      c. Submittal reference number assigned by Contractor; this number should not be specification section number.
      d. Specification section number to which submittal applies.
         1) Do not reference drawing/detail numbers unless accompanied by specification section number.
   4. Accompany submittals with transmittal form containing:
      a. Date.
      b. Project title and number.
      c. Name and address of:
         1) Architect.
         2) Contractor.
         3) Subcontractor.
         4) Supplier
         5) Manufacturer.
         6) Separate detailer, when pertinent.
      d. Number of each shop drawing, product data and sample submitted.
      e. Notification of deviations from Contract Documents.
      f. Other pertinent data.
E. Submittals shall include:
   1. Data and revision dates:
   2. Project title and number.
   4. Identification of product or material.
   5. Relation to adjacent structure or materials.
   6. Field dimensions, clearly identified as such.
   7. Specification section number.
   8. Applicable standards, such as ASTM number or Federal Specification.
   9. Blank space, 8 inches x 3 inches, for Contractor and Architect stamps.
11. Contractor’s stamp, initialed or signed, certifying review of submittal, verification of field measurements, and compliance with Contract Documents.
   a. Submittals without Contractor’s stamp and signature will be returned by Architect without review.

F. Processing:
   1. Allow sufficient review time so that installation will not be delayed as result of time required to process submittals, including time for resubmittals.
   2. Allow minimum of 21 days from date of receipt of complete submittal for Architect’s initial review and return of submittals.
   3. Allow additional time if processing must be delayed to permit coordination with subsequent submittals.
   4. Architect reserves right to withhold action on submittal requiring coordination with other submittals until related submittals are received.
   5. Architect will promptly advise Contractor when submittal being processed must be delayed for coordination.
   6. No extension of Contract Time will be authorized because of failure to transmit submittals to Architect sufficiently in advance of Work to permit processing.

G. Electronic Submittals: Make electronic submittals consisting of one color PDF of each document, Product Data Sheet, or Shop Drawing.
   1. Should full size hard copies of Submittals be required by District, Contractor, or Consultant, Architect will provide one marked-up color copy of PDF to Owner, Contractor, or Consultant for their use in printing additional copies.
   2. Architect will review and return marked-up PDFs to Contractor.
   3. One copy of each PDF shall be marked-up and maintained as “Record Document”.

1.03 PRODUCT DATA

A. Collect Product Data into single submittal for each element of construction or system.
   1. Do not include Material Safety Data Sheets/Safety Data Sheets (MSDS/SDS) in submittals to Architect.
      a. MSDS/SDS sheets will not be reviewed by Architect and will not be returned.

B. Product Data includes standard printed information on manufactured products that has not been specially prepared for this Project, including, but not limited to following items:
   1. Manufacturer’s product specifications and installation instructions.
   2. Catalog cuts.
   4. Roughing-in diagrams and templates.
5. Standard wiring diagrams.
7. Standard product operating and maintenance manuals.

C. Modify standard data sheets to delete information which is not applicable to Project.
   1. Where Product Data must be specially prepared because standard printed data
      is not suitable for use, submit as shop drawings.
      a. Mark each copy to show applicable choices and options.
      b. Where printed Product Data includes information on several products,
         some of which are not required, mark copies to indicate applicable
         information.
      c. Include following information:
         1) Manufacturer’s 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 and clearances required and as verified by
            Field measurement.
         6) Notation of coordination requirements.

D. Supplement standard information to provide additional information specifically
   applicable to Project:
   1. Clearly mark each copy to show applicable choices and options and identify
      pertinent materials, products, or models.
   2. Show dimensions and clearances required.
   3. Show performance characteristics and capacities.
   4. Show wiring or piping diagrams and controls.

E. Do not submit Product Data until compliance with requirements of Contract
   Documents has been confirmed.
   1. Unless noncompliance with Contract Document provisions is observed,
      submittal may serve as the final submittal.

F. Submittals: Make electronic submittals as specified in “General Submittal
   Procedures and Requirements” Article.

G. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers,
   manufacturers, fabricators, and others required for performance of construction
   activities.
   1. Show distribution on transmittal forms.
   2. Do not proceed with installation until applicable copy of Product Data is in
      installer’s possession.

H. Do not permit use of unmarked copies of Product Data in connection with
   construction.

1.04 SHOP DRAWINGS

A. Shop drawings are technical drawings and data that have been specially prepared
   for Project, including but not limited to following items:
   1. Prepared information, drawn to accurate scale.
   2. Fabrication and installation drawings.
5. Templates.
6. Patterns.
7. Coordination drawings (for use on Project Site).
8. Schedules.
9. Design mix formulas.
10. Contractor's engineering calculations.

B. Include following information:
1. Dimensions.
2. Identification of products and materials included.
3. Compliance with specified standards.
4. Notation of coordination requirements.
5. Notation of dimensions established by field measurement.
6. Sheet Size: Except for templates, patterns and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 inch by 11 inch but no larger than 30 inch by 42 inch.

C. Highlight, encircle, or otherwise indicate deviations from Contract Documents.

D. Do not reproduce Contract Documents or copy standard information as basis of Shop Drawings.

E. Standard information prepared without specific reference to Project is not considered Shop Drawings.

F. Submittals: Make electronic submittals as specified in “General Submittal Procedures” Article.

G. Do not use Shop Drawings without appropriate final stamp indicating action taken in connection with construction.

H. Contractor may request use of Architect’s computer-generated drawings in electronic format.
   1. Software for CAD formats requested by Contractor not currently available to Architect will be provided by Contractor at his own expense.
   2. Contractor must complete CAD Drawing Request Form (Attachment A) and submit it to Architect in timely manner.

1.05 SAMPLES

A. Samples are physical examples of Work, including, but not limited to, following items:
   1. Partial sections of manufactured or fabricated work
   2. Small cuts or containers of materials.
   3. Complete units of repetitively-used materials.
   4. Swatches showing color, texture and pattern.
   5. Color Range Sets:
   6. Units of Work to be used for independent inspection and testing.

B. Office Samples:
   1. Sufficient size and quantity to clearly illustrate:
      a. Functional characteristics of product or material, with integrally related parts and attachment devices.
      b. Full range of color, texture and pattern.
2. Where size and quantity are not specified, provide minimum of four samples, 12 inches by 12 inches, minimum size, where samples are required

C. Field Samples and Mock-Ups:
   1. Erect at Project Site in location acceptable to Architect.
   2. Construct each sample or mock-up complete, including Work of trades required in finished Work.
   3. Size of area as specified in respective specification section.
   4. Remove mock-ups at conclusion of Work or when acceptable to Architect.

1.06 VERIFIED REPORTS
   A. Submit Verified Reports to Division of State Architect (DSA). Comply with California Code of Regulations, Title 24, Part 1, Sections 4-336 and 4-343.

1.07 MISCELLANEOUS SUBMITTALS – WORK RELATED
   A. Including, but not limited to, following types of submittals:
      1. Specially prepared warranties/guarantees.
      2. Standard printed warranties.
      4. Printed industry standards.
      5. Collected and bound operating/maintenance manuals.
      7. Maintenance tools and spare parts.

1.08 CONTRACTOR RESPONSIBILITIES
   A. As defined in General Conditions of the Contract and following:
      1. Review shops drawings, product data and samples prior to submission to Architect.
      2. Determine and Verify:
         3. Field measurements.
         4. Field construction criteria.
         5. Catalog numbers and similar data.
      7. Coordinate each submittal with requirements of Work and of Contract documents.
      9. Do not begin fabrication of Work that requires submittals until return of submittals with Architect approval.

1.09 RESUBMITTAL REQUIREMENTS
   A. Shop Drawings:
      1. Revise initial drawings as required and resubmit as specified for initial submittal.
      2. Indicate on drawings changes that have been made other than those requested by Architect.

   B. Product Data and Samples: New data and samples, same as required for initial submittal.
1.10 DISTRIBUTION OF SUBMITTALS AFTER REVIEW

A. Distribute reproductions of Shop Drawings and copies of Product Data which carry Architect/Engineer stamp to:
   1. Project Site file.
   2. Record Documents file.
   3. Other affected contractors.
   4. Subcontractors.
   5. Supplier or Fabricator.
   6. Owner's Inspector.

B. Distribute samples that carry Architect's review stamps as directed by Architect.

1.11 ARCHITECT'S ACTION

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, Architect will review each submittal, mark to indicate action taken, and return promptly.
   1. Compliance with specified characteristics is Contractor's responsibility.

B. Action Stamp:
   1. Architect will stamp each submittal with uniform, self-explanatory action stamp.
   2. Stamp will be appropriately marked, as follows, to indicate action taken:
      a. Final Unrestricted Release: Where submittals are marked "No Exception Taken", that part of Work covered by submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.
      b. Final-But-Restricted Release: When submittals are marked "Make Correction Noted", that part of Work covered by submittal may proceed provided it complies with notations or corrections on submittal and requirements of Contract Documents.
         1) Final acceptance will depend on that compliance.
      c. Returned for Re-submittal: When submittal is marked "Revise and Resubmit", do not proceed with that part of Work covered by submittal, including purchasing, fabrication, delivery, or other activity.
         1) Revise or prepare new submittal in accordance with notations.
         2) Resubmit without delay.
         3) Repeat if necessary to obtain different action mark.
         4) Do not permit submittals marked "Rejected" or "Revise and Resubmit" to be used at Project Site, or elsewhere where Work is in progress.
      d. Other Action: Where submittal is primarily for information or record purposes, special processing or other activity, submittal will be returned, marked "Action Not Required".

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION (Not Applicable)

END OF SECTION 01 3300
ATTACHMENT A - CAD DRAWING REQUEST FORM

Date: _______________________________ Westberg + White Job No.______________

Project: _____________________________ Project Architect: ____________________

We (Contractor) ____________________________ request the following listed CAD file sheet numbers for use in the execution of our Work under the Contract Documents of the subject project and hereby assume all and sole responsibility of field verification and coordination with the Work of associated trades.

The attached computer-based information for the Project is provided to the Contractor (The User) as a courtesy for their sole convenience. The User recognizes that computer-based information is easily changeable, that changes are difficult to detect and that use or conversion of the information provided may introduce errors, inaccuracies or anomalies that Westberg + White, Inc., and their consultants can neither predict nor control. The delivery of this electronic data does not constitute the delivery of the professional work product of Westberg + White, Inc., and their consultants and Westberg + White, Inc., and their consultants shall not be responsible for any modifications made to the electronic files or any products derived from electronic files that are not prepared by Westberg + White, Inc., and their consultants.

By accepting and utilizing this electronic data in lieu of the corresponding drawings and specifications prepared by Westberg + White, Inc., and their consultants, the User agrees that such data is an instrument of service of Westberg + White, Inc., and their consultants, who shall be deemed to be the authors of the drawings and data and shall retain all common law, statutory law and other rights, including copyrights. The User, by accepting the electronic files, agrees to assume all risk and liabilities associated with the use of the information provided by Westberg + White, Inc., and their consultants and understands that Westberg + White, Inc., and their consultants make no claim or warranty as to the suitability or usefulness of the information for any purpose. The User also agrees, to the fullest extent permitted by law, to hold harmless and indemnify Westberg + White, Inc., and their consultants from and against any and all claims, liabilities, losses, damages and cost, including but not limited to attorney’s fees, arising from or in connection with the use, misuse, modification, or misinterpretation of the electronic data provided by Westberg + White, Inc., and their consultants.

Use of the attached computer-based information indicates acceptance and constitutes agreement to abide by the terms and conditions of this agreement.

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Requested File Format: Requested File Deliverable:

☐ DXF       ☐ CD Rom
☐ DWG (Auto CAD Version 2004, unless requested otherwise)
☐ E-Mail (Zipped Files)
Contractor’s E-mail address_________________________________________________

Signed: ____________________________ Date:___________

Print Name: ____________________________ Title:___________

Company: ______________________________

Address: ______________________________

Phone:_____________________

Total payment enclosed herewith at the rate of $30.00 per sheet: $___________________

Make checks payable to Westberg + White, Inc.
SECTION 01 4100

REGULATORY REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. General regulatory requirements pertaining to Work supplementary to other
      regulatory requirements mentioned or referenced elsewhere in Contract
      Documents.

1.02 REQUIREMENTS OF REGULATORY AGENCIES

A. Pertaining statutes, ordinances, laws, rules, codes, regulations, standards, and lawful
   orders of public authorities having jurisdiction of Work are incorporated into these
   Contract Documents same as if repeated in full, and as such are intended where
   reference is made in either singular or plural to Code or Building Code unless
   otherwise specified including, without limitation, those in list below.
   1. Contractor shall make available at Project Site such copies of listed documents
      applicable to Work as Architect or Owner may request including mentioned
      portions of California Code of Regulations (CCR).

B. Project shall be fully governed under State of California's Codes Section Group 1,
   Chapter 4, Part 1, CCR, Title 24, as it pertains to school construction:
   1. Inspector and continuous inspections of Work shall be per Sections 4-333(b) and
      4-342.
   2. Tests and testing laboratory per Section 4-335. (Owner shall pay for testing
      laboratory.)
   3. Special inspection per Section 4-333(c).
   4. Contractor shall submit verified reports per Sections 4-336 and 4-343(c).
   5. Administration:
      a. Duties of Architect and Engineers shall be per Sections 4-333(a) and 4-341.
      b. Duties of Contractor shall be per Section 4-343.
      c. Verified Reports per Section 4-336.
   6. Copies of CCR, Title 24, Part 1, Part 2 Volumes 1 and 2, Part 3, and Part 9, shall
      be made available during construction.

C. Public regulatory requirements: Statutes, ordinances, laws, rules, codes, regulations,
   and standards shall include, but not be limited to, following:
   1. California Code of Regulations (CCR):
      a. Title 19 - Public Safety.
      b. Title 24, Part 1 – 2013 California Administrative Code
      e. Title 24, Part 5 – 2013 California Plumbing Code (CPC).
      f. Title 24, Part 6 – 2013 California Energy Code
      g. Title 24, Part 9 – 2013 California Fire Code (CFC).
      h. Title 24, Part 12 – 2013 California Reference Standards Code
   2. Other statutes, ordinances, laws, regulations, rules, orders, and codes specified in
      other Sections of Specifications or bearing on Work.
1.03 GOVERNING REGULATIONS/AUTHORITIES

A. Architect has contacted authorities having jurisdiction where necessary to obtain information necessary for preparation of Contract Documents
   1. Information may or may not be of significance to Contractor.
   2. Owner and Architect, at request of Contractor, are to contact authorities having jurisdiction directly for information and decisions having bearing on Work.

1.04 SUBMITTALS

A. Permits, Licenses, and Certificates:
   1. Submit for Owner’s records, copies of following, including but not limited to:
   2. Permits
   3. Licenses
   4. Certifications
   5. Inspection reports
   6. Releases
   7. Jurisdictional settlements
   8. Notices
   9. Receipts for fee payments
   10. Judgments, and similar documents
   11. Correspondence, and records established in conjunction with compliance with standards and regulations bearing upon performance of Work.

PART 2 – PRODUCTS  (Not Applicable)

PART 3 – EXECUTION  (Not Applicable)

END OF SECTION 01 4100
SECTION 01 4200

REFERENCES

PART 1 - GENERAL

1.01 DEFINITIONS

A. Basic contract definitions are included in General Conditions of the Contract.

B. Indicated: Term "Indicated" refers to graphic representations, notes or schedules on Drawings, or other paragraphs or schedules in Specifications, and similar requirements in contract documents.
   1. Where terms such as "shown", "noted", "scheduled", and "specified" are used, it is to help locate the reference; no limitation of location is intended except as specifically noted.

C. Directed: Terms such as "directed", "requested", "authorized," "selected", "approved", "required", and "permitted" mean "directed by Architect", "requested by Architect", and similar phrases.
   1. No implied meaning shall be interpreted to extend Architect's responsibility into Contractor's area of construction supervision.

D. Approved: Term "approved," where used in conjunction with Architect's action on Contractor's submittals, applications, and requests, is limited to Architect's duties and responsibilities as stated in General Conditions of the Contract.

E. Regulations: Term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within construction industry that control performance of Work.

F. Furnish: Term "furnish" is used to mean "supply and deliver to Project Site, ready for unloading, unpacking, assembly, installation, and similar operations."

G. Install: term "install" is used to describe operations at Project Site including actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimensions, finishing, curing, protecting, cleaning, and similar operations."

H. Provide: Term "provide" means "furnish and install, complete and ready for intended use."

I. Installer: "Installer" is Contractor or entity engaged by Contractor, either as employee, subcontractor, or sub-subcontractor, for performance of particular construction activity, including installation, erection, application, and similar operations.
   1. Installers are required to be experienced in operations they are engaged to perform.

J. Project Site: Project Site is space available to Contractor for performance of construction activities, either exclusively or in conjunction with others performing other construction activities as part of Project.
   1. Extent of Project Site is shown on drawings and may or may not be identical with description of land upon which Project is to be built.
K. Testing Laboratories: “Testing Laboratory” is an independent entity engaged to perform specific inspections or tests, either at Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

### 1.02 INDUSTRY STANDARDS

A. Applicability of Standards: Except where Contract Documents include more stringent requirements, applicable construction industry standards have same force and effect as if bound or copied directly into Contract Documents.
   1. Such standards are made part of Contract Documents by reference.
   2. Individual Sections indicate which codes and standards Contractor must make available at Project Site for reference.

B. Publication Dates: Comply with standard in effect as of date of Contract Documents.

C. Copies of Standards: Each entity engaged in construction on Project is required to be familiar with industry standards.
   1. Applicable standards are not bound with Contract Documents.
   2. Where copies of standards are required by individual specification sections or are needed for performance of required construction activity, Contractor shall obtain copies directly from the publication source.

D. Conflicting Requirements: Where compliance with two or more standards is specified, and standards establish different or conflicting requirements for minimum quantities or quality levels, refer requirements that are different, but apparently equal, and uncertainties to Architect for decision before proceeding.

### 1.03 GOVERNING REGULATIONS/AUTHORITIES

A. Architect has contacted authorities having jurisdiction where necessary to obtain information necessary for preparation of Contract Documents
   1. That information may or may not be of significance to Contractor.
   2. Owner and Architect, at request of Contractor, are to contact authorities having jurisdiction directly for information and decisions having bearing on Work.

### 1.04 SUBMITTALS

A. Provide copies of following for Owner's records:
   1. Permits
   2. Licenses
   3. Certifications
   4. Inspection reports
   5. Releases
   6. Jurisdictional settlements
   7. Notices
   8. Receipts for fee payments
   9. Judgments and similar documents
   10. Correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of Work.
PART 2 - PRODUCTS  (Not Applicable)

PART 3 - EXECUTION  (Not Applicable)

END OF SECTION 01 4200
SECTION 01 4500
QUALITY CONTROL

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Administrative and procedural requirements for quality control services.
   2. Quality control services include inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities.
      a. They do not include contract enforcement activities performed by Architect.
   3. Inspection and testing services are required to verify compliance with requirements specified or indicated.
      a. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.
   4. Requirements for Contractor to provide quality control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

B. Related Sections:
   1. Section 01 7329: Cutting and Patching; requirements for repair and restoration of construction disturbed by inspection and testing activities

C. Related Requirements Specified Elsewhere:
   1. Inspections and testing required by laws, ordinances, rules, regulations or orders of public authorities: General Conditions.
   2. Certification of Products: Respective specification sections.
   4. Tests and Standards: Each specification section listed.

1.02 SELECTION OF TESTING AGENCY

A. Owner will select and employ consultant, testing laboratory or inspection agency to perform specified services.

B. Employment of Testing Laboratory in no way relieves Contractor of his obligation to perform Work in accord with Contract.

1.03 PROJECT INSPECTOR

A. Owner will select and employ DSA approved Project Inspector

1.04 PAYMENT

A. Costs of quality control services will be initially paid for by Owner. following quality control services, chargeable to Contractor, will be reimbursed to Owner by deductive change order:
   1. Batch Plant Inspection.
2. Taking and testing cores from masonry and concrete.
3. Testing of reinforcing steel and structural steel test specimens.
4. Shop and field welding inspection of structural steel.
5. Shop and field fabrication inspection of structural steel.
6. Roofing inspection and testing.

1.05 DEFICIENCIES

A. Cost of tests or inspections due to following will be reimbursed to Owner by deductive change order.
   1. Retesting because of failure of initial samples.
   2. Additional costs due to overtime work or extra shifts work because of improper scheduling of Work or of delivery of materials by Contractor.
   3. Failure to properly notify laboratory.
   4. Changes in sources, lots or suppliers of materials after original tests.
   5. Changes in methods or materials of construction requested by Contractor that require testing, inspection, or other related services in excess of that required by original design.
   6. Concrete mix designs in excess of first successful design for each concrete type.
   7. Overtime or extra shift work requiring overtime work by Owner's Inspector.

1.06 TESTS AND INSPECTION

A. Testing laboratory or Owner's representative, and not Contractor, will make selection of material required to be tested.

B. Notify Owner's representative sufficient time in advance of manufacture of material to be supplied by him under Contract Documents, which must, by terms of Contract be tested, in order that Owner may arrange for testing of same at source of supply.

C. Material shipped by Contractor from source of supply prior to having satisfactorily passed such testing and inspection or prior to receipt of notice from said representative that such testing and inspection will not be required shall not be incorporated in job.

1.07 TESTING AGENCY SERVICES

A. Cooperate with Architect and Contractor
   1. Provide qualified personnel promptly on notice.

B. Perform specified inspections, sampling and testing of materials and methods of construction:
   1. Comply with specified standards; ASTM, other recognized authorities, and as specified.

C. Attend pre-construction conference and progress meetings when requested by Architect or Owner.

D. Perform additional services as required by Owner.
E. Submittals: Promptly submit copies of reports of inspections and tests, mill analysis, concrete mix designs and certifications per applicable sections of specification.
   1. Submit one copy of test reports to:
      a. Owner.
      b. Architect.
      c. Structural Engineer.
      d. Contractor.
      e. Project Inspector.
   2. Include tests made, regardless of whether such tests indicate that material is satisfactory or unsatisfactory.
   3. Report samples taken but not tested.
   4. Report records of special sampling operations as required.
   5. Show in report that material or materials were sampled and tested in accordance with requirements of Title 24 and with approved specifications.
   6. Show specified design strength in test reports.
      a. State definitely in test reports whether or not material or materials tested comply with requirements.

F. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, following:
   1. Date of issue.
   2. Project title and number.
   3. Name, address, and telephone number of testing agency.
   4. Dates and locations of samples and tests or inspections.
   5. Names of individuals making inspection or test.
   8. Complete inspection or test data.
   9. Test results and interpretation of test results.
   10. Ambient conditions at time of sample taking and testing.
   11. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
   12. Name and signature of laboratory inspector.
   13. Recommendations on retesting.

G. Testing Agency is not authorized to:
   1. Release, revoke, alter, or enlarge requirements of Contract Documents or approve or accept portions of Work.
   2. Perform duties of Contractor.

1.08 INSPECTION BY OWNER

A. Provide full access to Owner and his representative for purpose of inspection of parts of Work and to shops wherein Work is in preparation
   1. Maintain proper facilities and provide safe access for such inspection.

B. Owner retains right to reject materials and workmanship which are defective, or to require their correction.
   1. Satisfactorily correct rejected workmanship and remove rejected materials from premises without charge to Owner.
   2. When Contractor does not correct such rejected work within reasonable time, fixed by written notice, Owner may correct same and charge expense to Contractor.
C. Should it be considered necessary or advisable by Owner at or before final acceptance of entire Work to make examination of Work already completed by removing or tearing out same, upon request, promptly furnish necessary facilities, labor, and materials.
1. When such Work is found to be defective due to fault of Contractor or his subcontractor, defray expenses of such examinations and of satisfactory reconstruction.
2. Should such Work be found to meet requirements of Contract, Contractor will be allowed additional cost of labor and material necessarily involved in examination and replacement.

1.09 WORK BY OWNER'S PROJECT INSPECTOR

A. Concrete slump tests.
B. Concrete cylinder samples.
C. Continuous inspection of masonry work.
D. Mortar and grout prism.

1.10 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested.
B. Provide to agency, selected preliminary representative samples of materials to be tested, in required quantities or assist agency in taking samples.
C. Furnish incidental labor and facilities:
   1. To provide access to Work.
   2. To obtain and handle samples at Site.
   3. To facilitate inspections and tests.
   4. For agency's exclusive use for storage and curing of test samples.
   5. To provide security and protection of samples and test equipment at Project Site.
D. Notify testing agency sufficiently in advance of operations to permit assignment of personnel and scheduling of tests.
E. Coordination: Coordinate sequence of activities to accommodate required services with minimum of delay.
   1. Coordinate activities to avoid necessity of removing and replacing construction to accommodate inspections and tests.
   2. Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

1.11 MISCELLANEOUS TESTS AND INSPECTIONS

A. Soil and Compaction Testing and Inspection: Performed by project geotechnical (soils) engineer employed and paid by Owner.
B. Special Tests: Special tests requested by Owner or Architect or DSA will be paid for by Owner, except that if such tests fail, deduct costs from Contract Price by Change Order.

PART 2 – PRODUCTS  (Not Applicable)

PART 3 – EXECUTION

3.01 REPAIR AND PROTECTION

A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes.
   1. Comply with requirements of Section 01 7329.

B. Protect construction exposed by or for quality control service activities, and protect repaired construction.

C. Repair and protection is Contractor's responsibility, regardless of assignment of responsibility for inspection, testing, or similar services.

3.02 SCHEDULE OF TESTS, INSPECTIONS, AND METHODS

   1. ACI – American Concrete Institute.

B. Excavations, Foundations and Retaining Walls (Chapter 18A):
   1. Site Grading: 1803A.3
   2. Compacted Fill Material: 1803A.5

C. Inspection (Chapter 17A):
   1. Site Soil and Backfill: 1704A.6

D. Concrete (Chapters 17A and 19A):
   1. Materials:
      a. Portland Cement Tests: 1705A.3.1, 1913A.1
      b. Concrete Aggregates: 1705A.3.1, 1903A.4
      c. Reinforcing Bars: 1705A.3.1 1913A.2
   2. Concrete Quality:
      a. Proportions of Concrete: ACI 318 – Section 5.2, 5.3, and 5.4
      b. Strength Tests of Concrete: 1905A.1.1, ACI 318 – Section 5.6
      c. Mixing: ACI 318
      d. Splitting Tensile Tests: 1905A.1.4, 1.5
      e. Placing Record: 1704A.4.7
   3. Concrete Inspection:
      a. Job Site: ACI 318 – Section 5.7
      b. Batch Plant and Material Tests: 1705A.3.2
      c. Waiver of Batch Plant and Material Tests: 1705A.3.3
      d. Reinforcing Bar Welding: 1903A.8, Table 1705A.2.1
      e. Post Installed Anchors: 1913A.7e, Pre-Placement Record: 1704A.4.6
E. Structural Steel (Chapters 17A and 22A):
   1. Materials:
      a. Structural Steel: 2205A.1
      b. Cold Formed Steel: 2210A.1
      c. Identification: 2203A.1
   2. Structural Steel Quality:
      a. Tests of Structural and Cold Formed Steel: 2211A.1.
      b. Tests of High Strength Bolts, Nuts, Washers: 2213A.1
   3. Inspection of Structural Steel:
      a. Shop Fabrication: 1704A.2.5, 1705A.2
      b. Welding: 1705A.2.2.1

END OF SECTION 01 4500
SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS

PART 1 – GENERAL

1.01 SUMMARY
A. Section Includes:
1. Temporary facilities required for this Work include, but are not necessarily limited to:
   a. Temporary utilities such as heat, water, electricity, and telephone.
   b. Field offices and sheds
   c. Sanitary facilities.
   d. Construction aids.
   e. Barriers.
   f. Temporary controls.
   g. Project identification and signs.
2. Equipment furnished by subcontractors shall comply with requirements of pertinent safety regulations.
   a. Ladders, planks, hoists, and similar items normally furnished by individual trades in execution of their own portions of Work are not part of this Section.

B. Related Sections:
1. Division 32 Sections for additional traffic control requirements.

C. Related Requirements:
1. Refer to District’s Division 00 Documents, including General Conditions, and other Division 01 Sections, for additional requirements.
2. Permanent installation and hook-up of various utility lines are described in other pertinent sections.

1.02 PROJECT CONDITIONS
A. Use means necessary to maintain temporary facilities in proper and safe condition throughout progress of Work.

PART 2 – PRODUCTS

2.01 UTILITIES
A. Water:
1. Provide necessary temporary water lines and water supply and upon completion of Work, remove such temporary facility.
2. Provide and pay for water needed for construction.

B. Electricity:
1. Provide necessary temporary wiring and upon completion of Work, remove such temporary facility.
2. Provide area distribution boxes so located that individual trades may furnish and use 100 foot maximum length extension cords to obtain adequate power and artificial lighting at points where needed for work, inspection, and safety.
3. Provide and pay for electricity needed for construction.
C. Heating: Provide and maintain heat necessary for proper conduct of operations needed in Work.

D. Telephone:
   1. Make necessary arrangements and pay costs for installation and operation of telephone service to Contractor’s office on Project Site and Owner’s inspector’s office on Project Site.
   2. Install telephone on separate line for each temporary office.
      a. Where office has more than one occupant, provide telephone for each additional occupant.
   3. Coin operated telephones are not acceptable.

2.02 FIELD OFFICES AND SHEDS

A. Contractor’s Facilities:
   1. Provide field office building and sheds adequate in size and accommodation for Contractor’s offices, supply, and storage.

B. Provide and maintain on premises, where directed, watertight storage sheds for materials which might be damaged by weather, including storage facilities for concrete test samples or other material samples required for Work.

2.03 SANITARY FACILITIES

A. Sanitary facilities include temporary toilets, wash facilities, and drinking water fixtures.
   1. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
   2. Install where facilities will best serve Project’s needs.
   3. Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility.
   4. Provide covered waste containers for used material.

B. Temporary Toilet Units: Provide self-contained, single-occupant toilet units of chemical, aerated recirculation, or combustion type.
   1. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
   2. Provide separate facilities for male and female personnel.

C. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for healthy and sanitary condition.
   1. Dispose of drainage properly.
   2. Supply cleaning compounds appropriate for each condition.
   3. Provide safety showers, eyewash fountains, and similar facilities for convenience, safety, and sanitation of personnel.

D. Drinking-Water Facilities: Provide containerized, tap-dispenser, bottled water drinking water units, including paper supply.
2.04 CONSTRUCTION AIDS

A. Provide construction aids and equipment required by personnel and to facilitate execution of Work
1. Scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, hoists, cranes, chutes and other such facilities and equipment.

B. Provide necessary facilities and means of access to structure so that Building Inspectors, Special Inspectors, Architect and Structural Engineer may inspect structure or portions of structure as necessary.
1. Means of access includes, but is not limited to, ladders, scaffolds,

2.05 BARRIERS

A. Temporary Fencing: Provide temporary fence around entire construction area as required for safety and protection.
1. Construction: Provide chain link fencing not less than six feet in height, complete with metal or wood posts and required bracing, and with suitably locked truck and pedestrian gates as required.
2. Provide opaque, fabric or plastic windscreen material, full height and run of fencing, including gates.

B. Tree and Plant Protection: Preserve and protect existing trees and plants at Project Site that are designated to remain, and those adjacent to Project Site.
1. Provide temporary barriers around each, or around each group of trees or plants.

2.06 TEMPORARY CONTROLS

A. Contractor shall be responsible for specific safety requirements by governmental authorities, including requirements of latest Occupational Safety and Health Act (OSHA) and Cal/OSHA.

B. Provide and maintain methods, equipment, and temporary construction, as necessary to provide controls over environmental conditions at construction site and related areas under Contractor’s control.
1. Remove physical evidence of temporary facilities at completion of Work.
2. Comply with requirements of authorities having jurisdiction.

C. Dust Control: Provide positive methods and apply dust control materials to minimize raising dust from construction operations, and provide positive means to prevent airborne dust from dispersing into atmosphere.

D. Water Control: Provide methods to control surface water to prevent damage to Project, Site, or adjoining properties.
1. Control fill, grading and ditching to direct surface drainage away from excavations, pits, tunnels and other construction areas and to direct drainage to proper runoff.
2. Provide, operate and maintain hydraulic equipment of adequate capacity to control surface water.
3. Dispose of drainage water in manner to prevent flooding, erosion, or other damage to Project Site or to adjoining areas.

E. Debris Control: Maintain areas under Contractor’s control free of extraneous debris.
1. Prevent accumulation of debris at construction site, storage and parking areas, or along access roads.
2. Provide containers for deposit of debris as specified in Section 01 7419.

F. Pollution Control:
   1. Provide methods, means and facilities required to prevent contamination of soil, water and atmosphere by discharge of noxious substances from construction operations.
   2. Provide equipment and personnel to perform emergency measures required to contain spillage, and to remove contaminated soils and liquids.
   3. Take special measures to prevent harmful substances from entering public waters.
      a. Prevent disposal of wastes, effluents, chemicals, and other such substances in sanitary or storm sewers.

G. Temporary Fire Protection: Install and maintain temporary fire protection facilities of types needed to protect against reasonably predictable and controllable fire losses.
   2. Prohibit smoking in construction areas.
   3. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
   4. Develop and supervise overall fire prevention and protection program for personnel at Project Site.
      a. Review needs with local fire department and establish procedures to be followed.
      b. Instruct personnel in methods and procedures.
      c. Post warnings and information.

2.07 PROJECT IDENTIFICATION AND TEMPORARY SIGNS

A. Prepare project identification and other signs of size indicated.
   1. Install signs where indicated to inform public and persons seeking entrance to Project.
   2. Support on posts or framing of preservative treated wood or steel.
   3. Do not permit installation of unauthorized signs.

B. Project Identification Sign: Provide one painted sign, of not less than 32 sq. ft. area, with painted graphic content to include:
   1. Title of Project.
   2. Name of Owner.
   3. Names and Titles of:
      a. Architect.
      b. Professional Consultants.
   4. Prime Contractor.
   5. Graphic Design, Style of Lettering, and colors: As designated by Architect.
   6. Erect on Site at lighted location of high public visibility, adjacent to main entrance to Project Site, as approved by Architect.

C. Provide temporary on-site informational signs.
   1. As required by codes, laws and regulatory agencies
   2. To identify key elements of the construction facilities.
   3. To direct traffic.
2.08 OWNERSHIP OF TEMPORARY FACILITIES AND CONTROLS

A. Items provided by Contractor under this Section remain property of Contractor
   1. Remove such items from job site immediately upon completion of Work.

PART 3 – EXECUTION

3.01 MAINTENANCE AND REMOVAL

A. Maintain temporary facilities as long as needed for safe and proper completion of Work.

B. Remove such temporary facilities as rapidly as progress of Work will permit, or as directed by Architect.

END OF SECTION 01 5000
SECTION 01 5713

TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Prevention of erosion due to construction activities.
B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.
C. Restoration of areas eroded due to insufficient preventive measures.
D. Performance bond.
E. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

1.02 RELATED SECTIONS

A. Section 31 1000: Site Clearing; Limits on clearing; disposition of vegetative clearing debris.
B. Section 31 2316: Excavation; temporary and permanent grade changes for erosion control.

1.03 REFERENCE STANDARDS

B. EPA (NPDES) - National Pollutant Discharge Elimination System (NPDES), Construction General Permit; current edition.

1.04 PERFORMANCE REQUIREMENTS

A. Comply with all requirements of U.S. Environmental Protection Agency for erosion and sedimentation control, as specified for the National Pollutant Discharge Elimination System (NPDES), Phases I and II, under requirements for the 2003 Construction General Permit (CGP).
B. Comply with all requirements of The California State Construction General Permit Order 2009-0009-DWQ for erosion and sedimentation control, even though this project is not required by law to comply.
D. Develop and follow an Erosion and Sedimentation Prevention Plan and submit periodic inspection reports.
E. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.

F. Provide to Owner a Performance Bond covering erosion and sedimentation preventive measures only, in an amount equal to 100 percent of the cost of erosion and sedimentation control work.

G. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

H. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
   1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
   2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 25 years.

I. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
   1. Control movement of sediment and soil from temporary stockpiles of soil.
   2. Prevent development of ruts due to equipment and vehicular traffic.
   3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

J. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
   1. Prevent windblown soil from leaving the project site.
   2. Prevent tracking of mud onto public roads outside site.
   3. Prevent mud and sediment from flowing onto sidewalks and pavements.
   4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

K. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
   2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.

L. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
   1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.

M. Open Water: Prevent standing water that could become stagnant.
N. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

1.05 SUBMITTALS

A. Erosion and Sedimentation Control Plan:
   1. Include:
      a. Site plan identifying soils and vegetation, existing erosion problems, and areas vulnerable to erosion due to topography, soils, vegetation, or drainage.
      b. Site plan showing grading; new improvements; temporary roads, traffic accesses, and other temporary construction; and proposed preventive measures.
      c. Where extensive areas of soil will be disturbed, include storm water flow and volume calculations, soil loss predictions, and proposed preventive measures.
      d. Schedule of temporary preventive measures, in relation to ground disturbing activities.
      e. Other information required by law.
      f. Format required by law is acceptable, provided any additional information specified is also included.
   2. Obtain the approval of the Plan by authorities having jurisdiction.
   3. Obtain the approval of the Plan by Owner.

B. Certificate: Mill certificate for silt fence fabric attesting that fabric and factory seams comply with specified requirements, signed by legally authorized official of manufacturer; indicate actual minimum average roll values; identify fabric by roll identification numbers.

C. Inspection Reports: Submit report of each inspection; identify each preventive measure, indicate condition, and specify maintenance or repair required and accomplished.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Gravel: Conforming to Greenbook standard.

B. Grass Seed For Temporary Cover: Select a species appropriate to climate, planting season, and intended purpose. If same area will later be planted with permanent vegetation, do not use species known to be excessively competitive or prone to volunteer in subsequent seasons.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.
3.02 PREPARATION

A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

3.03 SCOPE OF PREVENTIVE MEASURES

A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.

B. Construction Entrances: Traffic-bearing aggregate surface.
   1. Width: As required; 20 feet, minimum.
   2. Length: 50 feet, minimum.
   3. Provide at each construction entrance from public right-of-way.
   4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.

C. Linear Sediment Barriers: Made of silt fences or gravel bags.
   1. Provide linear sediment barriers as indicated on drawings.

D. Storm Drain Curb Inlet Sediment Trap: As detailed on drawings.

E. Storm Drain Drop Inlet Sediment Traps: As detailed on drawings.

F. Soil Stockpiles: Protect using one of the following measures:
   1. Cover with polyethylene film, secured by placing soil on outer edges.
   2. Cover with mulch at least 4 inches thickness of pine needles, sawdust, bark, wood chips, or shredded leaves, or 6 inches of straw or hay.

3.04 INSTALLATION

A. Traffic-Bearing Aggregate Surface:
   1. Excavate minimum of 6 inches.
   2. Place geotextile fabric full width and length, with minimum 12 inch overlap at joints.
   3. Place and compact at least 6 inches of 1.5 to 3.5 inch diameter stone.

B. Silt Fences:
   1. Store and handle fabric in accordance with ASTM D 4873.
   2. Where slope gradient is less than 3:1 or barriers will be in place less than 6 months, use nominal 16 inch high barriers with minimum 36 inch long posts spaced at 6 feet maximum, with fabric embedded at least 4 inches in ground.
   3. Where slope gradient is steeper than 3:1 or barriers will be in place over 6 months, use nominal 28 inch high barriers, minimum 48 inch long posts spaced at 6 feet maximum, with fabric embedded at least 6 inches in ground.
   4. Where slope gradient is steeper than 3:1 and vertical height of slope between barriers is more than 20 feet, use nominal 32 inch high barriers with woven wire reinforcement and steel posts spaced at 4 feet maximum, with fabric embedded at least 6 inches in ground.
   5. Install with top of fabric at nominal height and embedment as specified.
   6. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches, with extra post.
7. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12 inches high with post spacing not more than 4 feet.

3.05 MAINTENANCE

A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.

B. Repair deficiencies immediately.

C. Silt Fences:
   1. Promptly replace fabric that deteriorates unless need for fence has passed.
   2. Remove silt deposits that exceed one-third of the height of the fence.
   3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.

D. Clean out temporary sediment control structures weekly and relocate soil on site.

E. Place sediment in appropriate locations on Project Site and do not remove from Project Site.

3.06 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Engineer.

B. Clean out temporary sediment control structures that are to remain as permanent measures.

C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION 01 5713
PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Following Administrative and Procedural Requirements:
      a. Selection of products for use in Project
      b. Product delivery, storage, and handling.
      c. Manufacturers' standard warranties on products.
      d. Special warranties.
      e. Product substitutions.

B. Related Sections:
   1. Section 01 4200: References; for applicable industry standards for products specified.
   2. Section 01 7700: Closeout Procedures; for submitting warranties for contract closeout.

C. Related Requirements:
   1. Specific requirements for warranties on products and installations specified to be warranted are included in appropriate Sections in Divisions 02 through 33 Sections.
   2. Refer to District's Division 00 Documents, including General Conditions, and other Division 01 Sections, for additional requirements.

1.02 QUALITY ASSURANCE

A. To fullest extent possible, provide products of same kind, from single source.

1.03 SUBMITTALS

A. Product Listing Schedule: Prepare schedule showing products specified in tabular form acceptable to Architect.
   1. Include generic names of products required.
   2. Include manufacturer's name and proprietary product names for each item listed.
   3. Form: Prepare Product Listing Schedule with information on each item tabulated under following column headings:
      a. Related Specification Section number.
      b. Generic name used in Contract Documents.
      c. Proprietary name, model number and similar designations.
      d. Manufacturer's name and address.
      e. Supplier's name and address.
   4. Completed Schedule: Within fifteen days after date of commencement of Work, submit four copies of completed Product Listing Schedule.
      a. Furnish written explanation for omissions of data, and for known variations from Contract requirements.
1.04 DEFINITIONS

A. Definitions used in this Article are not intended to change meaning of other terms used in Contract Documents, such as "specialties", "systems", "structure", "finishes", "accessories", and similar terms.
   1. Such terms are self-explanatory and have well recognized meanings in construction industry.

B. Products: Items purchased for incorporating into Work, whether purchased for Project or taken from previously purchased stock. term "product" includes terms "material," "equipment," and terms of similar intent.
   1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation, shown or listed in manufacturer's published product literature, that is current as of date of Contract Documents.
   2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise.
      a. Products salvaged or recycled from other projects are not considered new products.

C. Substitutions: Changes in products, materials, equipment, and methods of construction required by Contract Documents and proposed by Contractor
   1. Following are not considered substitutions:
      a. Substitutions requested during bidding period, and accepted by written Addendum prior to opening of bids or award of Contract.
   2. Revisions to Contract Documents requested by Owner or Architect.
   4. Compliance with governing regulations and orders issued by governing authorities.

D. Basis-of-Design Product Specification: Where specific manufacturer's product is named and accompanied by words "Basis of Design", including make or model number or other designation, to establish significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

E. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for particular product and specifically endorsed by manufacturer to Owner.

F. Special Warranty: Written warranty required by or incorporated into Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

1.05 REQUESTS FOR SUBSTITUTIONS

A. Requests for Substitutions received after award of Contract will be considered only in case of substantiated product unavailability, or other conditions beyond control of Contractor.

B. Substitution Requests: Submit one electronic copy (PDF) of each request for consideration.
1. Identify product or fabrication or installation method to be replaced.
2. Include Specification Section number and title and Drawing numbers and titles.
   a. Refer to Article 2.02, in this Section.
3. Substitution Request Form: Use form provided by Owner; other forms will not be accepted.
   a. Requests received without properly completed substitution request form will be rejected without further review.
4. Documentation: Show compliance with specified requirements for substitutions and following, as applicable:
   a. Statement indicating why specified material or product cannot be provided.
      1) Submit statement on official letterhead of Contractor, supplier, or manufacturer, signed by an officer of the Company.
      2) Statement will be subject to independent verification by Architect.
   b. Product identification, including manufacturer's name and address.
   c. Coordination information, including list of changes or modifications needed to other parts of Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
   d. Detailed, side-by-side comparison of significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
   e. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
   f. Structural calculations, where applicable or requested, prepared and signed by Structural Engineer licensed in California.
   g. Samples, where applicable or requested.
   h. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
   i. Material test reports from qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
   j. Research/evaluation reports evidencing compliance with building code in effect for Project, from model code organization acceptable to authorities having jurisdiction.
   k. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for Work, including effect on overall Contract Time.
      1) When specified product or method of construction cannot be provided within Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
   l. Cost information, including proposal of change, when occurring, in Contract Sum.
   m. Designation of availability of maintenance services, sources of replacement materials.
   n. Contractor's certification that proposed substitution complies with requirements in Contract Documents and is appropriate for applications indicated.
   o. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

C. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 3300.
   1. Show compliance with requirements.
1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store and handle products using means and methods that will prevent damage, deterioration and loss, including theft; comply with manufacturer's written instructions.
   1. Schedule delivery to minimize long term storage at Project Site and to prevent overcrowding of construction spaces.
   2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.
   3. Deliver products to Project Site in undamaged condition in manufacturer's original sealed container, or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.
   4. Inspect products on delivery to ensure compliance with Contract Documents, and to ensure products are undamaged and properly protected.
   5. Store products in manner to facilitate inspection and measurement of quantity or counting of units.
   6. Store materials in manner that will not endanger Project structure.
   7. Store products subject to damage by elements under cover in weathertight enclosure above ground, with ventilation adequate to prevent condensation.
   8. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
   9. Protect stored products from damage.

1.07 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by Contract Documents.
   1. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of Contract Documents.

B. Special Warranties: Prepare written document that contains appropriate terms and identification, ready for execution.
   2. Submit draft for approval before final execution.
   4. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
   5. Refer to Division 2 through 32 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Section 01 7700 and General Conditions.

PART 2 – PRODUCTS

2.01 PRODUCT SELECTION

A. General Product Requirements: Provide products that comply with Contract Documents, that are undamaged and, unless otherwise indicated, unused at time of installation.
   1. Provide products complete with accessories, trim, finish, safety guards and other devices and details needed for complete installation and for intended use and effect.
   2. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves right to limit selection to products with warranties not in conflict with requirements of Contract Documents.

4. Where products are accompanied by term "as selected", Architect will make selection.

5. Where products are accompanied by term "match sample", sample to be matched is Architect's.


7. Or Equal: Where products are specified by name and accompanied by term "or equal", or "or approved equal", or "or approved", comply with provisions in "Product Substitutions" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures: Procedures for product selection include following:

1. Product: Where Specification paragraphs or subparagraphs titled "Product" name single product and manufacturer, provide product named.
   a. Substitutions may be considered, unless otherwise indicated.

2. Manufacturer/Source: Where Specification paragraphs or subparagraphs titled "Manufacturer" or "Source" name single manufacturers or sources, provide product by manufacturer or from source named that complies with requirements.
   a. Substitutions may be considered, unless otherwise indicated.

3. Products: Where Specification paragraphs or subparagraphs titled "Products" introduce list of names of both products and manufacturers, provide one of products listed that complies with requirements.
   a. Where products or manufacturers are specified by name, accompanied by term "or equal", or "or approved equal" comply with provisions in "Product Substitutions" Article to obtain approval for use of unnamed product.

4. Manufacturers: Where Specification paragraphs or subparagraphs titled "Manufacturers" introduce list of manufacturers' names, provide product by one of manufacturers listed that complies with requirements.
   a. Where manufacturers are specified by name, accompanied by term "or equal", or "or approved equal" comply with provisions in "Product Substitutions" Article to obtain approval for use of an unnamed product.

5. Product Options: Where Specification paragraph titled "Product Options" indicate that size, profiles, and dimensional requirements on Drawings are based on specific product or system, provide either specific product or system indicated or comparable product or system by another manufacturer.
   a. Comply with provisions in "Product Substitutions" Article to obtain approval for use of unnamed product.

6. Basis-of-Design Products: Where Specification paragraphs or subparagraphs titled "Basis-of-Design Product" are included and also introduce or refer to list of manufacturers' names, provide either specified product or comparable product by one of other named manufacturers.
   a. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on product named.
   b. Comply with provisions in "Product Substitutions" Article to obtain approval for use of unnamed product.
   c. Substitutions may be considered.

   a. Architect's decision will be final on whether proposed product matches satisfactorily.
b. Where no product is available within specified category that matches satisfactorily and complies with other specified requirements, comply with provisions of Contract Documents on "substitutions" for selection of matching product.

8. Visual Selection Specification: Where Specifications include phrase "as selected from manufacturer's colors, patterns, textures" or similar phrase, select product and manufacturer that complies with other specified requirements.
   a. Standard Range: Where Specifications include phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that does not include premium items.
   b. Full Range: Where Specifications include phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that includes both standard and premium items.

9. Performance Specification Requirements: Where Specifications require compliance with performance requirements, provide products that comply with requirements, and are recommended by manufacturer for application indicated.
   a. General overall performance of product is implied where product is specified for specific application.
   b. Manufacturer’s recommendations may be contained in product literature, or by manufacturer's certification of performance.

2.02 PRODUCT SUBSTITUTIONS

A. Timing: Requests for Substitutions are restricted to before bid opening as stated in Instruction to Bidders.
   1. Requests received after that time may be considered or rejected at discretion of Architect.
   2. Architect will consider request for substitution after commencement of Work only when specified product or construction method cannot be provided within Contract Time, cannot receive necessary approvals, cannot be provided in manner compatible with or coordinate with other materials or cannot provide required warranty.

B. Conditions: Contractor's substitution request will be received and considered by Architect when following conditions are satisfied, as determined by Architect; otherwise requests will be returned without action except to record noncompliance with these requirements
   1. Burden of proof of merit of proposed substitution is upon proposer.
   2. Extensive revisions to Contract Documents are not required.
   3. Requested substitution is consistent with Contract Documents and will produce indicated results.
   4. Request is timely, fully documented and properly submitted.
   5. Request is directly related to "or equal" clause or similar language in Contract Documents.
   6. Specified product or construction method cannot be provided within Contract Time.
      a. Request will not be considered when product or method cannot be provided as result of failure to pursue Work promptly, failure to identify items requiring long lead times, or failure to coordinate activities properly.
   7. Specified product or construction method cannot receive necessary approval by governing authority, and requested substitution can be approved.
8. Substantial advantage is offered Owner, in cost, time, energy conservation, or other considerations of merit, after deducting additional responsibilities Owner must assume.
   a. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner or separate Contractors, and similar considerations.

9. Specified product or construction method cannot be provided in manner that is compatible with other materials, and where Contractor certifies that requested substitution will overcome incompatibility.

10. Specified product or construction method cannot be coordinated with other materials, and where Contractor certifies that requested substitution can be coordinated.

11. Specified product or construction method cannot provide warranty required by Contract Documents and where Contractor certifies that requested substitution provide required warranty.

12. When requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of Work, is uniform and consistent, is compatible with other products, and is acceptable to contractors involved.

C. Architects Action: When necessary, within one week of receipt of request for substitution, Architect will request additional information or documentation for evaluation of request for substitution.
   1. Within 2 weeks of receipt of request, or one week of receipt of additional information or documentation, whichever is later, Architect will notify Contractor of acceptance or rejection of requested substitution.
   2. Form of Acceptance: Change Order.
   3. Use product specified when Architect cannot make decision on use of proposed Substitution within time allocated.
   4. Architect will not be responsible for locating or securing information which is not included in substantiating data.
   5. Architect's decision of acceptance or rejection of requested substitution shall be final.

D. Architect's cost for evaluating substitutions requested by Contractor, including making subsequent revisions to drawings, specifications and other resulting documentation, will be paid by Owner with reimbursement from Contractor by deductive change order.

E. Contractor's submittal and Architect's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART 3 – EXECUTION

3.01 INSTALLATION OF PRODUCTS

A. Comply with manufacturer's instructions and recommendations for installation of products in applications indicated.
   1. Anchor each product securely in place, accurately located and aligned with other Work.
2. Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

END OF SECTION 01 6000
PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Contractor shall enter into agreement with Civil Engineer of Record for engineering services required for Project.
   2. Survey work required in execution of Project.
   3. Civil, structural or other professional engineering services specified, or required to execute Contractor's construction methods.
   4. Coordination with testing laboratory and soils engineer.
   5. Contractor furnished assistance.
   6. Verification of conditions.

B. Related Sections:
   1. Section 01 3300: Submittal Procedures
   2. Section 01 7700: Closeout Procedures.

C. Related Requirements:
   1. Refer to District's Division 00 Documents, including General Conditions, for additional requirements.

1.02 QUALITY ASSURANCE

A. Qualifications of Surveyor or Engineer: Engage registered Civil Engineer or licensed Land Surveyor acceptable to both Contractor and Owner who is qualified to perform land surveying.
   1. Furnish to Owner prior to start of Work, name and license (or registration number) issued by State of California, Board of Registration for Professional Engineers and Land Surveyors.
   2. Provide notice to Owner during course of construction should identification of individual responsible for this work change, and obtain approval of Owner for replacement.

B. Field engineering services furnished during course of this Project shall be under direct supervision and control of named individual civil engineer or land surveyor.

1.03 SUBMITTALS

A. Comply with pertinent provisions of Section 01 3300.

B. Name and address of Surveyor or professional engineer to Architect, including changes as they may occur.

C. Upon request of Architect, submit documentation to verify accuracy of field engineering Work.
D. Submit certificate signed by registered Civil Engineer or Land Surveyor certifying that elevations and locations of improvements are in conformance, or non-conformance, with Contract Documents.

E. Record Drawings:
1. At Project completion, obtain and pay for CD’s and Files of Project Plans.
   a. Clearly indicate differences between original drawings and completed Work within specified tolerances.
2. Show as-built locations by coordinates of utilities onsite with top of pipe elevations at major grade and alignment changes.
3. Completed record drawing transparencies shall be dated, signed and certified as correct by Licensed Surveyor or Civil Engineer.
4. Comply with requirements of Section 01 7700.

PART 2 – PRODUCTS
(Not Applicable)

PART 3 – EXECUTION

3.01 SURVEY REFERENCE POINTS

A. Existing horizontal and vertical control points for Project are those designated on Drawings.

B. Locate and protect control points prior to starting site work, and preserve permanent reference points during construction.
   1. Make no changes or relocations without prior written notice to Architect.
   2. Report to Architect when reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
   3. Identify and protect survey monuments on Project Site discovered during construction, which are not referenced on Project Drawings.
      a. Tie out such monuments and notify Architect prior to allowing them to be disturbed.
   4. Replace permanent boundary markers disturbed during construction with new permanent monuments and file required Record of Survey or Corner Record in accordance with applicable State and County laws, at no additional cost to Owner.

3.02 PROJECT SURVEY REQUIREMENTS

A. Establish minimum of two permanent horizontal and vertical control points on Project Site, remote from building area referenced to data established by survey control points.
   1. Record locations, with horizontal and vertical data, on Project Record Documents, including description of monuments in place.

B. Establish lines and levels, locations and dimensions, by instrumentation or similar technical appropriate means:
   1. Site Improvements:
      a. Utility lines, including, but not limited to, storm drains, sewers, water mains, gas, electric and telephone lines.
      b. Provide adequate horizontal control to locate lines and provide vertical control in proportion to slope of line as required for accurate construction.
   2. Building Lines and Levels: Furnish building corner offsets as required to adequately locate buildings.
   3. Provide control lines and levels required for Mechanical and Electrical Work.
4. Provide grade stakes and elevations as required to construct paved areas, landscaped areas, and other areas as required.
   a. Calculate and layout subgrade elevations and intermediate controls as required to provide smooth transitions between the spot elevations indicated on plans.
   b. From time to time, verify layout of Work by same methods.
5. Provide batter boards or other similar control for drainage, utility, and other onsite structures as required.

3.03 RECORDS

   A. Maintain complete, accurate surveyor's log of control and survey work as it progresses.
      1. Make this log available for reference.

END OF SECTION 01 7123
SECTION 01 7329
CUTTING AND PATCHING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes
   1. Administrative and procedural requirements for cutting and patching.

B. Related Sections:
   1. Section 01 1100: Summary of Work

C. Related Requirements:
   1. Refer to Division 26 Sections for cutting, patching, or relocating electrical systems.
   2. Refer to plumbing and electrical drawings for additional requirements related to replacement of modular restroom unit.

1.02 QUALITY ASSURANCE

A. Requirements for Structural Work: Do not cut and patch structural elements in manner that would reduce their load-carrying capacity or load-deflection ratio.

B. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in manner that would result in reducing their capacity to perform as intended or result in increased maintenance or decreased operational life or safety.
   1. Obtain approval before cutting and patching following operating elements or safety related systems:
      a. Shoring, bracing, and sheeting.
      b. Primary operational systems and equipment.
      c. Air or smoke barriers.
      d. Water, moisture, or vapor barriers.
      e. Membranes and flashings.
      f. Fire protection systems.
      g. Noise and vibration control elements and systems.
      h. Control systems.
      i. Communication systems.
      j. Electrical wiring systems.

C. Visual Requirements: Do not cut and patch construction exposed on exterior or in occupied spaces, in manner that would, in Architect's opinion, reduce aesthetic qualities, or result in visual evidence of cutting and patching.
   1. Remove and replace Work that has been cut and patched in visually unsatisfactory manner.
   2. Engage recognized experienced and specialized fabricator to cut and patch following categories of exposed Work:
      a. Processed concrete finishes.
PART 2 – PRODUCTS

2.01 MATERIALS

A. Use materials that are identical to existing materials.
   1. Where identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to fullest extent possible with regard to visual effect.
   2. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3 – EXECUTION

3.01 INSPECTION

A. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding if unsafe or unsatisfactory conditions are encountered.

3.02 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect existing construction during cutting and patching to prevent damage.
   1. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Take precautions necessary to avoid cutting existing pipe, conduit or ductwork serving building, but scheduled to be removed or relocated until provisions have been made to bypass them.

3.03 PERFORMANCE

A. General: Employ skilled workmen to perform cutting and patching.
   1. Proceed with cutting and patching at earliest feasible time and complete without delay.
   2. Cut existing construction to provide for installation of other components or performance of other construction activities and subsequent fitting and patching required to restore surfaces to their original condition.

B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction.
   1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping.
   2. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces.
      a. Temporarily cover openings when not in use.
   3. To avoid marring existing finished surfaces, cut or drill from exposed or finished side into concealed surfaces.
4. Cut through concrete and masonry using cutting machine such as carborundum saw or diamond core drill.
5. By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned.
6. Cut-off pipe or conduit in walls or partitions to be removed.
   a. Cap, valve or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

C. Patching: Patch with durable seams that are as invisible as possible.
   1. Comply with specified tolerances.
      a. Where feasible, inspect and test patched areas to demonstrate integrity of installation.
      b. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in manner that will eliminate evidence of patching and refinishing.

3.04 CLEANING

A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access.

END OF SECTION 01 7329
SECTION 01 7419

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. References.
   2. System description for construction and demolition waste management.

B. Related Sections:
   1. Section 01 3300 – Submittal Procedures.
   2. Section 01 4100 – Regulatory Requirements.
   3. Section 01 5000 – Temporary Facilities and Controls.
   4. Section 01 7423 – Cleaning.
   5. Section 01 7700 – Closeout Procedures.

1.02 REFERENCES


B. California Code of Regulations, Title 14 – Natural Resources
   1. Division 7 – Department of Resources Recycling and Recovery

1.03 SYSTEM DESCRIPTION

A. Collection and separation of construction and demolition waste materials generated
   on-site as follows:
   1. Re-use or recycling on-site.
   2. Transportation to approved recyclers or re-use organizations.
   3. Transportation to legally designated landfills for purpose of recycling, salvaging, or
      reusing minimum of 50 percent of construction and demolition waste generated.

1.04 SUBMITTALS

A. Construction and Demolition Waste Management Plan (Exhibit 1):
   1. Within 10 calendar days after Notice to Proceed and prior to waste removal,
      submit following to Owner for review and approval:
      a. Materials to be recycled, re-used, or salvaged, either on-site or off-site.
      b. Estimates of construction and demolition waste quantity (in tons) by type of
         material.
         1) If waste is measured by volume, give factors for conversion to weight in
         tons.
      c. Procedures for recycling/re-use program.
      d. Permit or license and location of Project waste disposal areas.
      e. Site Plan for placement of waste containers.

B. Construction and Demolition Waste Management Monthly Progress Report (Exhibit 2):
   1. Submit Summary of waste generated by Project, monthly with Application for
      Payment. Include following:
a. Firms accepting recovered or waste materials.
b. Type and location of accepting facilities (landfill, recovery facility, or used materials yard).
   1) If materials are re-used or recycled on job site, location should be designated as “On-site Re-use/Recycling.
c. Type of materials and net weight (tons) of each.
d. Value of materials or disposal fee paid.
e. Attach weigh bills and other documentation confirming amount and disposal location of waste materials.

C. Construction and Demolition Waste Management Final Compliance Report:
   1. Final update of Waste Management Plan to provide summary of total waste generated by Project.

D. Waste management Report for Contractors (Exhibit 3):
   1. Complete attached form and submit to Owner.

E. Solid Waste Management and Recycling Plan (Exhibit 4):
   1. Complete attached form and submit to Owner.

PART 2 – PRODUCTS  (Not Applicable)

PART 3 – EXECUTION

3.01 IMPLEMENTATION

A. Implement approved Waste Management Plan including collecting, segregating, storing, transporting and documenting each type of waste material generated, recycled or re-used, or disposed in landfills.

B. Designate on-site person to be responsible for instruction workers and overseeing sorting and recording of waste/recyclable materials.

C. Include waste management and recycling in worker orientation and as agenda item for regular job meetings.

D. Limit recycle and waste bin areas to approved areas indicated on Waste management Plan.
   1. Keep recycle and waste bins neat and clearly marked to avoid contamination of materials.

3.02 ATTACHMENTS

A. Exhibit 1: Construction and Demolition Waste Management Plan.


END OF SECTION 01 7419
EXHIBIT 1

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT PLAN

CONSTRUCTION/MAINTENANCE/ALTERATION AND DEMOLITION PROJECTS

PROJECT NAME: __________________________________________________________

PROJECT NO: __________________________________________________________

NAME OF COMPANY: ________________________________________________________

CONTACT PERSON: _________________________________________________________

TELEPHONE: ______________________________________________________________

PROJECT SITE LOCATION: __________________________________________________

PROJECT TYPE:

___ New Construction    ____ Demolition    ___ Maintenance/Alteration Projects

PROJECT SIZE (SQ.FT.): _____________________________________________________

DATE AND ESTIMATED PERIOD: _______________________________________________
EXHIBIT 1 FORM

<table>
<thead>
<tr>
<th>(1) Material Type</th>
<th>(2) Tons Estimated Recycle</th>
<th>(3) Tons Estimated Reuse</th>
<th>(4) Tons Estimated Salvage</th>
<th>(5) Tons Estimated Landfill</th>
<th>(6) Proposed Disposal or Recycling Facility</th>
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Total

Diversion Rate: \( \frac{\text{Columns[2]+(3)+(4)}}{\text{[(2)+(3)+(4)+(5)]}} = \)

Signature   Title   Date

Column 1: “Material Type” – Enter type of materials targeted for recycling, reuse, or requiring disposal.

Columns 2 through 4: “Estimated Generation” – Enter estimated quantities (tons) of recyclable, reusable, or salvageable waste materials anticipated to be generated and state number of salvageable items.

Column 5: “Estimated Landfill” – Enter quantities (tons) of materials to be disposed in landfill.

Column 6: “Disposal Location” – Enter end-destination of recycled, salvaged, and disposed materials.

General: (1) Attach proposed Recycling and Waste Bin Location Plan.
(2) Attach name and contact data for each recycling or disposal destination to be used.
EXHIBIT 2

CONSTRUCTION AND DEMOLITION WASTE MANAGEMENT MONTHLY PROGRESS REPORT

CONSTRUCTION/MAINTENANCE/ALTERATION AND DEMOLITION PROJECTS

PROJECT NAME: __________________________________________________________

PROJECT NO: __________________________________________________________

NAME OF COMPANY: __________________________________________________________

CONTACT PERSON: __________________________________________________________

TELEPHONE: __________________________________________________________

PROJECT SITE LOCATION: __________________________________________________

PROJECT TYPE:

___New Construction    _____Demolition    ___Maintenance/Alteration Projects

PROJECT SIZE (SQ.FT.): __________________________________________________

DATE AND ESTIMATED PERIOD: _____________________________________________
EXHIBIT 2 FORM

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Tons Actual Recycle</th>
<th>Tons Actual Reuse</th>
<th>Tons Actual Salvage</th>
<th>Landfill Name</th>
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Total

Diversion Rate: Columns[(2)+(3)+(4)] / [(2)+(3)+(4)+(5)]

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<thead>
<tr>
<th>Signature</th>
<th>Title</th>
<th>Date</th>
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</table>

Column 1: “Material Type” – Enter type of materials targeted for recycling, reuse, or requiring disposal.

Columns 2 through 4: “Estimated Generation” – Enter estimated quantities (tons) of recyclable, reusable, or salvageable waste materials anticipated to be generated and state number of salvageable items.

Column 5: “Estimated Landfill” – Enter quantities (tons) of materials to be disposed in landfill.

Column 6: “Disposal Location” – Enter end-destination of recycled, salvaged, and disposed materials.

General: (1) Attach proposed Recycling and Waste Bin Location Plan.
(2) Attach name and contact data for each recycling or disposal destination to be used.
EXHIBIT 3

WASTE MANAGEMENT REPORT FOR CONTRACTORS

Complete this form each time materials are removed from Project Site or reused onsite. Submit to Owner’s Project Manager.

PROJECT SITE LOCATION: ____________________________ DATE: __________

COMPANY: ___________________________________________

MATERIAL: __________________________________________

____________________________________________________________________________

____________________________________________________________________________

____________________________________________________________________________

WAS THE MATERIAL RECYCLED: YES____ NO____

VOLUME/WEIGHT: ______________________________________

RECYCLING COMPANY OR DISPOSAL SITE: ______________________________

SUBMITTED BY: _____________________________________________

PHONE NUMBER: ____________________________________________
SOLID WASTE MANAGEMENT AND RECYCLING PLAN

Prepare Waste Management and Recycling Plan by completing the following form for Construction and Demolition materials produced because of Work performed at Citrus Community College District. Owner requires that Contractors recycle materials when there is viable recycling company available.

Owner’s Environmental Health and Safety Supervisor will assist applicants in developing and implementing Waste Management and Recycling Plan.

COMPANY NAME: ___________________ CONTACT: __________________________

ADDRESS: _________________________ PHONE: _____________________________

PROJECT SITE: __________________________

Please fill out following form for submittal. Form will help to identify types of materials, estimated quantities of materials, and how material will be transported and recycled or disposed.

If you have questions regarding this form or recycling and disposal, please call James Poper, Director of Facilities Services at 562.908.3441
EXHIBIT 4 FORM

Circle the material that will be generated at the construction site, estimate the quantity, list how the materials will be transported, and write in where the materials will be taken.

<table>
<thead>
<tr>
<th>MATERIALS</th>
<th>ESTIMATED QUANTITY (in yards and tons)</th>
<th>HAULER (List hauler’s name if not self–haul)</th>
<th>RECYCLING COMPANY OR DISPOSAL SITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salvage and used building</td>
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<td></td>
<td></td>
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<tr>
<td>Wood</td>
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<tr>
<td>Plant Debris</td>
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<td>Wallboard</td>
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<td>Glass</td>
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<td></td>
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<td>Soil</td>
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<tr>
<td>Corrugated cardboard</td>
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<td>Metals</td>
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<tr>
<td>Masonry/Tile</td>
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<tr>
<td>Concrete/Asphalt</td>
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<tr>
<td>Toilets (porcelain)</td>
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<tr>
<td>Carpet Padding (foam)</td>
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<tr>
<td>Other</td>
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<tr>
<td>Mixed Loads (i.e. trash)</td>
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</table>

FOR DISTRICT USE ONLY:

Approval Status:

_____ Approved

_____ Further explanation needed, see attached

_____ Denied

Reviewed by:_____________________________ Date:________________
SECTION 01 7423
CLEANING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Performance of cleaning, during progress of Work, and at completion of Work, as required by General Conditions.

B. Related Sections:

C. Related Requirements:
   1. Refer to District’s Division 00 Documents, including General Conditions, for additional requirements.

1.02 QUALITY ASSURANCE

A. Verify that requirements of cleanliness are being met.

B. Final Cleaning: Use only professional cleaning company experienced in commercial cleaning.

1.03 DISPOSAL REQUIREMENTS

A. Conduct cleaning and disposal operations in compliance with applicable codes, ordinances, regulations, and anti-pollution laws.

B. In addition to specified requirements, comply with applicable requirements of fire and governing authorities having jurisdiction.

1.04 PAYMENT WITHHELD

A. Architect reserves right to withhold certification of payment requests for failure on part of Contractor to regularly clean Project in conformance with requirements of this Section.

PART 2 – PRODUCTS

2.01 CLEANING MATERIALS AND EQUIPMENT

A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.

B. Use only those cleaning materials and methods recommended by manufacturer of surface material to be cleaned.

C. Use cleaning materials only on surfaces recommended by cleaning products manufacturer.
PART 3 – EXECUTION

3.01 PROGRESS CLEANING DURING CONSTRUCTION

A. Execute periodic cleaning to keep Work, Project Site and adjacent properties free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations.
   1. Maintain stored items in orderly arrangement allowing maximum access and providing required protection of materials.
      a. Provide on-site containers for collection of waste materials, debris and rubbish.
   2. Provide adequate storage for waste materials awaiting removal from Project Site, observing requirements for fire protection and protection of environment.
   3. Handle hazardous, dangerous or unsanitary waste materials separately from other waste material by placing it in proper containers.
   4. Burying or burning of waste materials is not permitted.
   5. Remove waste materials, debris and rubbish from Project Site periodically and dispose of at legal disposal areas away from Project Site.

B. Project Site:
   1. Inspect Project Site daily and pick up scrap, debris, and waste material.
      a. Place waste material in designated containers.
   2. Flammable waste shall be kept in sealed metal containers until removed from Project Site.
   3. Maintain Project Site clear of debris so as not to impede construction and fire department access

C. Structures:
   1. Weekly, and more often if necessary, inspect structures and pick up scrap, debris, and waste material.
      a. Remove items and place in designated container.
   2. Weekly, sweep interior spaces clean. Space shall be free from dust and other material capable of being removed by handheld broom, (i.e.: “broom clean”).
   3. As required preparatory to installation of succeeding material, clean structures or pertinent portions thereof to degree of cleanliness recommended by manufacturer of succeeding material.
   4. Following installation of finish floor materials, clean finish floor daily, and more often if necessary.
      a. Provide adequate protection of finish where Work is being performed in space in which finish materials have been installed.
      b. “Clean”, for purpose of this subparagraph, shall be interpreted as meaning free from foreign materials that, in opinion of Architect, may be injurious to finish floor material, (i.e.: “vacuum clean”).

3.02 DUST CONTROL

A. Clean interior spaces prior to start of finish painting and continue cleaning on as-needed basis until painting is finished.

B. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.
3.03 FINAL CLEANING

A. Prior to completion of Work, remove from Project Site, tools, surplus materials, equipment, scrap, debris, and waste.

B. Employ experienced workers or professional cleaners for final cleaning.
   1. Comply with manufacturer’s instructions.

C. Complete following cleaning operations before requesting inspection for Certification of Substantial Completion:
   1. Site: Clean Site, including landscape development areas, of rubbish, litter and other foreign substances.
      a. Sweep paved areas broom clean, including public paved areas directly adjacent to Project Site.
         1) Remove stains, spills and other foreign deposits.
      b. Rake grounds that are neither paved nor planted, to smooth even-textured surface and remove resultant debris.
   2. Exterior and Interior: Clean exposed exterior and interior hard-suraced finishes to dust-free condition
      a. Remove traces of soils, waste material, smudges and other foreign matter.
      b. Remove traces of splashed material from adjacent surfaces.
      c. Remove materials using equipment as instructed by manufacturer of surface materials to be cleaned.
      d. Leave concrete floors broom clean.
   3. Carpeted Surfaces:
      a. Use only dry-chemical method of cleaning.
      b. Do not use steam cleaning or water based cleaning on carpet.
      c. Use materials and methods fully approved by carpet manufacturer, as instructed in manufacturer’s published literature.
      d. Vacuum carpet.
   4. Labels: Remove labels that are not permanent labels.
   5. Transparent Materials: Clean transparent material, including mirrors and glass in doors and windows.
      a. Remove glazing compound and other substances that are noticeable vision obscuring materials.
      b. Replace chipped or broken glass and other damaged transparent materials.
      c. Restore reflective surfaces to their original reflective condition.
      d. Clean glass inside and outside.
      e. Polished Surfaces:
         1) Apply polish recommended by manufacturer of material being polished to surfaces requiring routine application of buffed polish.

D. Ventilating Systems:
   1. Clean permanent filters and replace disposable filters if units were operated during construction.
   2. Clean ducts, blowers and coils if units were operated without filters during construction.

E. Wipe surfaces of mechanical and electrical equipment.
   1. Remove excess lubrication and other substances.
   2. Clean plumbing fixtures to sanitary condition.
   3. Clean light fixtures and lamps.
F. Comply with regulations of authorities having jurisdiction and safety standards for cleaning.
   1. Do not burn waste materials.
   2. Do not bury debris or excess materials on Owner’s property.
   3. Do not discharge volatile, harmful or dangerous materials into drainage systems.
   4. Remove waste materials from Project Site and dispose of in lawful manner.
   5. Where extra materials of value remaining after completion of associated Work have become Owner’s property, arrange for disposition of these materials as directed.

G. Prior to final completion, or Owner occupancy, Contractor shall conduct inspection of sight-exposed interior and exterior surfaces, and work areas, to verify that entire Work is clean.

3.04 CLEANING DURING OWNER’S OCCUPANCY

A. Should Owner occupy portion of Project prior to its completion by Contractor, acceptance by Owner/Architect shall be in accordance with General Conditions of the Contract.

END OF SECTION 01 7423
SECTION 01 7700
CLOSEOUT PROCEDURES

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Administrative and procedural requirements for Project Closeout, including but not limited to:
      a. Inspection procedures.
      b. Substantial Completion
      c. Final Acceptance

B. Related Sections:
   1. Section 01 7423: Cleaning
   2. Section 01 7839: Project Record Documents

C. Related Requirements:
   1. Closeout requirements for specific construction activities are included in appropriate Sections in Divisions 02 through 33.

1.02 BENEFICIAL OCCUPANCY AND ACCEPTANCE OF SUBSTANTIAL COMPLETION

A. Comply with CCR, Title 24, Part 1 - Administrative Code, Section 4-336 CCR (Schools)] Requirements for Closeout Procedures.
   1. Comply with additional requirements in District's Division 00 Sections and General Conditions of the Contract.

B. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete following (List exceptions in request):
   1. In application for payment that coincides with, or first follows, date Substantial Completion is claimed, show one hundred percent completion for portion of Work claimed as substantially complete.
      a. Include supporting documents for completion as indicated in Contract documents and statement showing accounting of changes to Contract sum.
      b. If one hundred percent completion cannot be shown, include list of incomplete items, value of incomplete construction, and reasons Work is not complete.
   2. Make required submittals of specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents, along with record drawings and similar final record information in accordance with requirements in Section 01 7839.
   3. Complete final clean up requirements in accordance with Section 01 7423, including touch-up painting.
      a. Touch-up and otherwise repair and restore marred exposed finishes.

C. Inspection Procedures: Upon receipt of request for inspection, Architect will either proceed with inspection or advise Contractor of unfilled requirements.
   1. Should Architect and Owner determine that Work is not substantially complete:
      a. Architect will promptly notify Contractor in writing, giving reason(s) for his determination.
b. In conjunction with Inspector of Record and Construction Manager, Architect will prepare list of items (Punch List) to be completed or corrected.
   1) Punch List may be developed for less than entire project, when approved by Architect and Owner.

c. Contractor shall remedy deficiencies and notify Architect when Work is ready for re-inspection.

d. Architect will prepare Certificate of Substantial Completion, accompanied by Punch List, following inspection, or advise Contractor of construction that must be completed or corrected before certificate will be issued.

2. Architect will repeat inspection when requested and if assured that Work has been substantially completed in each phase, will submit Certificate of Substantial Completion to Contractor and Owner for their written acceptance of responsibilities assigned them in Certificate.
   a. Owner reserves right to occupy each completed phase upon issuance of Certificate of Substantial Completion.

3. Results of completed inspection will form basis of requirements for final acceptance.

D. Mandatory Substantial Completion Submittals include, but are not necessarily limited to:
   1. Redlined’ As-Built Set (marked up drawings).
   2. On As-Built Set and Specifications manual record revisions to original contract document with contrasting color.
   3. Operation and Maintenance Manuals for items specified in pertinent Sections and for other items approved by Architect.
   4. Warranties and Guarantees.
   5. Training.
   7. Evidence of payment and release of liens, when requested by Owner.
   8. List of Subcontractors, service organizations and principal vendors, including current names, addresses and telephone numbers, where they may be contacted for emergency service, including nights, weekends, and holidays.

1.03 FINAL ACCEPTANCE

A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete following (List exceptions in request):
   1. Contractor shall prepare and submit notice (Project Closeout Request) that Work is ready for final inspection and acceptance.
   2. Architect, and Owner’s Inspector to verify that Punch List items are complete.
   3. Should Architect or Owner’s Inspector determine Work is incomplete or defective:
      a. Architect or Owner’s Inspector will promptly notify Contractor in writing, listing incomplete or defective work.
      b. Contractor shall remedy deficiencies promptly and notify Owner’s Inspector when ready for re-inspection.

B. Reinspection Procedure: Architect will reinspect Work upon receipt of notice that Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to Architect.
   1. Upon completion of reinspection, Architect will prepare certificate of final acceptance, or advise Contractor of work that is incomplete, or of obligations that have not been fulfilled but are required for final acceptance.
   2. If necessary, reinspection will be repeated.
3. When Architect determines Work is acceptable under Contract Documents, he will notify Owner’s Inspector that Project is complete per Contract Drawings and Specifications.

4. Upon acceptance, Contractor must certify that Project has been completed in compliance with Contract Documents.
   a. Copy of this report shall be submitted to following:
      1) Architect.
      2) Owner’s Inspector.

C. Final Payment Procedure.
   1. Submit following in accordance with requirements of Section 01 7839:
      a. Final payment request with releases and supporting documentation not previously submitted and accepted.
      b. Include certificates of insurance for products and completed operations where required.
   2. Updated final statement, accounting for final additional changes to Contract Sum.
   3. Certified copy of Architect’s final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and list has been endorsed and dated by Architect.
   4. Consent of surety to final payment.
   5. Comply with additional requirements in District’s Division 00 Sections and General Conditions of the Contract.

PART 2 – PRODUCTS  (Not Applicable)

PART 3 – EXECUTION  (Not Applicable)

END OF SECTION 01 7700
SECTION 01 7839

PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Administrative and procedural requirements for preparing, maintaining, and submitting following:
      a. Project Record Documents.
      b. Operating and Maintenance Data and Manuals.
      c. Warranties, Guarantees, and Bonds.
      d. Spare parts and Maintenance Materials.
      e. Instructions to Owner’s Personnel.

B. Related Sections:
   1. Separate Specification Sections requiring Record Documents.

C. Related Requirements:
   1. Refer to District’s Division 00 Documents, including General Conditions, for additional requirements.

1.02 PROJECT RECORD DOCUMENTS

A. Dedicated Record Set: Maintain one set of Contract Drawings and one copy of Project Specifications for use during construction to record changes made during construction.
   1. Revisions shall be recorded with contrasting color.
   2. Do not use record documents for construction purposes.

B. Record Documents and Shop Drawings:
   1. Record in concise and neat manner and on continual basis actual revisions to Work.
   2. Include reference to appropriate document with date revision/change was approved or directed.
   3. Changes/Revisions to Drawings and Specifications include, but are not limited to:
      a. Changes made by RFI and CO.
      b. Changes made to shop drawings.
   4. Mark set to show actual installation where installation varies substantially from Work as originally shown.
      a. Mark whichever drawing is most capable of showing conditions fully and accurately.
      b. Where shop drawings are used, record cross-reference at corresponding location on Contract drawings.
      c. Give particular attention to concealed elements that would be difficult to measure and record at later date.
   5. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of Work.
   6. Mark new information that is important to Owner, but was not shown on Contract Drawings or shop drawings.
7. Note related Change Order numbers where applicable.
8. Label each document “PROJECT RECORD” in neat large printed letters.
9. Record information concurrently with construction progress.
   a. Do not conceal Work until required information is recorded.
10. Legibly mark each item to record actual construction including:
   b. Measured horizontal and vertical locations of underground utilities and
      appurtenances, referenced to permanent surface improvements.
      1) Identify drains and sewers by invert elevation.
   c. Measured locations of internal utilities and appurtenances concealed in
      construction, referenced to visible and accessible features of Work.
   d. Identify ducts, dampers, valves, access doors and control equipment
      wiring.
   e. Field changes of dimension and detail.
   f. Details not on original Drawings.

C. Store Record Documents and Samples in Contractor’s Field Office, separate from
   documents used for construction.
   1. Protect record documents from deterioration and loss in secure, fire-resistive
      location.
   2. Provide access to record documents for Architect’s reference during normal
      working hours.
   3. Provide files and racks for storage of Documents
   4. Provide secure storage space for storage of samples.
   5. Maintain documents in clean, dry, legible condition and in good order.
      a. Replace soiled or illegible documents.

D. Record Specifications: Maintain one complete copy of Project Manual, including
   addenda, and one copy of other written construction documents such as Change
   Orders and modifications issued in printed form during construction.
   1. Legibly mark these documents and record at each product section description
      of actual products installed to show substantial variations in actual Work
      performed in comparison with text of specifications and modifications including
      following:
      a. Manufacturer’s name, trade name, product model and number and
         supplier.
      b. Give particular attention to substitutions, selection of options and similar
         information on elements that are concealed or cannot otherwise be
         readily discerned later by direct observation, including following:
         1) Authorized product substitutions or alternates utilized.
         2) Changes made by Addenda and Modifications.
   2. Note related record drawing information and product data.
   3. Upon completion of Work, submit record specifications to Architect for Owner’s
      records.

E. Owner’s Project Inspector will verify that Project Record Documents are fully updated
   prior to approving Payment Applications.
   1. Obtain Owner’s Inspector’s signature on record set verifying information.

F. Record drawings will be reviewed by Architect for completeness and acceptance.

G. As-Built Drawings: Shall be turned over to Owner in following manner:
   1. Separate each discipline (i.e. Civil, Architectural, Mechanical, Electrical,
      Pluming, and so on)
2. Identify disciplines of Drawings by adding white tag.
3. Tag each discipline.
4. Tag shall be size No. 8, 8-11/16 by 2-3/4 inches.
5. Legibly write on tag name of Project, and discipline inside tube.
6. Each discipline shall be separately tubed by using U-Line tube or equal.
7. Size of tube: 4 inches minimum and 6 inches maximum.

H. Record of Electronic (Digital) Files: Immediately before inspection of Substantial Completion, review marked-up Record Set with Architect and Owner’s Inspector.
1. When authorized, prepare full set of corrected digital files of Record Documents.
2. Submit following documents:
   a. Scan sheets in As-Built Set, furnish annotated PDF electronic files.
   b. CD or CD’s of PDF files and file labeling is to include following information:
      1) Project name.
      2) Date.
      3) Name of Architect.
      4) Name of Contractor
      5) Disciplines included in CD (i.e. Title sheet, Civil, Architectural, Structural, Mechanical, and so on)
      6) Labeling and indexing of files contain within CD shall be in Sequential order to match Title Sheet of Contract Documents.

I. RFI’s: Furnish one copy of RFI’s questions and answers submitted on Project.
1. Submit RFI binder in following manner:
   a. Binder: 8-1/2 by 11 inch three-ring D binder with vinyl-covers at the front and spine.
   b. Provide new white binders.
   c. Project Name.
   d. Label binder with front and spine cover labeled “RFI’s”.
   e. Furnish tab for each individual RFI.
   f. Submit RFI Binder(s) inside Bankers Box (11 by 15 inches) or equal size, box or boxes, shall include two labels on face and side of box.
   g. Boxes should be labeled as follows:
      1) Use Avery Label 6573 or equal size.
      2) Type Bid No., Project Name, Number of boxes (i.e. Box 1 of 5).
      a) Refer top attached sample label at end section.
      3) Label’s Font for labels: Use Vernada, size 48 for Bid No.
      a) Use Vernada, size 16 for rest of content on label.

1.03 OPERATING AND MAINTENANCE DATA AND MANUALS

A. Submit two sets prior to Substantial Completion inspection for Architect’s review and approval.

B. Manual Format:
1. Prepare data in form of instructional manual for use by Owner’s personnel.
   a. Binders
      1) Commercial quality, heavy-duty, three-ring D binders with durable and cleanable vinyl-covers at front and spine, with internal pockets to hold CD.
      2) Size: 8-1/2 by 11 inches
      3) Provide new white binders.
b. Identify Project Name/Building Name and Project Number on cover of manual.

2. Table of Contents: Include in each volume, neatly typewritten.
   a. Identify Contractor, name of responsible principal, address, and phone number.
   b. List each product included, indexed to content of volume.
   c. List, with each product, name, address, and telephone number of subcontractor or installer and maintenance contractor, as appropriate and nearest source of supply for parts and replacement.
   d. Identify location of installed equipment.
   e. Submit M&O Manuals inside “Bankers Box” (11 by 15 inches) or equal size, box.
      1) Include (2) labels on face and side of boxes.
      2) Boxes should be labeled as follows:
         a) Use Avery Label 6573 or equal size.
         b) Type Bid No., Project Name, Project’s, Number of boxes (i.e. Box 1 of 5).
         c) Refer to attached sample label at end of this Section.
      3) Font for Labels: Use Vernada, 48 point for Bid No.
         a) Use Vernada, 16 point for rest of content on label.

3. Product Data:
   a. Include only those sheets which are pertinent to specific product.
   b. Annotate each sheet to clearly identify specific product or part installed.
   c. Include CD with Product Data information.
      1) Maintenance schedules and equipment list must be in editable Word or Excel spreadsheet format.

4. Drawings:
   a. Supplement product date with Drawings as necessary to clearly illustrate relations of component parts of equipment and systems.
   b. Coordinate Drawings with information in Project Record Documents to ensure correct illustration of completed installation.
   c. Do not use Project Record Documents as maintenance drawings.
   d. Full size and half size hard copies of Drawings are required.

5. Copy of each warranty and service contract as specified.

1.04 WARRANTIES, GUARANTEES, AND BONDS

A. Disclaimers and Limitations: Manufacturer’s disclaimers and limitations on product warranties do not relieve Contractor of warranty on Work that incorporates products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with Contractor.

B. Manufacturer’s warranties and guarantees not withstanding, warrant entire Work against defects in materials and workmanship for twelve months from Date of Acceptance of Substantial Completion.
   1. Warranties and guarantees between Contractor and manufacturers and Contractor and suppliers shall not affect warranties or guarantees between Contractor and Owner.
1.05 WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as 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 warranty has failed and been corrected by replacement or rebuilding, reinstat warranty by written endorsement.
   1. Reinstated warranty shall be equal to original warranty with equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that Work covered by warranty has failed, replace or rebuild Work to an acceptable condition complying with requirements of Contract documents.
   1. Contractor is responsible for cost of replacing or rebuilding defective Work regardless of whether Owner has benefited from use of Work through portion of its anticipated useful service life.

D. Owner's Recourse: Written warranties made to Owner are in addition to implied warranties, and shall not limit duties, obligations, right and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which Owner can enforce such other duties, obligations, rights, or remedies.
   1. Rejection of Warranties: Owner reserves right to reject warranties and to limit selections to products with warranties not in conflict with requirements of Contract Documents.

E. Owner reserves right to refuse to accept Work for Project where special warranty, certification, or similar commitment is required on such Work or part of Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

F. Warranties and guarantees shall be submitted to Contractor for Architect’s review and approval prior to final payment.

G. For warranty items delayed, warranty period shall not start until items have been completed.

H. Furnish two original copies with wet signatures of warranties and guarantees on Project.

I. Organize warranties/guarantees into orderly sequence base on Table of Contents by Project Specifications:
   1. Bind warranties/guarantees in 8-1/2 by 11 inch heavy-duty, three ring binders, same as specified in Article 1.03.
   2. Identify each binder on front and spine with printed sheet “WARRANTIES”, project name and name of contractor.
   3. Contractor to issue Contractor’s and Subcontractor’s Warranties/Guarantees using attached Warranties/Guarantees form found on Page 8 of this Section.
1.06 SUBMITTALS

A. Submit written warranties to Architect prior to date certified for Substantial Completion.
   1. When Architect's Certificate of Substantial Completion designates commencement date for warranties other than date of Substantial Completion for Work, or designated portion of Work, submit written warranties upon request of Architect.

1.07 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit (2) copies of final approved manual to Owner's Inspector prior to final payment.

B. Content for each unit of mechanical equipment and each mechanical system, as applicable and appropriate, including but not limited to following:
   1. Description of units, or system and component parts.
   2. Operating procedures.
   4. Servicing and lubrication schedule, with list of lubricants required.
   5. As-installed control diagrams by controls manufacturer.
   6. Other data as required in various specification sections.

C. Content, for each electrical and electronic system, as applicable and appropriate, including but not limited to following:
   1. Description of system and component parts.
   2. Circuit directories of panel boards.
   3. As-installed color-coded wiring diagrams.
   4. Operating procedures.
   5. Maintenance procedures.
   6. Other data as required in individual sections.

D. Prepare and include additional data as may be required for instruction of Owner's personnel.

E. Additional requirements for operating and maintenance data: As may be specified in individual Sections.

F. Provide complete information for products specified in individual Sections.

1.08 INSTRUCTION OF OWNER'S PERSONNEL

A. Provide instruction/training to Owner personnel as indicated in individual specification sections and as required.

B. Provide to Owner, date and list (signatures) of Owner personnel who attended training.
   1. Schedule instructional meeting or meetings after instructional manuals have been submitted, reviewed, and approved by Architect.
   2. Coordinate meetings to include tier subcontractors.

C. Instruction sessions will be held in Owner designated area on Project Site and at Owner's convenience.
1. Amount of time required for each session shall be as specified in individual sections.

D. Review contents of Manuals with Owner’s personnel in full detail to explain every aspect of operation and maintenance.

1.09 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.

PART 2 – PRODUCTS  
(Not Applicable)

PART 3 – EXECUTION  
(Not Applicable)

END OF SECTION 01 7839
WARRANTY/GUARANTEE FORM

FOR __________________________________________________________ WORK

We, the undersigned, do hereby warranty and guaranty that the parts of the Work described above which we have furnished or installed for:

Project Name: (Insert Project Name)
Owner: (Insert Owner’s Name)
Location: (Insert Project Location)

Are in accordance with the Contract Documents and that all said work as installed with fulfill or exceed all the Warranty and Guaranty requirements. We agree to repair or replace work installed by us, together with any other work which is displaced or damaged by so doing, that proves to be defective in workmanship, material, or operation within a period of:

(Insert written years) year(s)

from the date of filing of the Notice of Completion, ordinary wear and tear and unusual neglect or abuse excepted.

In the event of our failure to comply with the above-mentioned conditions within a reasonable time period determined by the Owner, after notification in writing, we, the undersigned, all collectively and separately, hereby authorize the Owner to have said defective work repaired and/or replaced and made good, and agree to pay to the Owner upon demand all monies that the Owner may expend in making good said defective work, including all collection costs and reasonable attorney fees.

Date:

(Insert Name of Contractor) (Insert Name of Subcontractor, Manufacturer or Supplier)

Signature:  Signature:

Name: Name:

Title: Title:

State License No. State License No.:

Local Representative: For maintenance, repair, or replacement service, contact:

Name: 
Address: 
Phone:
Bid No. XXXX

[Project Name]  DSA No. N/A

RFI BINDERS 01 OF 04

BINDERS 01 OF 04: RFI’S 001 THRU 5
BINDERS 02 OF 04: RFI’S 051 THRU 100
BINDERS 03 OF 04: RFI’S 100 THRU 150
BINDERS 04 OF 04: RFI’S 151 THRU 200

Box 1 of 5
PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Furnishing labor, materials and equipment necessary for selective site demolition, dismantling, cutting, and alterations as indicated, specified, or required for completion of Work.
2. Includes items such as following:
   a. Protection of existing improvements to remain.
   b. Cleaning existing improvements to remain.
   c. Disconnecting and capping utilities.
   d. Removing debris, waste materials, and equipment.
   e. Removal of existing items, where indicated, for performance of Work, including, but not limited to:
      1) Restroom modular unit.
      2) Ramp for restroom unit.
      3) Asphalt paving and parking striping.
      4) Chain link fence - fabric only.
         a) Fence framing to remain.
      4) Fence post footings
      5) Light poles and bases.
         a) Coordinate with electrical.
   f. Removal of existing hardscape, including planter areas, where indicated.
   g. Salvageable items to be retained by Owner.
      1) Relocation of existing shade structure.
      2) Relocation on in-ground commemorative plaque.

B. Related Sections:
1. Section 01 1100: Summary of Work.
2. Section 01 5000: Temporary Facilities and Controls.
3. Section 01 5723: Temporary Erosion and Sedimentation Controls.
4. Section 01 7329: Cutting and Patching
5. Section 01 7423: Cleaning
6. Section 31 1000: Site Clearing; removal of trees, clearing and grubbing.
7. Section 32 3113: Chain Link Fence and Gates

C. Related Requirements:
1. Refer to Plumbing Drawings for Work related to replacement of Restroom Modular Unit.
2. Refer to Division 26 sections

1.02 QUALITY ASSURANCE

A. Prior to commencement of Work, schedule walkthrough with Owner’s Authorized Representative and Architect to confirm Owner property items have been removed from scheduled Work areas.
1. Identify and mark remaining property items and schedule their removal.
2. Review limits of demolition and items indicated on shop drawings.
B. Perform Work of this section by workers skilled in demolition of site improvements.
   1. Perform Work of this section under full time direct supervision.

C. Coordinate demolition for correct sequence, limits, and methods.
   1. Schedule demolition Work to create least possible inconvenience to public and facility operations.

1.03 SUBMITTALS

A. Shop Drawings: Indicating extent of items and systems to be removed.
   1. Indicate items to be salvaged or items to be protected during demolition.
   2. Indicate locations of utility terminations and extent of abandoned lines to be removed.
      a. Include details indicating methods and location of utility terminations.

1.04 PROJECT CONDITIONS

A. Drawings may not indicate in detail entire demolition Work to be performed.
   1. Examine existing conditions to determine full extent of required demolition.
   2. Existence and location of underground utility pipes or structures shown are obtained by search of available records.
      a. Contractor is required to take due precautionary measures to protect utilities shown and other lines or structures not shown.
      b. Design Professional is not responsible for location of underground utilities or structures whether or not shown on and installed by Contract Documents.
      c. It shall be Contractor’s responsibility to examine conditions before commencing operations.
   3. Contractor shall immediately notify Owner and Architect, should such unidentified conditions be discovered.

B. Repair damage to existing improvements or damage due to excessive demolition.

C. Provide necessary measures to avoid excessive damage from inadequate or improper means and methods, improper shoring, bracing or support.

D. Should conditions be encountered that vary from those indicated, promptly notify Architect for clarification before proceeding.

PART 2 – PRODUCTS

2.01 HANDLING OF MATERIALS

A. Items scheduled for salvage by Owner shall be delivered to location designated by Owner’s authorized representative.
   1. Items shall be cleaned, packaged and labeled for storage.

B. Items scheduled for reuse shall be stored on Project Site and protected from damage, theft, and other deleterious conditions.
PART 3 - EXECUTION

3.01 GENERAL

A. Protection:
   1. Do not commence demolition until safety partitions, barricades, warning signs and other forms of protection are installed.
      a. Comply with requirements of Section 01 5000.
   2. Provide safeguards, including warning signs, lights and barricades, for protection of workers, occupants, and public.

B. When safety of existing construction appears to be endangered, take immediate measures to correct such conditions.
   1. Cease operations and immediately notify Architect and Owner.

3.02 DEMOLITION

A. Remove existing construction only to extent necessary for proper installation of Work and interfacing with existing construction.
   1. Cut back finished surfaces to straight, plumb or level lines as required for smooth transition.

B. Where openings are cut oversize or in improper locations, replace or repair to required condition.

3.03 CONCRETE AND ASPHALT PAVING REMOVAL

A. Prior to cutting concrete and asphalt paving, determine locations of hidden utilities or other existing improvements and provide necessary measures to protect them from damage.

B. Cutting of concrete or asphalt paving shall be as indicated or as reviewed by Architect.
   1. Replace concrete and asphalt paving demolished in excess of amounts indicated.

C. Break up and completely remove existing concrete paving, walks, and asphalt paving to indicated limits.
   1. Cutting shall be performed to neat and even line with proper tools or concrete cutting saw.
      a. Minimum depth of cut shall be 1-1/2 inches, unless otherwise indicated.
   2. Do not damage concrete or asphalt intended to remain.

D. Remove concrete broken beyond indicated limits to nearest joint or score line and replace with new concrete to match existing.
   1. Refer to additional requirements in Section 31 1000.

3.04 CHAIN LINK FENCING

A. Existing chain link fencing indicated to be removed and not reinstalled shall be completely removed, including footings.
   1. Fill and compact excavations left by footing removal.
B. Where existing chain link fencing is indicated for removal of fabric only, remaining posts and rails are to be left in place and protected for installation of new fabric specified in Section 32 3113.

3.05 REMOVAL OF EXISTING ELECTRICAL EQUIPMENT AND SERVICES

A. Remove existing electrical equipment fixtures and services not indicated for reuse and not necessary for completion of Work.

B. Remove abandoned conduit and cap unused portions of existing conduit.

3.06 REMOVAL OF EXISTING PLUMBING SERVICE CONNECTIONS

A. Disconnect existing plumbing service connections to existing restroom modular unit and cap, to facilitate removal of unit.
   1. Reconnection of plumbing services to new modular unit is indicated on Plumbing Drawings.

3.07 REMOVAL OF OTHER MATERIALS

A. Remove existing improvements not specifically indicated or required but necessary to perform Work.
   1. Cut to clean lines, allowing for installation of Work.

B. Remove existing lawn sprinkler lines and fittings.
   1. Cut back to existing lines to remain and cap.
   2. Comply with requirements on Landscape Drawings and as specified.

3.07 PATCHING

A. Patch or repair materials to remain when damaged by performance of this Work.
   1. Finish material and appearance of patch or repair Work shall match existing.
   2. Refer to Section 01 7329 for additional requirements.

3.08 CLEANING

A. Comply with requirements of Section 01 7423 and following:
   1. Clean existing materials to remain with appropriate tools and equipment.
   2. Protect existing improvements during cleaning operations.
   3. Debris shall be dampened by fog water spray prior to transporting by truck.
   4. Debris pick-up area shall be kept broom-clean and washed daily with clean water.
   5. Remove waste and debris, other than items to be salvaged.
      a. Turn over salvaged items to Owner, or store and protect for reuse where required.
      b. Continuously clean up and remove items as demolition Work progresses.
   6. Remove and legally dispose of rubbish, debris, and waste materials off Project Site.

END OF SECTION 01 4113
SECTION 03 3000

CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Formwork for cast-in-place concrete and installation of embedded items.
      a. Work includes footings for Monument Signs, chain link and metal fence and
gates.
   2. Reinforcing steel for concrete unless specifically noted otherwise.
   3. Reinforced concrete with compressive strengths as shown.
   4. Concrete finishing

B. Related Sections:
   1. Section 01 4500: Quality Control
   2. Section 05 5000: Metal Fabrications; metal fences and gates
   3. Section 07 9200: Joint Sealants
   3. Section 32 0523: Concrete for Exterior Improvements; concrete for walks,curbs, and parking signs.

1.02 REFERENCES

A. California Code of Regulations (CCR), Title 24, Part 2, California Building Code (CBC),

B. ASTM International (ASTM):
   1. ASTM C-94 – Standard Specification for Ready-Mixed Concrete
   4. ASTM C685 – Standard Specification for Concrete Made By Volumetric Batching
      and Continuous Mixing
   5. ASTM A 1064 - Standard Specification for Carbon-Steel Wire and Welded Wire
      Reinforcement, Plain and Deformed, for Concrete
      Concrete Paving and Structural Construction (Nonextruding and Resilient
      Bituminous Types)
   7. ASTM D1752 - Standard Specification for Preformed Expansion Joint Filler for
      Concrete Paving and Structural Construction (Nonextruding and Resilient
      Bituminous Types)

C. American Concrete Institute (ACI):
   1. ACI 301 – Specification for Structural Concrete for Buildings.
   2. ACI 304 – Recommended Practice for Measuring, Mixing and Placing Concrete.
   3. ACI 305 – Recommended Practice for Hot Weather Concreting.
   5. ACI 318 – Building Code Requirements for Reinforced Concrete.
   6. ACI 347 – Recommended Practice for Concrete Formwork

E. The Engineered Wood Association (APA):
   1. Voluntary Product Standard Structural Plywood (PS 1-09)
   2. Guide to Plywood Grades

F. West Coast Lumber Inspection Bureau (WCLIB):

1.03 QUALITY ASSURANCE

A. Formwork and Accessories:
   1. Design Criteria: Formwork shall conform to ACI 347.
      a. Formwork:
         1) Shall prevent leakage or washing out of cement mortar.
         2) Shall resist spread, shifting, and settling.
         3) Shall reproduce accurately required lines, grades, and surfaces within tolerances specified.
      b. Safety: Contractor shall be responsible for adequate strength and safety of formwork including falsework and shoring.
   2. Allowable Tolerances: Formwork shall produce concrete within tolerance limits recommended in ACI 347, unless otherwise noted.

B. Reinforcing:
   1. Welders' Qualifications: Welders shall be qualified in accordance with AWS D1.4 and AWS D1.
   2. Reinforcing steel shall not be permitted to rust where there is danger of staining exposed surfaces of adjacent concrete.
      a. Contractor shall replace rust-stained concrete at his expense.
   3. Allowable Tolerances: Reinforcing steel shall be placed within tolerances permitted by ACI 318, Section 7.5 unless otherwise approved by Architect.
   4. Owner's Testing Agency will provide tests in accordance with CBC Chapter 17A.
      a. Collect mill test reports for reinforcement.
      b. Take samples from bundles at fabricators.
         1) When bundles are identified by heat number and accompanied by mill analysis, two specimens shall be taken from each ten tons, or fraction thereof, of each size and grade.
         2) When reinforcement is not positively identified by heat numbers or when random sampling is intended, two specimens shall be taken from each 2 tons, or fraction thereof, of each size and grade.
   3. Test for tensile and bending strengths.
      a. Provide inspection of welding, including prior fit-up, welding equipment, weld quality and welder certification in accordance with AWS D1.4 and AWS D1.8
      b. Chemical analysis sufficient to determine carbon equivalent and minimum preheat temperature shall be performed when reinforcement does not conform to low-alloy steel requirements of CBC Section 1903A.8.

C. Concrete:
   1. Testing Laboratory Qualifications: Testing Laboratory shall be under direction of registered Civil Engineer licensed in State of California and shall have operated successfully for four years prior to this Work, and shall conform to requirements of ASTM E329.
   2. Requirements of ACI 301 shall govern work, materials and equipment related to this Section.
      a. Specifications set minimum results required, and references to procedures are intended to establish minimal guides.
3. Contractor shall be responsible for quality of concrete in place and shall bear burden of proof that concrete meets minimum requirements.

4. Placing of concrete by means of pumping will be acceptable method of placement providing that Contractor can demonstrate that:
   a. Specified concrete strengths will be met.
   b. Equipment has record of satisfactory performance under similar conditions and using similar mix.
   c. Trial batches have been made.

1.04 SUBMITTALS

A. Contractor’s Testing Laboratory’s certificate of compliance.

B. Contractor shall submit:
   1. Certified copies of mix designs for each concrete class specified including compressive strength test reports.
   2. Certification that materials meet requirements specified.
   3. Samples as requested by Architect.
   4. Certification from vendor that samples originate from and are representative of each lot proposed for use.

C. Owner’s Testing Agency will submit reports on tests and inspections performed to Owner, Architect, Contractor, and Division of the State Architect.

D. Reinforcing Steel Reports: Certified mill test reports (tensile and bending) for each heat or melt of steel prior to delivery of material to Project Site.
   1. Where reinforcing is to be welded, mill test reports shall verify weldability of steel.

E. Shop Drawings:
   1. Cast-in-place Concrete:
      a. Show construction joint locations and details.

F. Mix Designs: Prepare mix designs for Architect’s review and include following information in mix design data:
   1. Design:
      a. Project name, address, Site location, and location of design usage.
      b. Contractor, Sub-Contractor, Supplier and Plant Location.
      c. Mix Number.
      d. Specified compressive strength, maximum aggregate size, slump, and placement method.
      e. Application and location in structure.
      f. Signature and stamp of licensed civil engineer responsible for mix design.
   2. Materials:
      a. Design Method.
      b. Water-Cement Ratio.
      c. Cement: Type, amount, and compliance with specified criteria statement.
      d. Aggregates: Source(s), gradations (Individual and combined).
      e. Admixtures: Brand, classification, dosage, addition method.
      f. Water source.
      g. Test Results, Batch Quantities, Yield (calculations).
   3. Special Considerations:
      a. Unit Weight.
      b. Other considerations relative to placement, curing, finish, and testing.
G. Schedule of placing for Architect's review before starting Work.

H. Samples: Formwork and accessories, upon request of Architect.

1.05 PROJECT CONDITIONS

A. Sequencing Schedule for Formwork:
   1. Ensure timely delivery of embedded items.
   2. Be responsible for cutting and patching necessitated by failure to place embedded items.
   3. Plan erection and removal to permit proper sequence of concrete placing without damage to concrete.

1.06 DELIVERY, STORAGE, AND HANDLING

A. General:
   1. Ensure storage facilities are weather tight and dry.
   2. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use.

B. Reinforcing:
   1. Deliver reinforcement and accessories to Project Site not more than 48-hours before placement.
   2. Store in manner to prevent excessive rusting and fouling with grease, dirt, or other bond-weakening coatings.
   3. Take precautions to maintain identification after bundles are broken.

C. Cast-in-Place Concrete:
   1. Store bulk cement in bins capable of preventing exposure to moisture.
   2. Use sacked cement in chronological order of delivery.
      a. Store each shipment so that it may be readily distinguishable from other shipments.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Formwork and Accessories:
   1. Forming Materials:
      a. Panel or board forms at Contractor's option.
         1) Panel Forms: Minimum 5/8 inch thick exterior grade plywood with sealed edges, PS 1 grade Plyform Class I and II B-B Exterior or HDO Exterior.
      2. Wood Framing: WCLIB standard grade or better Douglas Fir.
      3. Form Ties and Spreaders: Metal type acting as spreaders, leaving no metal within one inch of concrete face and no fractures, spalls, depressions or other surface disfigurements greater than 3/4 inch in diameter.
      4. Expansion Joint Filler:
         a. Fiber Type: Premolded asphalt-impregnated fiber, ASTM D1751, 1/4 inch thick unless otherwise noted.
         b. Provide one of following, or approved equal:
            1) W. R. Meadows, Inc. - Sealtight Fibre Expansion Joint (Basis-of-Design)
            2) J.D. Russell Company – Fiberflex Fiber Expansion Joint
            3) Right / Pointe Company – Fibre Expansion Joint
            4) SpecChem Fiber Expansion Joint
c. Cork Type: Preformed cork, ASTM D1752, Type II, 1/2-inch size unless otherwise noted.
   1) Right / Pointe Company – Cork-Standard Expansion Joint, or approved equal.

4. Form Sealer: Grace Construction Products – Formfilm, or approved equal.

5. Release Agent:
   a. Must not stain or otherwise adversely affect architectural concrete surfaces.
   b. Provide one of following, or approved equal:
      1) Nox-Crete Co. – Nox-Crete Form Coating
      2) Industrial Synthetics Corp. – Synthex

B. Reinforcing:
   1. Bars: New billet steel, ASTM A615 Grade 60, and ASTM A706, Grade 60, where welded.
      a. Refer to Structural Drawings for use of Grade 40 bars.
   2. Tie Wires and Spirals: ASTM A82.
   3. Bar Supports: As required for assembling and supporting reinforcement in place.
      a. Typical: CRSI Class B pregalvanized.
      b. Concrete adobes for foundations and slabs on grade.
   4. Threaded coupler: Lenton Standard coupler by ERICO or approved equal.
      a. Coupler shall develop 125-percent of specified yield strength reinforcement.

C. Concrete:
   1. General Requirements:
      a. Cement and aggregates shall have proven history of successful use with one another.
         1) Sources of cement and aggregate shall remain unchanged throughout Work unless Architect approves request for change made at least 10 days prior to anticipated date of casting.
      b. Ready-mixed concrete shall meet requirements of ASTM C94.
      c. Deviations in properties of materials tested by Owner's Testing Agency shall be cause for their rejection pending additional test results and redesign of mix by Contractor's Testing Laboratory.
      d. No frozen aggregates will be permitted.
   2. Cement:
      a. Conforming to ASTM C150, Type II / V, low alkali.
      b. Use one brand of cement throughout Project, unless otherwise acceptable to Architect.
   3. Aggregates:
      a. Conform to Section 1903A.1, Chapter 19A, Concrete, CCR, Title 24, Part 2 CBC, and following:
         b. Coarse Aggregate: Conforming to ASTM C 33.
            1) Consisting of clean, hard, fine grained, sound crushed rock, or washed gravel, or combination of both.
            2) Free from oil, organic matter or other deleterious substances and shall not contain more than two percent by weight of shale or cherty material.
      c. Fines: ASTM C33. Sand equivalent shall be not less than 75 when tested as per ASTM D2419.
      d. Provide aggregates from single source for exposed concrete.

D. Water: Clean and potable, free from impurities detrimental to concrete.

E. Concrete Admixtures:
   1. Use of concrete admixtures is subject to approval of Structural Engineer.
2. Use of calcium chloride or admixtures containing calcium chloride is prohibited.

3. If approved, provide admixtures produced by establish reputable manufacturers.
   a. Use in compliance with manufacturer’s printed directions.
   b. Do not use admixtures which have not been incorporated and tested in
      accepted mix designs.

4. If approved, following types of admixtures may be used, conforming to
   manufacturer’s recommendations for use:
   a. Water Reducing: Conforming to ASTM C 494, Type A.
   b. Accelerating or Retarding: Conforming to ASTM C 494

F. Fly Ash:
   1. Fly ash conforming to ASTM C 618, Class N or F may be used at Contractor’s
      option.
      a. Use of Class C is not permitted.
   3. Do not substitute more than 15 percent by weight of fly ash or other pozzolan, for
      ASTM C 150, Portland Cement.

G. Non-Shrink, Non-Metallic Grout: Premixed high strength grout requiring only addition
   of water at Project Site.
   1. Five Star Grout by Five Star Products, Inc.
   2. MasterFlow 928 by BASF Corporation, Construction Chemicals
   3. SikaGrout 428 FS by Sika Corporation

H. Curing Materials:
   1. Concrete Curing Paper: Conforming to ASTM C 171, non-staining, reinforced
      type.
      b. Approved equal.
   2. Liquid Curing Compound: Conforming to ASTM C 309, Type 1, Class B, approved
      standard product resin type.
      a. Deliver in unopened labeled containers.
      b. Water based acrylic polymer blend, free of wax or oil, compatible with
         subsequent applied finishes or floor coverings.
      c. Do not apply curing compounds in areas designated to receive floor
         coverings.

2.02 SOURCE QUALITY CONTROL

A. Plywood shall bear APA grade-trademark.

B. Owner’s Testing Agency will:
   1. Review mix designs, certificates of compliance, and samples of materials
      Contractor proposes to use.
   2. Test and inspect materials, as necessary, in accordance with ACI 318 and CBC
      Sections 1903A and 1905A for compliance with requirements.
   3. Take samples as required from Contractor’s designated sources.
   4. Take one grab sample for each 100 tons of Portland cement except that, when
      used in bulk loading ready-mix plants where separate bins for pretested cement
      are not available, take grab samples for each shipment of cement placed in bin
      with not less than one sample being taken for each day’s pour and subsequently
      test such samples if required by Architect who may be so advised by DSA.
5. Test coarse, intermediate, and fine aggregate by use of solution of sodium or magnesium sulfate, or both whenever in judgment of Architect such tests are necessary to determine quality of material.
   a. Perform such tests in accordance with ASTM C88.
   b. Loss shall not exceed 6 percent of either fine intermediate or coarse aggregate.
   c. Aggregate failing to comply with this requirement may be used in Work provided it contains less than 2 percent of shale and other deleterious particles and shows loss in soundness test of not more than 10 percent when tested in sodium sulphate solution.
   d. Test aggregates as required by CBC Section 1903A.6.

6. Test for sand equivalent of fine aggregate in accordance with California Test 217.

7. Test for cleanliness value of coarse and intermediate aggregate in accordance with California Test 227.

8. Inspect plant prior to starting Work to verify following:
   a. Plant is equipped with approved metering devices for determining moisture content of fine aggregate.
   b. Other plant quality controls are adequate.

9. Continuously inspect quality and quantity of materials used in transit mixed concrete, in batched aggregates and ready-mixed concrete at mixing plant or other location per CBC Section 1905A.1 and ACI 318 Chapter 5, where other materials are measured.

C. Waiver of Batch Plant Inspection:

1. Continuous batch plant inspection may be waived in accordance with CBC Section 1705A.3.3

2. When batch plant inspection is waived, following requirements shall apply:
   a. Qualified technician of Testing Agency shall check first batch at start of day.
   b. Licensed weighmaster to positively identify materials as to quantity and certify to each load by batch ticket.
   c. Batch tickets, including material quantities and weights:
      1) Shall accompany load
      2) Shall be transmitted to inspector of record (Project Inspector) by truck driver with load identified thereon.
      3) Load shall not be placed without batch ticket identifying mix.
      4) Inspector will keep daily record of placements, identifying each truck, its load, time of receipt, and approximate location of deposit in structure, and will transmit copy of daily record to enforcement agency.

2.03 MIXES

A. General Requirements:

1. Contractor shall perform tests or assemble necessary data indicating conformance with Specifications.

2. For each mix submit data showing that proposed mix will attain required strength in accordance with requirements of CBC Section 1905A.1

3. Contractor shall instruct Laboratory to base mix design on use of materials tested and approved by Owner's Testing Agency.

4. Mix design shall include compression strength test reports per CBC Section 1904A and 1905A.1.

5. Mix shall be designed, tested, and adjusted if necessary in ample time before first concrete is scheduled to be placed. Laboratory data and strength test results for revised mix design shall be submitted to Architect prior to using in Project.
6. Insure mix designs will produce concrete to strengths specified and of uniform density without segregation.
7. If mix yield exceeds 1-cubic yard, modify mix design to no more than one cubic yard without changing cement content.
8. Contractor's mix designs shall be subject to review by Architect and Owner's Testing Agency.
9. Introduction of calcium chloride will not be permitted.
10. Admixtures will not be permitted unless DSA approves, Architect reviews, Contractor modifies mix designs as necessary, and modifications are accepted by Owner's Testing Agency.
   a. Refer to CBC 1905A, ACI 318 Sections 3.2 and 3.6

B. Patching Mortar: Mix in proportions by volume of one part cement to two parts fine sand.

C. Non-Shrink, Non-Metallic Grout: Follow approved manufacturer's printed instructions and recommendations.

2.04 MIXING

A. Batching Plant Conditions:
   1. Ensure equipment and plant will afford accurate weighing, minimize segregation and will efficiently handle materials to satisfaction of Architect and Owner's Testing Agency.
   2. Use approved moisture meter capable of determining moisture content of sand.

B. General Requirements:
   1. Thoroughly clean concrete equipment before use for architectural concrete mixes to avoid contamination.
   2. Mix cement, fine and coarse aggregates, admixtures and water to exact proportions of mix designs.
      a. Method of mixing shall comply with ACI 318 Section 5.8.
   3. Measure fine and coarse aggregates separately according to approved method which provides accurate control and easy checking.
   4. Adjust grading to improve workability; do not add water unless otherwise directed.
   5. Maintain proportions, values, or factors of approved mixes throughout Work.
   6. Mix concrete in transit mixers five minutes immediately prior to discharge in addition to mixing as called for by ACI 304 and ASTM C 94.

C. Admixtures: Use automatic metering dispenser to introduce admixture into mix.
   1. Dispenser shall be recommended and calibrated by admixture manufacturer.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine areas where formwork will be constructed and verify that:
   1. Excavations are sufficient to permit placement, inspection and removal of forms.
   2. Excavations for earth forms have been neatly and accurately cut.
   3. Conditions are otherwise proper for formwork construction.
   4. Do not start work until unsatisfactory conditions have been corrected.

B. Examine units of Work to be cast and verify that:
   1. Construction of formwork is complete.
2. Required reinforcement, inserts, and embedded items are in place.
3. Form ties at construction joints are tight.
4. Concrete-receiving places are free of debris.
5. Depths of depressed slab conditions are correct for delayed finish noted and for its proper bonding to concrete.
6. Conveying equipment is clean and properly operating.
7. Architect has reviewed formwork and reinforcing steel and that preparations have been checked with Project Inspector.

C Do not begin casting before unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Obtain necessary information for coordination of formwork with items to be embedded in concrete and other related work.

B. Ensure availability of sufficient labor, equipment and materials to place concrete correctly in accordance with scheduled casting.

C. Protect finished surfaces adjacent to concrete-receiving places.

D. Clean transportation and handling equipment at frequent intervals and flush thoroughly with water before each day's run.
   1. Do not discharge wash water into concrete form.

E. Construction Joints:
   1. Clean and roughen construction joint contact surfaces by removing surface laitance and exposing sound mortar.
   2. Sandblasting and bush-hammering are acceptable methods.

3.03 FORMWORK CONSTRUCTION

A. General:
   1. Design, erect, support, brace, and maintain formwork to support vertical and lateral, static, and dynamic loads that might be applied until concrete structure can support such loads.
      a. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.
      b. Maintain formwork construction tolerances complying with ACI 347.
   2. Construct forms to sizes, shapes, lines and dimensions shown, and to obtain accurate alignment, location, grades, level and plumb Work in finished structures.
      a. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in Work.
      b. Use selected materials to obtain required finishes.
      c. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.
   3. Frame openings where indicated on Architectural, Structural, Mechanical, Plumbing and Electrical Drawings.

B. Earth Forms:
   1. Construct wood edge strips at top sides of excavations.
   2. Provide forms for footings wherever concrete cannot be placed against solid earth excavation.
3. Remove loose dirt and debris prior to concrete pours.
4. Foundation concrete may be placed directly into neat excavations provided foundation trench walls are stable as determined by Geotechnical Engineer, subject to approval of DSA.
   a. In such case, minimum formwork shown on Drawings is mandatory to insure clean excavations immediately prior to and during placing of concrete.
   b. Refer to Structural Drawings for footing requirements where footings are not formed.

C. Formed Elements:
   1. Carefully align inside and outside forms before tightening ties.
   2. Plywood Forms: Insure vertical joints are plumb and horizontal joints are level; arrange joints and ties in geometrical pattern as approved by Architect.
   3. Form inside corners at exposed conditions with mitered boards or plywood so that no concrete is placed against form ends.
   4. After erection, seal cracks, holes, slits, gaps, and apertures in forms so that they will withstand the pressure and will remain completely watertight.
   5. Provide means to seal bottom of forms at construction joints such as foam tape or other gasket devices.
   6. Apply coating of release agent prior to erection of formwork following approved manufacturer's recommendations.

D. Expansion Joints:
   1. Provide in exterior concrete paving on grade at maximum 24 feet on center or as noted and at intersections with vertical surfaces, curbs, manholes or other penetrations through paving.
   2. Use fiber type expansion joint fillers typically and depress 1/4 inch unless otherwise noted.
   3. Use cork type expansion joint fillers at conditions with non-bituminous waterproofing, liquid waterproofing, or sealant systems.

E. Construction Joints:
   1. Provide where shown on Drawings as directed by Architect and per ACI 318, Section 6.4.
   2. Provide key indentations at joints.
   3. Provide pour strips on inside face of forms at horizontal joints, but remove strips and thoroughly clean out reglets before placing subsequent portions of wall.
   4. Prevent formations of shoulders and ledges.
   5. Provide means for drawing forms into firm contact with concrete before placing additional concrete over previous pours where shrinking and warping has separated concrete from forms.

F. Embedded Items:
   1. Properly locate, unless locating is specified elsewhere, and place inserts and embedded items required by other trades prior to casting concrete.

3.04 REINFORCING PLACEMENT

A. General:
   1. Place bars as noted.
   2. Reinforcement shall be continuous.
      a. Refer to Structural Drawings for lap splice schedule.
      b. Stagger splices where possible.
      c. Contact lap splices shall be securely wired together to maintain alignment.
3. Ensure placement will permit concrete protection in conformance with CRSI or to extent shown.
4. Support and fasten bars securely with spacers, chairs or ties to permit their being walked upon without displacement or movement both before and during placement of concrete.
   a. Wire-tie bar intersections.
5. Do not bend bars around openings or sleeves.
   a. Wherever conduits, piping, inserts, or sleeves, and like items interfere with placing of reinforcement, obtain Architect's approval of placing before concreting.
6. Do not field bend bars unless expressly noted in the Contract Documents.

B. Prior to placing concrete, verify reinforcement has been bent, positioned, and secured in accordance with Drawings; ensure removal of oil, grease, dirt, or other bond-weakening coatings; replace severely rust-pitted reinforcing bars.

C. Quality Assurance:
   1. Project Inspector will inspect placement of reinforcement and notify Structural Engineer of discrepancies in placement.
   2. Owner's Testing Agency will inspect shop and field welding of reinforcing bars in accordance with CBC Section 1705A.2.2.1

3.05 CONCRETE PLACEMENT

A. Project Inspector, Architect, Structural Engineer, Testing Laboratory and DSA shall be notified at least 48 hours before placing concrete.

B. Place concrete in accordance with CBC Section 1905A and ACI 318, Chapter 5.
   1. Medium broom finish on exterior flatwork, unless otherwise indicated.
   2. Steel trowel for interior slabs, unless otherwise indicated.

C. Place concrete in cycles as continuous operation to permit proper and thorough integration and to complete scheduled placement.
   1. Do not place concrete where sun, wind, heat, or facilities prevent proper finishing and curing.

D. Convey concrete as rapidly and directly as practicable to preserve quality and to prevent separation from re-handling and flowing.
   1. Do not deposit concrete initially set.
   2. Cast concrete within ninety minutes after adding water unless otherwise noted.
   3. Re-tempering of concrete which has partially set will not be permitted.

E. Take precautions to avoid damage to under-slab moisture barrier and displacement of reinforcement and formwork.

F. Deposit concrete vertically in its final position.
   1. Avoid free falls in excess of six feet where reinforcement will cause segregation and in typical conditions unless Architect approves otherwise.

G. Keep forms and reinforcement clean above pour line by removing clinging concrete with wire brush before casting next lift. Also remove leakage through forms.

H. Interruption in casting longer than 60-minutes shall be cause for discontinuing casting for remainder of day.
1. In this event, cut back concrete and provide construction joints as Architect directs.
2. Clean forms and reinforcement as necessary to receive concrete at later time.

I. Hot Weather Concreting: Conform to ACI 305 and following requirements when mean daily temperature rises above 75 degrees F.
   1. Upper temperature limit of concrete mixes shall be established by Contractor for each class of concrete.
      a. Concrete temperature during placing shall not be so high as to cause difficulty from loss of slump, flash set, or cold joints, and shall not exceed 90 degrees F.
      b. Other project climatic conditions detrimental to concrete quality such as relative humidity, wind velocity, and solar radiation shall also be considered.
   2. Trial batches of concrete for each mix design shall be made at limiting mix temperature selected.
      a. In lieu of trial batches, compression strength test reports (20 minimum) at limiting temperature for each proposed mix shall be submitted to Owners testing laboratory for review.
   3. Practices to maintain concrete below maximum limiting temperature shall be in accordance with ACI 305.
      a. Concrete ingredients may be cooled before mixing, or flake ice or well-crushed ice of size that will melt completely during mixing may be substituted for part of mixing water.
   4. Practices to avoid potential problems of hot weather concreting shall be employed by Contractor in accordance with ACI 305.
   5. When temperature of reinforcing steel or steel deck forms is greater than 120 degrees F, reinforcing and forms shall be sprayed with water just prior to placing concrete.

J. Cold Weather Concreting:
   1. No placement of concrete will be allowed at temperatures below 20 degrees Fahrenheit or if mean daily temperature for curing period is anticipated to be below 20 degrees Fahrenheit.
   2. No concrete placement will be allowed on frozen sub-grade.
   3. Conform to ACI 306 and following requirements when mean daily temperature falls below 40 degrees Fahrenheit.
      a. Reinforcement, forms, or ground to receive concrete shall be completely free from frost.
      b. Concrete at time of placement for footings shall have temperature no lower than 50 degrees Fahrenheit.
         1) For other concrete this minimum temperature at time of placement shall be 60 degrees Fahrenheit.
         2) Maximum temperature shall be 90 degrees Fahrenheit.
      c. Concrete shall be maintained at temperature no lower than 50 degrees Fahrenheit for minimum 7-day period after placement by means of blanket insulation, heaters, or other methods as approved by Architect.
      d. Contractor shall keep record of concrete surface temperature for first 7-days after each pour.
         1) Record shall be open to inspection by Architect.

K. Consolidating:
   1. Use vibrators for thorough consolidation of concrete.
   2. Provide vibrators for each location during simultaneous placing to ensure timely consolidation around reinforcement, embedded items and into corners of forms; ensure availability of spare vibrators in case of failures.
a. Vibrate through full depth of freshly placed concrete.
3. Do not place vibrators against reinforcement, attach to forms, or use to spread concrete.
4. Exposed Concrete: Vibrate with rubber type heads and, in addition, spade along forms with flat strap or plate.

L. Construction Joints:
1. Verify location and conformance with typical details
   a. Provide only where designated or approved by Architect.
   b. Comply with CBC Section 1906A.4.
2. Horizontal and vertical construction joints to be thoroughly sandblasted to clean and roughen entire surface to minimum 1/4-inch relief exposing clean coarse aggregate solidly embedded in mortar matrix.
3. Just prior to depositing concrete, surface of construction joint shall be thoroughly wetted.

M. Contraction (Control) Joints in Slabs-on-Grade:
1. Construct contraction joints in slabs-on-ground to form panels of patterns indicated on Shop Drawings.
   a. Use saw cuts 1/8 inch x 1/4 slab depth, unless otherwise indicated.
2. Time saw cutting to allow sufficient curing of concrete to prevent raveled or broken edges.
3. Contraction joints in unexposed floor slabs may be formed by saw cuts as soon as possible after slab finishing as may be safely done without dislodging aggregate, maximum 24 hours after pouring.
4. If joint pattern is not shown, provide joints not exceeding 15 feet in either direction and located to conform to bay spacing wherever possible; at column centerlines, half bays, third-bays

N. Formed Elements:
1. Space points of deposit to eliminate need for lateral flow.
   a. Placing procedures of concrete in forms permitting escape of mortar, or flow of concrete itself, will not be permitted.
2. Level top surface upon stopping work.
3. Take special care to fill each part of forms by depositing concrete directly as near final position as possible, and to force concrete under and around reinforcement, embedded items, without displacement.
4. After concrete has taken its initial set, care shall be exercised to avoid jarring forms or placing strain on ends of projecting reinforcement.

3.06 CURING

A. General Requirements:
1. Deploy curing measures immediately after casting and for measures other than application of curing compound, extend for seven days.
   a. Architect may recommend longer periods based upon prevailing temperature, wind and relative humidity.
   b. Comply with ACI 318, Section 5.11.
2. Avoid alternate wetting and drying and fluctuations of concrete temperature.
3. Protect fresh concrete from direct rays of sun, rain, freezing, drying winds, soiling, and damage.
4. Do not permit curing method to affect adversely finishes or treatments applied to finish concrete.
B. Curing Method, Typical: Obtain Architect's approval of alternate measures.
   1. Keep forms and concrete surfaces moist during period forms are required to remain in place.
   2. Apply curing compound, only when approved by Architect, per manufacturers’ recommendations.

3.07 FORM REMOVAL

A. Secure the Architect's approval for time and sequence of form removal.

B. Form Removal: Forms shall be removed without damage to concrete, and in no case shall they be removed prior to concrete member attaining specified strength:

<table>
<thead>
<tr>
<th>MEMBER</th>
<th>STRENGTH</th>
<th>MINIMUM TIME*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vertical surfaces of walls</td>
<td>0.60 ft(^c)</td>
<td>7 days</td>
</tr>
</tbody>
</table>

1. *Estimated curing time required to obtain desired strength.
   a. Results of 7-day test cylinder break shall be presented to Architect to demonstrate compliance with above specified strength requirements prior to form removal.
   b. Where 7-day test cylinder break demonstrates strength that is less than that specified, Contractor may elect to take additional cylinders at time of next pour to demonstrate strength requirements.
   c. Contractor shall bear cost of taking and testing additional samples.

C. Forms:
   1. Remove forms carefully to avoid damaging corners and edges of exposed concrete.
   2. Reuse:
      a. Architect will approve reuse of forms provided they are straight, clean, free from nails, dirt, hardened concrete, or other injurious matter and edges and surfaces are in good condition.
      b. Clean and repair damage caused by placing, removal, or storage.
         1) Reuse of formwork with repairs or patches which would result in adverse effects to architectural concrete finish will not be permitted.
      c. Store formwork in manner to prevent damage or distortion.
      d. Reseal as required to achieve concrete of specified quality.

3.08 CLEANING, PATCHING, AND DEFECTIVE WORK

A. Where concrete is under strength, out of line, level or plumb, or shows objectionable cracks, honeycombing, rock pockets, voids, spalling, exposed reinforcement, signs of freezing, or is otherwise defective, and, in Architect's judgment, these defects impair proper strength or appearance of Work, Architect will require its removal and replacement at Contractor's expense.

B. Immediately after stripping and before concrete is thoroughly dry, patch minor defects, form-tie holes, honeycombed areas, and similar areas, with patching mortar.
   1. Patch shall match finish of adjacent surface unless otherwise noted.
   2. Remove ledges and bulges.

C. Compact mortar into place and neatly file defective surfaces to produce level, true planes.
1. After initial set, dress surfaces of patches mechanically or manually to obtain same texture as surrounding surfaces.

D. Rock Pockets:
1. Cut out to full solid surface and form key.
2. Thoroughly wet before casting mortar.
3. Where Architect deems rock pocket too large for satisfactory mortar patching as described, cut out defective section to solid surface, key and pack solid with concrete to produce firm bond and match adjacent surface.

E. Cleaning
1. Ensure removal of bituminous materials, form release agents, bond breakers, curing compounds if permitted, and other materials employed in concrete work which would otherwise prevent proper application of sealants, liquid waterproofing, and other delayed finishes and treatments.
2. Where cleaning is required, take care not to damage surrounding surfaces or leave residue from cleaning agents.

3.09 CLEAN UP

A. Perform Work to keep affected portions of Project Site neat, clean, and orderly.
1. Remove, immediately upon completion of Work, surplus materials, rubbish, and equipment associated with or used in performance.
2. Be aware that failure to perform clean-up operations within 24 hours of notice by Architect will be considered adequate grounds for having work done by others at no added expense to Owner.

3.10 FIELD QUALITY CONTROL

A. Owner's Testing Agency will:
1. Perform testing in accordance with ACI 318 and CBC Section 1903A and 1905A.
2. Review concrete mix designs.
3. Inspect concrete and grout placement continuously.
4. Test concrete to control slumps according to ASTM C143.
5. Continuously monitor concrete temperature as it arrives on Project Site.
6. Test concrete for required compressive strength in accordance with CBC Section 1704A, 1704A.3, and 1903A:
   a. Make and cure three specimen cylinders according to ASTM C31 for each 50 cubic yards, or fraction thereof, of each class poured at Project Site each day.
   b. Retain one cylinder for 7-day test and two for 28-day test.
   c. Number each cylinder 1A, 1B, 1C, 2A, 2B, 2C, etc; date each set; and keep accurate record of pour each set represents.
   d. Transport specimen cylinders from Project to laboratory after cylinders have cured for 24-hours on Project Site.
   e. Cylinders shall be covered and kept at air temperatures between 60 and 80 degrees Fahrenheit.
   f. Test specimen cylinders at age 7-days and age 28-days for specified strength according to ASTM C39.
   g. Base strength value on average of two cylinders taken for 28-day test.
7. Test and inspect materials, as necessary, in accordance with ACI 318, MM Test Method 227 (Coarse and Intermediate Aggregates) and MM Test Method 217 (Fine Aggregates), for compliance with requirements specified in this section.

B. Submit ticket for each batch of concrete delivered to Project Site.
1. Ticket shall bear following information:
   a. Design mix number.
   b. Signature or initials of ready mix representative.
   c. Time of batching.
   d. Weight of cement, aggregates, water and admixtures in each batch with maximum aggregate size.
   e. Total volume of concrete in each batch.
   f. Notation to indicate equipment was checked for contaminants prior to batching.

2. Pay Owner's Testing Agency for taking core specimens of hardened structure and testing specimen according to ASTM C88 and C42 when laboratory tests of specimen cylinders show compressive strengths below specified minimum.

3.11 PROTECTION

A. Protect concrete from injurious action of elements and defacement during construction operations.

B. Protect exposed corners of concrete from traffic or use which will damage them.

C. Make provisions to keep exposed concrete free from laitance caused by spillage or leaking forms or other contaminants.
   1. Do not allow laitance to penetrate, stain, or harden on surfaces which have been textured.

END OF SECTION 03 3000
SECTION 05 5000
METAL FABRICATIONS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Extent of miscellaneous metal fabrications is shown on Drawings and includes, but is not limited to, following:
      a. Items fabricated from iron and steel shapes, plates, bars, strip, tubes, and castings which are not part of structural steel or other metal systems specified elsewhere.
   2. Work includes, but is not limited to:
      a. Custom metal fence and gates.
      c. Monument Signs.
      d. Miscellaneous framing and supports
   3. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry for installation of miscellaneous metal fabrication work.
      a. Provide setting drawings, templates, instructions and directions for installation of anchorage devices.
      b. Coordinate delivery with other work to avoid delay.

B. Related Sections:
   1. Section 03 3000: Cast-in-Place Concrete; concrete footings for fence and monument sign posts.
   2. Section 07 9200: Joint Sealants
   3. Section 08 7100: Door Hardware; panic devices
   4. Section 09 9100: Painting; field painting of metal fabrications not indicated to receive hot-dip galvanized finish or high performance coatings.
   5. Section 09 9600: High Performance Coatings.

C. Related Requirements:
   1. Refer to Division 26 sections for electrical power and lighting requirements for Monument Signs.

1.02 REFERENCES


B. American Institute of Steel Construction (AISC):
   1. AISC – Design, Fabrication and Erection of Structural Steel for Buildings.

C. American Institute of Steel and Iron (AISI):
   1. AISI S100 – North American Specification for the Design of Cold-Formed Steel Structural Members.
D. American Welding Society (AWS):
   1. Comply with applicable provisions of following welding standards:
      a. AWS D1.1 – Structural Welding Code - Steel
      b. AWS D1.3 – Structural Welding Code - Sheet Steel
   2. Certify that each welder has satisfactorily passed AWS qualification tests
      for welding processes involved and, when pertinent, has undergone
      recertification.
   3. AWS QC1 – Standard for AWS Certification of Welding Inspectors.

E. ASTM International (ASTM):
   1. ASTM A 36 - Standard Specification for Carbon Structural Steel
   2. ASTM A 123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings
      on Iron and Steel Products
   3. ASTM A 153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and
      Steel Hardware
   4. ASTM A 307 - Standard Specification for Carbon Steel Bolts, Studs, and
      Threaded Rod 60000 PSI Tensile Strength
   5. ASTM A 500 - Standard Specification for Cold-Formed Welded and Seamless
      Carbon Steel Structural Tubing in Rounds and Shapes
   6. ASTM A 501 - Standard Specification for Hot-Formed Welded and Seamless
      Carbon Steel Structural Tubing
   7. ASTM A 653 - Standard Specification for Steel Sheet, Zinc-Coated
      (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
   8. ASTM A 780 - Standard Practice for Repair of Damaged and Uncoated Areas
      of Hot-Dip Galvanized Coatings
   9. ASTM A 1008 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon,
      Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved
      Formability, Solution Hardened, and Bake Hardenable
   10. ASTM A 1011 - Standard Specification for Steel, Sheet and Strip, Hot-Rolled,
       Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with
       Improved Formability, and Ultra-High Strength
       Grout (Nonshrink)
   12. ASTM F 593 - Standard Specification for Stainless Steel Bolts, Hex Cap
       Screws, and Studs

F. The Society for Protective Coatings (SSPC):
   1. SSPC SP 1 – Solvent Cleaning.
   2. SSPC SP 2 – Hand Tool Cleaning.
   3. SSPC SP 3 – Power Tool Cleaning.
   4. SSPC SP 6 – Commercial Blast Cleaning.

1.03 QUALITY ASSURANCE

A. Field Measurements: Take field measurements prior to preparation of shop drawings
   and fabrication, where possible.
   1. Do not delay Project progress
      a. Allow for trimming and fitting wherever taking field measurements before
         fabrication might delay Work.

B. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize
   field splicing and assembly.
   1. Disassemble units only as necessary for shipping and handling limitations.
2. Clearly mark units for reassembly and coordinated installation.

C. Welding Inspector Qualifications:
   1. Welding Inspectors shall be trained and thoroughly experienced in inspecting welding operations, and qualified as Certified Welding Inspectors (CWI) in accordance with AWS D1.1, AWS D1.3, and AWS QC1.

D. Welder Qualifications:
   1. Welders, welding operators, and tackers shall be qualified in accordance with AWS D1.1.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products to be used in fabrication of miscellaneous metal fabrications, including paint products.
   1. Product data for specified shop primer system:
      a. Material List: Provide inclusive list of required coating materials
         1) Identify material by manufacturer's catalog number and general classification.
      b. Manufacturer's Information: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, and applying coating material proposed for use.

B. Shop Drawings: For fabrication and erection of miscellaneous metal assemblies.
   1. Include plans and elevations at scale of not less than 1/2 inch equals 1 foot.
      a. Include details of sections and connections at scale of not less than 3 inches equals 1 foot.
      b. Show anchorage and accessory items.
      c. Provide templates for anchor and bolt installation by others.

C. Electrode Requirements:
   1. Packaging of weld filler metals shall conform to requirements of AWS D.1.1.
      a. FCAW electrodes shall be received in undamaged moisture-resistant containers.
      b. They shall be protected against contamination and injury during shipment and storage.
      c. When removed from protective packaging and installed on machines, care shall be taken to protect electrodes and coatings from deterioration or damage.

D. Welding Procedures: Procedures shall assign responsibility to person or position and shall contain enough detail to be useful to workforce without reference to governing specifications.
   1. Procedures need not act as work instructions.
   2. Procedures shall be dated and indicate person or position that has authority to maintain procedure.
      a. Welding Procedure Specifications (WPSs): Welding Procedure Specifications (WPSs) shall conform to requirements of AWS D1.1 and D1.8.
      b. Submit Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQR) as required by AWS D1.1 and D1.8, to be used on Project to Owner’s Testing Agency who shall review and approve WPSs.
1) Use forms provided in Annex E of AWS D1.1 and D1.8 or equivalent.

3. Weld Sequence Procedures: Submit written procedures indicating field welding sequences for each type of connection with multiple field-welded joints, and sequence of such connections to be field-welded at each level.

4. Weld Shrinkage and Distortion Control Plan: Where shrinkage is likely to cause distortion or other problems, submit mitigation plan.
   a. Contractor is responsible for determining conditions requiring Weld Shrinkage and Distortion Control Plan.

PART 2 – PRODUCTS

2.01 MATERIALS AND COMPONENTS

A. Metal Surfaces – General:
   1. For fabrication of miscellaneous metal work which will be exposed to view, only use materials which are smooth and free of surface blemishes.
   2. Do not use materials having exposed-to-view surfaces exhibiting pitting, seam marks, roller marks, rolled trade names, roughness, oil canning, stains, discoloration or other imperfections.

B. Steel Plates, Shapes and Bars: ASTM A 36.

C. Steel Tubing: Hot-formed, welded or seamless, ASTM A 501 or cold-formed, ASTM A 500.

D. Structural Steel Sheet: Hot-rolled, ASTM A 1011; or cold-rolled ASTM A 1008, Class 1; of grade required for design loading.

E. Galvanized Structural Steel Sheet: ASTM A 653; of grade required for design loading.

F. Concrete Inserts: Threaded or wedge type, galvanized ferrous castings, either malleable iron ASTM A 47 or cast steel ASTM A 27.
   1. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.

G. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.

H. Fasteners:
   1. Use fasteners made of same basic metal as fastened metal, unless otherwise indicated.
      a. Do not use metals which are corrosive or incompatible with materials joined.
      b. Do not use exposed fasteners except where unavoidable.
         1) Match finish of metal surrounding fastener.
   2. Provide Phillips flat-head machine screws for exposed fasteners, unless otherwise indicated.
   3. Provide zinc-coated fasteners for exterior use or where built into exterior walls.
   4. Select fasteners for type, grade and class required.
   5. Steel Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A; with hex nuts, unless noted otherwise.
   a. Alloy Group 2, Type 316 or 316L, stainless steel bolts complying with ASTM F 593 and nuts complying with ASTM F 594.

7. Lag Bolts: Square head type, ASME B 18.2.1 Machine Screws: Cadmium plated steel, ASME B 18.6.3


10. Expansion Bolts:
    a. Concrete Anchorage: Hilti Kwik Bolt TZ; ICC ESR-1917

   1. Provide one of following or grout specifically recommended by manufacturer for types of applications indicated:
      a. Masterflow 713 Plus; BASF Building Systems
      b. Sealight 588 Grout; W.R. Meadows
      c. Five Star Grout; Five Star Products, Inc.
      d. SikaGrout 212; Sika Corporation.

J. Shop Primer for Ferrous Metal: Carbozinc 859 VOC Organic Zinc-Rich Epoxy Primer by Carboline Company, Hydro-Zinc 94-H20 by Tnemec Company, or approved equal; VOC compliant at 100 g/L or less.
   1. Coordinate selection of primer with finish paint requirements in Section 09 9600, as applicable.
      a. Primer and finish coat materials for exposed steel are required to be complete system by one manufacturer
   2. Prime painting with specified shop primer is required of exposed structural steel and exterior metal work.
   3. Finish field painting is specified in Section 09 9600.

K. Galvanizing: Provide zinc coating for those items shown or specified to be galvanized, as follows:
   1. ASTM A 123:
      a. For galvanizing rolled, pressed and forged steel shapes, plates, bars and strip 1/8 inch thick and heavier.
      b. For galvanizing assembled steel products.
      c. Perform galvanizing after fabrication with Work assembled in as large sections as can be handled.
   2. ASTM A 153 for galvanizing iron and steel hardware.
   3. Hot dip galvanize concealed structural steel and metal work after fabrication unless otherwise indicated.
   4. Remove projections, barbs, and icicles after galvanizing.
   5. Do not galvanize exterior exposed structural steel and metal work.
      a. Exposed structural steel and metal work are to receive high performance coatings as specified in Section 09 9600.
   6. Galvanizing Repair Paint: Organic zinc rich paint complying with SSPC-Paint 20, with dry film containing not less than 94 percent zinc dust by weight.

L. Isolation Between Dissimilar Materials:
   1. Provide single-component, inert-type non-corrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities; VOC compliant.
2. Elasto-Deck BT as manufactured by Pacific Polymers International, Inc. or equivalent product acceptable to Architect.

M. Joint Sealant: Comply with requirements of Section 07 9200 and following.
   1. Nonsag, nonstaining, silicone sealant complying with ASTM C 920; of type and grade required to seal joints in formed metal; as recommended in writing by formed metal manufacturer or fabricator.

2.02 FABRICATION – GENERAL

A. Fabricate items to comply with requirements indicated, including those for quality, thickness and finish of material as well as those indicating dimensions and details.
   1. Use heavier metal gages, stiffeners or metal backing as required to produce surface flatness, free of "oil-canning", and to impart sufficient strength for use indicated.
   2. When not otherwise indicated, provide following minimum thickness of metal and comply with SMACNA recommendations for fabrication and installation details:
      a. Sheet Steel: 16 gage, unless noted otherwise.
      b. Galvanized Sheet Steel: 16 gage.
   3. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support.
   4. Use type of materials shown or specified for various components of Work.

B. Use hot-rolled steel bars for work fabricated from bar stock, unless shown or specified to be fabricated from cold-finished or cold-rolled stock.

C. Supply as part of this Section, miscellaneous small parts of material thinner than 10 gage, or items specifically called out in this section, when such supply is normal and accepted part of Work.

D. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges.
   1. Ease exposed edges to a radius of approximately \( \frac{1}{32} \) inch unless otherwise shown.
   2. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing Work.

E. Weld corners and seams continuously, complying with AWS recommendations.
   1. At exposed connections, grind exposed welds smooth and flush, to match and blend with adjoining surfaces.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible.
   1. Use exposed fasteners of type shown or, if not shown, Phillips flat-head countersunk screws or bolts.

G. Form sheet metal items in maximum lengths and keep joints to minimum.
   1. Do not exposed cut edges of sheet metal except as indicated.
   2. Fold back exposed ends of unsupported sheet metal to form 1/2 inch wide hem on concealed side, or ease exposed edges with backing to radius of approximately \( \frac{1}{32} \) inch.
   3. Form items with flat, flush surfaces, true to line and level, and without cracking and grain separation at bends.
H. Provide type of anchorage shown.
   1. Coordinate with supporting structure.
   2. Fabricate and space anchoring devices as shown and as required to provide adequate support for intended use.

I. Cut, reinforce, drill and tap miscellaneous metal work as required to receive finish hardware and similar items.

J. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.

2.03 MISCELLANEOUS METAL FABRICATIONS

A. Manufacture or fabricate items to sizes, shapes and dimensions required.
   1. Furnish malleable iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

B. Miscellaneous Framing and Supports: Provide miscellaneous steel framing and supports which are not part of structural steel framework, as required to complete Work.
   1. Fabricate miscellaneous units to sizes, shapes and profiles shown or, if not shown, of required dimensions to receive adjacent other work to be retained by framing.
   2. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars, of welded construction using mitered joints for field connection.
   3. Cut, drill and tap units to receive hardware and similar items.
   4. Equip units with integrally welded anchor straps for casting into poured concrete or building into masonry wherever required.
   5. Except as otherwise shown, space anchors 24 inches on center and provide minimum anchor units of 1-1/4 by 1/4 by 8 inch steel straps.

C. Miscellaneous Steel Trim: Provide shapes and sizes as required for profiles shown.
   1. Except as otherwise noted, fabricate units from structural steel shapes and plates and steel bars, with continuously welded joints and smooth exposed edges.
   2. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation of other work.
   3. Galvanize miscellaneous steel trim where indicated, unless indicated to be painted.

2.04 DECORATIVE METAL FENCE AND GATES

A. Materials for Fence and Gates:
   1. Fence and Gate Posts: HSS steel tube with steel cap welded to top of each post.
      a. Size and thickness as indicated.
   2. Gate Frames: 2-1/2 inch by 2-1/2 inch 1/8 inch HSS steel tube.
   3. Fence and Gate Pickets: 1 inch by 1 inch by 11 gage square steel tube.
   4. Wire Mesh for Gates: Square, 1 inch opening with Intercrimp weave.
      a. Wire Diameter: 0.1200 inch.
      b. Weight: 0.83 lb/square foot.
   5. Panic Hardware Mounting Plates: 10 inch high by 1/8 inch thick steel plate by width of gate, at both sides of each gate indicated to receive panic hardware.
B. Gate Hardware:
   1. Hinges:
         1) Mammoth 180 Self-Closing Hinge Set – Model M180BL by Hoover Fence Company, or approved equal.
         2) Color: Black
      b. Fire Lane Access Gate: Extra heavy duty ball bearing steel butt hinges:
         1) 8 inches by 8 inches.
         2) Minimum of 3 hinges per gate leaf up to 7 feet 6 inches in height.
         3) Provide Knox Box for Fire Department access.
   2. Cane Bolts: Stanley Model 1009, 5/8 inch diameter by 18 inches long, steel.
      a. Black finish.
   3. Kick Plates: 10 inch high by 1/8 inch thick steel plate by width of gate, at both sides of each gate.

2.05 MONUMENT SIGNS

A. Materials:
   1. Posts: Steel tube as indicated.
   2. Sheet Metal Coping: 18 gage
      a. Conform to SMACNA recommendations for fabrication
      b. Prefinished to match metal panel siding
   4. Metal Siding: Profile Series Exposed Fastener BR5-36 as manufactured by Centria.
         1) Standard smooth surface finish.
         2) Prefinished Coating System: Duragard Plus by Centria.
            a) Color: As selected by Architect.
      b. Panel Depth: 1-1/2 inches.
      c. Panel Width: 36 inches.
      d. Panel Lengths: As indicated.

2.06 SHOP FINISHES

A. Shop Painting: Apply specified shop primer to uncoated surfaces of miscellaneous metal work, except members or portions of members to be embedded in concrete, surfaces and edges to be field welded, and surfaces specified to be galvanized.
   1. Comply with requirements of SSPC-PA 1 - Paint Application Specification No. 1, and following.
   2. Remove scale, rust and other deleterious materials before applying shop coat.
      a. Clean off heavy rust and loose mill scale in accordance with SSPC SP-2: Hand Tool Cleaning, SSPC SP-3: Power Tool Cleaning, or SSPC SP-6: Commercial Blast Cleaning.
   3. Clean metal work to receive paint coating specified in Section 09 9600 in accordance with SSPC SP-6: Commercial Blast Cleaning.
      a. Conform to requirements for paint coating systems specified in Section 09 9600.
   4. Remove oil, grease and similar contaminants in accordance with SSPC SP-1: Solvent Cleaning.
   5. Immediately after surface preparation, brush or spray on primer in accordance with manufacturer's instructions, and at rate to provide uniform dry film thickness of 2.0 mils for each coat.
      a. Use painting methods which will result in full coverage of joints, corners, edges and exposed surfaces.
6. Apply one shop coat to fabricated metal items, except apply 2 coats of paint to surfaces inaccessible after assembly or erection.
   a. Change color of second coat to distinguish it from first.

B. Galvanized Finish:
   1. Where specified, galvanize items after fabrication.
   2. Conform to requirements for galvanizing as specified in “Materials and Components” Article.
   3. Where galvanizing is removed by assembly procedures, touch up abraded areas with specified zinc-rich paint.

PART 3 – EXECUTION

3.01 PREPARATION

A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction.
   1. Coordinate delivery of such items to Project Site.

3.02 INSTALLATION – GENERAL

A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete construction.
   1. Galvanize exposed fasteners to secure to in-place construction.

B. Cutting and Fitting: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications.
   1. Fit exposed connections accurately together to form tight hairline joints.
   2. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations.
   3. Grind joints smooth and touch-up shop paint coat.
   4. Do not weld, cut or abrade surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.

C. Placement: Set Work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels.
   1. Provide temporary bracing or anchors in formwork for items which are to be built into concrete, masonry or similar construction.

D. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.
3.03 FIELD PAINTING

A. Finish paint exposed components of decorative metal fence and gates with high performance coating system specified in Section 09 9600.
   1. Do not paint panic devices and other prefinished items.
   2. Color: Black

B. Finish paint exposed surfaces of chain link fence, gates, and components that do not have factory applied vinyl coating.
   1. Field paint includes existing galvanized chain link fence components.
   2. Clean and prepare existing galvanized surfaces to receive high performance paint specified in Section 09 9600.
      a. Conform to paint manufacturer’s recommendations for product application.

C. Corrosion Protection: Coat concealed surfaces of metal that will come into contact with grout, concrete, or dissimilar metals with heavy coat of specified isolation material.

D. Touch-up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as specified for shop painting.
   1. Apply by brush or spray to provide minimum dry film thickness of 2.0 mils.

E. Repair of Galvanized Surfaces: Repair areas damaged by welding, cutting or during handling, transport or erection in accordance with ASTM A 780 by application of multiple coats of galvanizing repair paint, to dry film thickness of 8 mils.

END OF SECTION 05 5000
SECTION 06 1000
ROUGH CARPENTRY

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Furnish labor, material, and equipment required to complete Work shown on
      Drawings and specified herein, including but not limited to following:
      a. Wood Framing.
      b. Blocking, backing, nailers, and wood grounds required for securing
         other work.
      c. Wood furring.
      d. Rough Hardware and Connectors.

B. Related Sections:
   1. Section 03 3000: Cast-in-Place Concrete; formwork and accessories
   2. Section 08 1400: Wood Doors

1.02 REFERENCES

A. California Code of Regulations (CCR), Title 24, Part 2, California Building Code (CBC),

B. Underwriters’ Laboratories, Inc. (UL)
   1. Fire Hazard Classification – FR-S

D. West Coast Lumber Inspection Bureau (WCLIB):

E. Western Wood Products Association (WWPA):
   1. Standard Grading Rules for Western Lumber.

F. American Wood Preservers Association Standards (AWPA)

G. ASTM International (ASTM):
   1. ASTM A 153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel
      Hardware.
      Deposited on Iron and Steel.
   3. ASTM E 84 – Standard Test Method for Surface Burning Characteristics of
      Building Materials.

H. American Wood Council (AWC):

1.03 QUALITY ASSURANCE

A. Wood Product Quality Standards:
   1. Lumber Standards: Comply with West Coast Lumber Inspection Bureau (WCLIB).
2. Factory-mark each piece of lumber with type, grade, mill and grading agency.

B. Do not use powder driven fasteners unless approved by Structural Engineer.

C. Single-Source Responsibility for Fire Retardant Treated Wood:
   1. Obtain each type of fire-retardant-treated wood product from one source and by single producer.

1.04 SUBMITTALS

A. Shop Drawings: Specially fabricated rough hardware.

B. Certificates of compliance with specified standards.

C. Wood treatment data as follows, including chemical treatment manufacturer's instructions for handling, storing, installation, and finishing of treated material:
   1. For each type of preservative treated wood product include certification by treating plant stating type of preservative solution and pressure process used, net amount of preservative retained, and compliance with applicable standards.
   2. For water-borne treated products include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to Project Site.
   3. For fire-retardant-treatment wood products, include certification by treating plant that treated material complies with specified standard and other requirements as well as data relative to bending strength, stiffness, and fastener-holding capacities of treated wood.
   4. Material test reports from qualified independent testing agency indicating and interpreting test results relative to compliance of fire-retardant-treated wood products with requirements indicated.
   5. Warranty of chemical treatment manufacturer for each type of treatment.

1.05 PROJECT CONDITIONS

A. Environmental Requirements: Maintain uniform moisture content of lumber at not more than 19 percent before, during, and after installation.

B. Sequencing and Scheduling: Coordinate details with other Work supporting, adjoining or fastening to rough carpentry Work.

1.06 SEQUENCING

A. Coordination: Fit carpentry work to other work; scribe and cope as required for accurate fit.
   1. Correlate location of furring, nailers, blocking, grounds and similar supports to allow proper attachment of other work.
   2. Cooperate with other trades, especially Concrete, and Metal Fabrications to prevent duplication of rough hardware furnished.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide proper facilities for handling and storage of materials to prevent damage to edges, ends, and surfaces.

B. Where necessary, stack materials off ground on level flat forms, fully protected from weather.
1. Keep materials dry.

1.08 REGULATORY REQUIREMENTS:

A. California Building Code (CBC) – Chapter 23.

PART 2 – PRODUCTS

2.01 MATERIAL – GENERAL

A. Rough Carpentry:
   1. Sills on Concrete: Pressure treated Douglas Fir.
   2. Lumber (Wood Framing): As shown on Structural Drawings

B. Rough Hardware:
   1. Where rough carpentry is exposed to weather, in ground contact, or in area of high relative humidity, provide fasteners with hot-dip zinc coating conforming to ASTM A 153 or of AISI Type 316 stainless steel.
      a. Comply with CBC Section 2303.6
      a. Provide guide washers to accurately control penetration, maximum 3/4-inch.
      b. Accomplish fastening by low-velocity piston-driven powder-actuated tool.
      c. Pins and Tool: Hilti Fastening Systems or approved equal.
      a. Tightening of nut or increased tension on bolt shank shall act to force wedges outward to create positive increased resistance to withdrawal,
      b. DSA Approved Expansion Bolts
         1) For Concrete: Kwik Bolt TZ – ESR-1917
         2) For Concrete Unit Masonry: Kwik Bolt 3 – ESR 1385
   5. Miscellaneous Hardware:
      a. Provide common screws, bolts, fastenings, washers and nuts required to complete rough carpentry Work.

2.02 LUMBER

A. General:
   1. Nominal sizes are indicated, except as shown by detail dimensions.
   2. Provide actual sizes as required by CBC, Chapter 23, for moisture content specified for each use.
   3. Provide dressed lumber, S4S, unless otherwise indicated.
   4. Provide seasoned lumber with 19 percent maximum moisture content.

B. Framing Lumber:
   2. Stress grades and wood species as noted on Structural Drawings.

2.03 FIRE-RETARDANT-TREATED MATERIALS

A. Where fire-retardant-treated wood is indicated, comply with applicable requirements of AWPA C20 (lumber).
1. Identify fire-retardant-treated wood with appropriate classification marking of Underwriters Laboratories, Inc., U.S. Testing, Timber Products Inspection, Inc. or another testing and inspecting agency acceptable to authorities having jurisdiction.

2. Evaluation Reports: Provide fire-retardant-treated wood acceptable to authorities having jurisdiction and for which current model code research or evaluation report exists that evidences compliance of fire-retardant-treated wood for application indicated.

B. Interior Type: For interior locations, use chemical formulation that produces treated lumber with following properties under conditions present after installation:
   1. Strength Adjustments: Adjust design values for fire retardant treated wood in accordance with CBC Section 2303.2.5
      a. Bending strength, stiffness, and fastener-holding capacities are not reduced below values published by manufacturer of chemical formulation under elevated temperature and humidity conditions simulating installed conditions when tested by qualified independent testing agency.
   2. No form of degradation occurs due to acid hydrolysis or other causes related to treatment.
   3. Contact with treated wood does not promote corrosion of metal fasteners.

C. Inspect each piece of treated lumber after drying and discard damaged or defective pieces.

2.04 FABRICATION

A. Preparation:
   1. Verify measurements at Project Site.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify that surfaces to receive rough carpentry materials are prepared to required grades and dimensions.

B. Examine areas to receive rough carpentry Work and verify following:
   1. Completion of installation of building components to receive rough carpentry Work.
   2. That surfaces are satisfactory to receive Work.
   3. That spacing, direction, and details of supports are correct to accommodate installation of blocking, backing, stripping, furring and nailers.
   4. That anchor bolts and hold down bolts are properly installed.

3.02 INSTALLATION

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted.
   1. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit.
   2. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
B. Do not use materials with defects that impair quality of rough carpentry or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

C. Cutting: Do cutting and framing required to accommodate structural members, piping conduit, ducts, and installation of mechanical, electrical, and other equipment and apparatus.
   1. Obtain Architect or Structural Engineer’s approval before cutting of structural members not detailed on Structural Drawings.
   2. Reinforce cut plates with metal straps.
   3. Holes up to 2 inches in diameter may be bored at center of joists over 8 inches in depth.

D. Bracing and Shoring: Provide supports, guys and braces, required to stabilize structure during construction.

E. Accurately saw-cut and fit lumber into position and securely nail, spike, lag bolt, or bolt as required.

F. Fasteners: Drill holes for fasteners and size as noted.
   1. Nails and Spikes: Smaller than diameter of fastener.
      a. Predrill as required to prevent splitting.
   2. Lag Bolts:
      a. Drill holes same diameter and length as shank, conforming to NDS Part 12 – 12.1.4.2 (a).
      b. Drill lead holes for threaded portion, conforming to NDS Part 12 – 12.1.4.2 (b).
   3. Bolts: Holes 1/32 inch to 1/16 inch larger than bolt.
   4. Framing Connectors: Smaller than diameter of fastener.
      a. Predrill as required to prevent splitting.

G. Nailing: Refer to details and tables on Drawings for specific nailing requirements.
   1. In absence of specific instruction, comply with following:
      a. CBC, Table 2304.9.1.
      b. Spacing: 1/2 length of nail minimum.
      c. Edge Distance: 1/4 length of fastener.
      d. Toe Nailing: Drive toe nails at angle or approximately thirty degrees with piece and started approximately one-third length of nail from end of piece.
      e. Replace split or otherwise damaged structural members.

H. Bolts: Use standard cut washer under bolt heads and nuts against wood.
   1. Use heavy plate washer or malleable iron washer where noted on Drawings; drive into place.
   2. Drive bolts into place to ensure full engagement of nut; projection of bolt beyond nut not to exceed one bolt diameter.
   3. Tighten nuts at installation and again immediately prior to enclosure.

I. Lag Bolts: Lubricate with soap or similar material.
   1. Turn into place without driving.
   2. Ensure penetration into lagged member of 60 percent of bolt length.
   3. Drill lead holes complying with requirements of Article 3.02 F 2.
   4. Provide washers of same sizes as specified for bolts.

J. Framing Connectors: Drive nails into holes of each connector.
   1. Install bolts in each framing connector unless detailed otherwise.
K. Fire Blocks and Draft Stops: Comply with CBC, Section 708.

3.03 WOOD GROUNDS, NAILERS, AND BLOCKING

A. Provide wherever shown and where required for screeds or attachment of other work.
   1. Form to shapes as shown and cut as required for true line and level of work to be
      attached.
   2. Coordinate location with other work involved.

B. Attach to substrates as required to support applied loading.
   1. Countersink bolts and nuts flush with surfaces, unless otherwise shown.
   2. Build into masonry during installation of masonry work.
   3. Where possible, anchor to formwork before concrete placement.

C. Provide permanent grounds of dressed, preservative treated, key-beveled lumber not
   less than 1-1/2 inch wide and of thickness required to bring face of ground to exact
   thickness of finish material involved.
   1. Remove temporary grounds when no longer required.

3.04 SILLS AND PLATES

A. Install Pressure Preservative treated lumber for plates and sills in conformance with
   CBC, Section 2304.11

B. Bolt to foundations and slabs.
   1. Level sills with shims, washers placed, and nuts tightened to level bearing.

C. Pack space between sill and concrete with dry-pack cement grout mixed at ratio of 1.0
   part cement to 3.0 parts sand, by volume, with only enough water for placement and
   hydration.

3.05 STUD WALLS, PARTITIONS, AND FURRING

A. Provide studs in continuous lengths without splices.

B. Comply with CBC, Section 2308.9.8, for framing for pipes.

C. Plates: Provide single bottom plate and double top plate.
   1. Stagger joints 4 feet in top plates.

D. Nail or anchor plates to supporting construction.

E. Corners and Intersections: Frame with 3 studs or as detailed.

F. Openings: Frame with double studs each side and double headers placed on edge,
   resting on cripple studs.
   1. Truss or block over headers.

G. Provide continuous horizontal blocking row at mid-height of single-story partitions over
   8 feet high and at midpoint of multi-story partitions, using 2 inch thick members of
   same width as wall or partitions.

H. Cut-in blocks wherever necessary for bracing or backing for applied finish or fixtures.
I. Cut-in 2 inch solid blocking between studs at horizontal joints in non-structural plywood wall sheathing.

J. Provide continuous perimeter backing at ceiling plane for longitudinal forces of wall-secured suspended ceiling systems.

3.06 CLEANING

A. Remove damaged or otherwise disfigured portions and replace with new prior to Owner's acceptance.

B. Wash finished Work in strict accordance with product manufacturer's directions and ensure that washed surfaces do not differ from clean unwashed surfaces.
   1. Differences will be considered unsatisfactory work.

END OF SECTION 06 1000
SECTION 07 9200
JOINT SEALANTS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Joint sealants required to seal exterior joints weather and water tight

B. Related Sections:
   1. Section 09 9100: Painting; paintable caulk.
   2. Section 32 0523: Concrete for Exterior Improvements.
   3. Section 32 1246: Asphalt Paving; sealing of joints in asphalt pavements

1.02 REFERENCES

A. ASTM International (ASTM):

B. South Coast Air Quality Management District (SCAQMD):
   1. Rule 1168 – Adhesive and Sealant Applications

1.03 QUALITY ASSURANCE

A. Use only qualified workers thoroughly skilled and specially trained in techniques of installing sealant, who can acceptably demonstrate to Architect their ability to fill joints solidly and neatly.

B. Compatibility Tests: Prior to start of sealant work, sealant manufacturer and sealant installer shall conduct compatibility tests of sealant for each different sealing condition and substrate for entire Project.

C. Pre-installation Field Testing:
   1. Field test adhesion of joint sealant material to Project substrates.
   2. Verify joint sealant materials will satisfactorily adhere to substrates.
   3. Arrange field testing with manufacturer or designated representative.
   4. Notify parties minimum 7 days prior to field testing.

1.04 SUBMITTALS

A. Product Data: Manufacturer's specifications, performance test data, recommendations, handling, installation and curing instructions for each type of sealant, and associated miscellaneous material required.

B. Samples: Minimum of four, 3 inch long samples of each color required (except black) for each type of sealant exposed to view.
C. Compatibility Tests: Results of each compatibility test to Architect and Contractor for approval prior to start of sealant Work.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project Site in original unopened containers bearing manufacturer's name, product designation, date of manufacturer and mixing instructions.
   1. Store in accordance with manufacturer's recommendations.
   2. Provide uniform ambient temperature between 60 and 80 degrees F.

1.06 WARRANTY

A. Manufacturer shall provide 5 year material warranty.

B. Installer shall provide 2 year labor warranty.

PART 2 – PRODUCTS

2.01 GENERAL

A. Compatibility: Provide joint sealants, joint fillers and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.

B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside building envelope that comply with following limits for VOC content in accordance with SCAQMD Rule 1168:
   1. Architectural Sealants: Not more than 250 g/L.
   2. Sealant Primers for Nonporous Substrates: Not more than 250 g/L.
   3. Sealant Primers for Porous Substrates: Not more than 775 g/L.

C. Colors: Provide color of exposed joint sealant indicated or as selected by Architect from manufacturer's standard colors.

2.02 MATERIALS

A. Elastomeric Sealant Standard: Provide manufacturer's standard chemically curing, elastomeric sealant of base polymer indicated which complies with ASTM C 920 requirements, including those referenced for Type, Grade, and Class.

B. Sealant No. 1: Silicone rubber based, one-part, low-modulus, non-acid curing sealant; Type S, Grade NS, Class 50.
   1. Provide one of following product:
      a. Dow Corning 790; Dow Corning Corp.
      b. General Electric Silpruf SCS 2000; Momentive Performance Products
      c. Pecora 890; Pecora Corp.
   2. Apply Sealant No.1 to following exterior joints:
      a. Vertical expansion and control joints
      b. Prefinished metal coping at Monumental and Entry Signs.
C. **Sealant No.2:** Two-Component Polyurethane Sealant; Type M, Grade P, Class 25.
   1. Provide one of following products:
      b. MasterSeal SL 2 Sealant: BASF Corporation, Construction Systems
      c. Urexpan NR-200: Pecora, Corp.
   2. Apply Sealant No.2 to following exterior joints:
      a. Horizontal control and expansion joints in concrete flatwork and concrete paving.

### 2.03 MISCELLANEOUS MATERIALS

A. **Joint Primer:** Provide type of joint primer recommended by sealant manufacturer for joint surfaces to be primed or sealed.

B. **Bond Breaker Tape:** Polyethylene tape or other plastic tape as recommended by sealant manufacturer to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant.
   1. Provide self-adhesive tape where applicable.

C. **Sealant Backer Rod:** Compressible rod stock of polyethylene foam, polyethylene jacketed polyurethane foam, neoprene foam or other flexible, permanent, durable nonabsorptive material as recommended by sealant manufacturer for compatibility with sealant.
   1. Provide products by one of following, or approved equal.
      a. Denver Foam by Backer Rod Mfg. Inc.
      b. Sof-Rod by Nomaco, Inc.
      c. Sealtight Kool-Rod by W.R. Meadows, Inc.

### PART 3 - EXECUTION

#### 3.01 EXAMINATION

A. Examine joints, with installer present, for compliance with requirements for joint configuration, installation tolerances and other conditions affecting joint sealant performance.
   1. Correct improper conditions.

#### 3.02 JOINT PREPARATION

A. Preparation of surfaces to receive sealant shall conform to the sealant manufacturer's specifications.

B. Perform preparation in accordance with ASTM C 804 for solvent release sealants, and ASTM C 962 for elastomeric sealants.

C. Clean joint surfaces immediately before installation of sealant or calking compound.
   1. Remove dirt, insecure coatings, moisture and other substances which could interfere with bond of sealant compound.
      a. Surfaces shall be thoroughly dry before application of sealants.
   2. Etch concrete joint surfaces as recommended by sealant manufacturer to remove excess alkalinity, unless sealant manufacturer's printed instructions indicate that alkalinity does not interfere with sealant bond and performance.
a. Etch with 5 percent solution of muriatic acid; neutralize with dilute ammonia solution, rinse thoroughly with water and allow to dry before sealant installation.

D. Prime joint surfaces where recommended by sealant manufacturer.
   1. Protect elements surrounding Work of this section from damage or disfiguration
   2. Do not allow primer to spill or migrate onto adjoining surfaces.
   3. Use air pressure or other methods to achieve required results.
   4. Use masking tape to keep sealants off surfaces that will be exposed in finished Work.

3.03 INSTALLATION OF SEALANT

A. Comply with manufacturer's printed instructions except where more stringent requirements are shown or specified, and except where manufacturer's technical representative directs otherwise.

B. Set joint filler units at proper depth or position in joint to coordinate with other work, including installation of bond breakers, backer rods and sealant.
   1. Do not leave voids or gaps between ends of joint filler units.

C. Install sealant backer rod for sealants, except where recommended to be omitted by sealant manufacturer for application indicated.

D. Install bond breaker tape where required by manufacturer's recommendations to ensure that elastomeric sealants will perform properly.

E. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform, continuous ribbons without gaps or air pockets, with complete wetting of joint bond surfaces equally on opposite sides.
   1. Except as otherwise indicated, fill sealant rabbet to slightly concave surface, slightly below adjoining surfaces.
   2. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form slight cove, so that joint will not trap moisture and dirt.
   3. Tool joints to form smooth, uniform beads with slightly concave surfaces, with finished joints straight, uniform, smooth and neatly finished.
   4. Remove excess sealant from adjacent surfaces of joint, leaving work in neat, clean condition.
   5. Do not use tooling agents unless recommended by sealant manufacturer.

F. Seal joints before adjacent surfaces are waterproofed or painted.

G. Install sealant to depths recommended by sealant manufacturer but within following general limitations, measured at center (thin) section of bead:
   1. For sidewalks, pavements and similar joints sealed with elastomeric sealant and subject to traffic and other abrasion and indentation exposures, fill joints to depth equal to 75 percent of joint width, but neither more than 1/2 inch deep nor less than 3/8 inch deep.
   2. For normal moving joints sealed with elastomeric sealant but not subject to traffic, fill joints to depth equal to 50 percent of joint width, but neither more than 1/2 inch deep nor less than 1/4 inch deep.
   3. For joints sealed with non-elastomeric sealants, fill joints to depth in range of 75 percent to 125 percent of joint width.
H. Where irregular surface or sensitive joint border exists apply masking tape at edge of joint to insure joint neatness and protection.
   1. Remove masking tape after sealant is applied.

I. Spillage: Do not allow sealants or compounds to overflow or spill onto adjoining surfaces, or to migrate into voids of adjoining surfaces.
   1. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.

J. Recess exposed edges of exposed joint fillers slightly behind adjoining surfaces, unless otherwise shown, so that compressed units will not protrude from joints.

K. Bond ends of joint filler together with adhesive or join by other means as recommended by manufacturer to ensure continuous watertight performance.

3.04 MISCELLANEOUS WORK

A. Sealing shall be provided wherever required to prevent light leakage as well as moisture leakage.
   1. Refer to Drawings for condition and related parts of Work.

B. Install sealants to depths as indicated or, if not indicated, as recommended by sealant manufacturer but within following general limitations:
   1. For joints in concrete walks, slab and paving subject to traffic, fill joints to depth equal to 75 percent of joint width, but not more than 3/4 inch deep or less than 3/8 inch deep, depending on joint width.

3.05 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

B. Remove and legally dispose of rubbish, debris, and waste materials off Project Site.

3.06 CURING

A. Allow sealants to cure in accordance with manufacturer's printed recommendations.
   1. Do not disturb seal until completely cured.

3.07 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances or from damage resulting from construction operations or other causes so that they are without deterioration or damage at time of substantial completion.
   1. When, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealant immediately and reseal joints with new materials to produce joint sealant installations with repaired areas indistinguishable from original work.

END OF SECTION 07 9200
SECTION 08 1213

HOLLOW METAL FRAMES

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Knocked down, site assembled prefinished steel door frames

B. Related Sections:
   1. Section 07 9200: Joint Sealants
   2. Section 08 1400: Wood Doors
   3. Section 08 7100: Door Hardware
   4. Section 09 2900: Gypsum Board

1.02 REFERENCES

A. ASTM International (ASTM):
   1. ASTM A 653 – Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   2. ASTM A 1008 – Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High Strength Low-Alloy and High Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.

B. Steel Door Institute (SDI):
   2. SDI A250.8 – Specifications or Standard Steel Doors and Frames (SDI-100).

1.03 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum documented experience of more than five years providing hollow metal doors and frames for similar size projects.

B. Coordinate with hardware supplier for fabrication of frames to receive hardware items.

C. Quality Standards:
   1. Provide steel frames complying with specified reference standards and following:
      a. Material free from defects in material, conforming to project specifications for preengineered opening systems.
      b. Proven durability of factory finishes allowing for bending and shaping of material after finish is applied

1.04 SUBMITTALS

A. Product Data: For each type of frame indicated.
   1. Including, but not limited to following:
a. Model and configuration.
b. Material description and gage.
c. Finishes
d. Construction details

B. Shop Drawings: For fabrication and installation of hollow metal door frames.
   1. Including, but not limited to following:
      a. Opening designation
      b. Conditions at openings and rough opening requirements.
         1) Indicate throat openings to suit wall thickness.
      c. Details of each frame type and frame anchorage and accessory items.
      d. Location and installation requirements for finish hardware and reinforcement.
      e. Details of joints and connections.

C. Samples:
   1. Hollow Metal Frame:
      a. Standard frame showing corner joint construction.
      b. Hinge, strike, and closer reinforcement.
      c. Floor anchor, dust cover, and jamb anchors.
      d. Factory finishing for color and gloss.

D. Certification: Certification of compliance with referenced standards and specified criteria, including but not limited to:
   1. Physical Endurance in accordance with ANSI A250.4

E. Door Schedule: Use same reference designations indicated on Drawings in preparing schedule for frames.

1.05 SYSTEM DESCRIPTION

A. Design Requirements: Frame assemblies shall include reinforcing and provisions for hardware as shown and specified.
   1. Drawings indicate profile and general details of steel frame fabrication and installation.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver frames, cartoned or crated, to provide protection during transit and Project storage.

B. Inspect frames upon delivery for damage and notify shipper and supplier should damage be found.
   1. Minor damages may be repaired provided refinished items are equal with respect to new work and acceptable to Architect.
   2. Remove and replace damaged items that cannot be repaired as directed.

C. Store frames at Project Site under cover.
   1. Place units on minimum 4 inch high wood blocking.
   2. Avoid using non-vented plastic or canvas shelters that could create humidity chamber.
   3. Should door frame packaging become wet, remove cartons immediately.
4. Provide minimum 1/4 inch spaces between stacked frames to permit air circulation.

1.07 WARRANTY

A. Manufacturer’s Certificate of Warranty: Provide manufacturer’s standard warranty certificate stating material is warranted for period of one year from date of building occupancy.

B. Installer shall provide 2 year labor warranty.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Hollow metal frames shall be products of single manufacturer.

B. Subject to compliance with specified requirements, provide products as manufactured by Timely Industries, division of SDS Industries, Inc. or approved equal:

C. Materials, fabrication, and installation must comply with requirements of standards referenced in “Quality Assurance” Article.

2.02 MATERIALS

A. Steel thicknesses must meet minimum requirements of ASTM standards and as described in SDI A250.8.

B. Cold Rolled Steel Sheets: ASTM A 1008, Commercial Steel (CS), suitable for exposed applications. Type B; stretcher-leveled standard of flatness.

C. Supports and Anchors: Fabricate from minimum 16 gage sheet steel unless noted otherwise.
   1. After fabricating, galvanize units to be built into exterior walls according to ASTM A 153, Class B.

D. Inserts, Bolts, and Fasteners:
   1. Provide as shown and to suit conditions of secure installations.

E. Sound Deadener: Spray-on type, non-combustible and non-bleeding
   1. INC DC-10 Noise Dampening Compound by Industrial Noise Control, Inc., or approved equal

2.03 FRAMES

A. General: Provide knocked down steel frames for wood doors that comply with ANSI/SDI A250.8 and with details indicated for type and profile.
   1. Conceal fastenings, unless otherwise indicated.

B. Frames of cold rolled steel thick steel sheet for wood doors.

C. Frame Profile: Timely “C” Series, 1.2 mm (18 gage) thick.
   1. For 1-3/4 inch thick doors.
D. Casings: Aluminum casings formed to be applied to frame after frame is anchored to wall construction.
   1. Aluminum, no reveal, with TA-28 full 1-3/4 inch face profile with standard T-24 corner alignment clips.

E. Door Silencers: Stops to receive three silencers on strike jambs on single door frames and two silencers on heads of double door frames.
   1. Timely TA-5 vinyl, clear stick-on type.

F. Plaster Guards: Provide 0.016 inch thick, steel sheet plaster guards or mortar boxes to close off interior of openings
   1. Place at back of hardware cutouts where mortar or other materials might obstruct hardware operation.

2.04 FRAME REINFORCEMENT AND ACCESSORIES

A. Provide manufacturer's reinforcements shipped loose to Project Site for hardware application as follows:
   1. TA-10 for regular arm closers.
   2. TA-11 for hinge reinforcement.
   3. TA-12 for parallel arm closers other stop mounted surface hardware.

B. Provide cut-outs and reinforcement for mortised hardware as specified in Section 08 7100.

2.05 FABRICATION

A. Fabricate steel frame units to comply with ANSI/SDI A250.8 and following:
   1. Rigid, neat in appearance, and free from defects including warp and buckle.
   2. Openings for single swing frames to be precut, notched, and fabricated at manufacturer's facility.


C. Frame Construction: Fabricate frames to profiles shown.
   1. Fabricate frames with mitered corners.
   2. Provide notches, tabs and stops for positive alignment of frame parts at corners.
   3. Casing Clips: Fabricate frames with factory applied, heat treated clips to ensure no deflection in clip upon application or removal of casing.
      a. Attachment clips may not be of same material as frame.

D. Sound Deadener: Apply sound deadener to concealed surfaces of frames in accordance with manufacturer's instructions
   1. Produce effective sound deadening for each application

E. Hardware Preparation: Prepare frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier.
   1. Comply with applicable requirements in ANSI A250.6 and ANSI A 115 specifications for frame preparation for hardware.
F. Hardware Reinforcement:
   1. Reinforce frames to receive surface applied hardware.
      a. Drilling and tapping for surface applied hardware may be done at Project Site.
      b. Hinge Reinforcement: 14 gage steel pierced to create depth of thread for hinge screws equal to or exceeding 7 gage steel.
         1) Hinge plate to be mechanically attached to hinge emboss on frame
      c. Reinforcing for other items of finish hardware shall be accomplished according to ANSI A250.6
   2. Locate hardware as indicated on Shop Drawings
      a. Where not indicated, locate according to ANSI/SDI A250.5, except where modified by requirements of CBC, Section 1008.1.9.2.

2.06 FINISHES

A. Frames and Casings: Prefinished with factory applied impact resistant, polyester baked enamel finish.
   1. Colors: As selected by Architect from manufacturer’s stock colors.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify following:
   1. Acceptability of existing conditions before starting Work.
   2. Opening sizes and wall thicknesses are within specified tolerances.
   3. Finished walls are in plane to ensure proper door alignment.

3.02 FRAME INSTALLATION

A. Install knocked down steel door frames, and accessories in accordance with final shop drawings, manufacturer's installation instructions, and as specified.
   1. Install prefinished frames near end of Project after wall painting is complete, using qualified installers familiar with installation of prefinished drywall frames.
   2. Anchor frames with screws located at every casing clip or every 11 inches as shown on manufacturer’s instructions.
      1) Field verify quantity and location of fasteners prior to installing casing.
   3. Coordinate installation of frames with installation of hardware specified in Section 08 7100 and wood doors in Section 08 1400.

3.03 TOUCH-UP

A. Touch-up blemishes on finished frames with factory prepared touch up paint.

3.04 ADJUST AND CLEAN

A. Immediately before installation of doors, remove protective wrappings from frames.
B. Final Adjustment: Check and readjust operating finish hardware items, leaving doors and frames undamaged and in complete and proper operating condition.
C. Remove and legally dispose of rubbish, debris and waste materials off Project Site.
3.05 PROTECTION

A. Protect Work until Substantial Completion.

END OF SECTION 08 1213
SECTION 08 1400
WOOD DOORS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Hollow Core Wood Doors.

B. Related Sections:
   1. Section 06 1000: Rough Carpentry.
   2. Section 08 1213: Hollow Metal Frames; hollow metal frames for wood doors.
   3. Section 08 7100: Door Hardware.
   4. Section 09 9100: Painting.

1.02 REFERENCES

A. California Code of Regulations (CCR), Title 24, Part 2, California Building Code (CBC), Volumes 1 and 2, 2013 edition

B. American National Standards Institute (ANSI)/Window and Door Manufacturers Association (WDMA):
   1. ANSI/WDMA I.S. 1A – Architectural Wood Flush Doors

C. Woodwork Institute (WI):

1.03 QUALITY ASSURANCE

A. Wood doors shall conform to industry standards and requirements referenced in Article 1.02.
   1. Including latest revisions, and special requirements specified.

B. Quality Standards: Provide wood flush doors complying with following standards:
   1. ANSI/WDMA I.S. 1A
   2. AWS Section 9 – Doors
      a. Conform to AWS Section 9 Custom Grade requirements, unless noted otherwise

C. Obtain doors from single manufacturer to assure uniformity in quality of appearance and construction, fabricated to dimensions specified.

D. Door modifications are not permitted, unless reviewed and accepted by Architect.

1.04 SUBMITTALS

A. Product Data: Manufacturer's product data, specifications and installation instructions for each type of wood door required, including details of core and edge construction, trim for louvers and similar components.
B. Shop Drawings: Schedules and plans, indicating location and size of each door.
   1. Elevations and details of each kind of door, indicating door construction details,
   2. Include opening identification symbols, sizes, door type and grade, swing, 
      undercuts and other pertinent data.
   3. Show location and extent of hardware blocking.
      a. Provide blocking as required to eliminate need for through-bolting of 
         surface applied hardware.
   4. Use same door numbering system as Door Schedule on Drawings.
   5. Indicate name of door manufacturer on shop drawings.

C. Samples:
   1. Construction Samples: Minimum of 4 samples of not less than 6 inches by 6 
      inches for each type of door to be furnished, showing face, edge and core 
      construction.

D. Certificates:
   1. Certificate that solid core wood doors comply with requirements of WDMA I.S. 
      1A. and AWS Section 9.

1.05 SYSTEM DESCRIPTION

A. Design Requirements: Drawings indicate sizes, locations and general details of 
   wood door construction and installation.

1.06 PROJECT CONDITIONS

A. Do not install doors until building is enclosed and ambient conditions are within 
   temperature and humidity range recommended by door manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Protect wood doors during transit, storage, and handling to prevent damage, soiling 
   and deterioration.
   1. Package doors at factory prior to shipping using manufacturer's standard 
      method.
B. Deliver materials in manufacturers original, unopened, undamaged containers with 
   identification labels intact.
   1. Include name of manufacturer stamped or marked on packaging.
C. Deliver doors to Project Site only after building has been provided with design 
   temperature and humidity.
D. Store and handle in accordance with ANSI/WDMA I.S.1A.
   1. Store doors protected from exposure to harmful conditions and at temperature 
      and humidity conditions recommended by manufacturer.

1.08 WARRANTIES

A. Door Manufacturer's Warranty:
   1. Written agreement on door manufacturer's standard form signed by 
      manufacturer, installer and Contractor, agreeing to repair or replace defective 
      doors which have warped (bow, cup or twist) or which show telegraphing of 
      core construction in face veneers, or do not conform to tolerance limitations of 
      AWS.
2. Warranty shall be in effect during following period of time after date of Substantial Completion:
   a. Hollow Core Flush Interior Doors: Life of original installation

B. Installer Warranty:
   1. Provide labor warranty for wood doors.
      a. Warranty Period: 2 years

C. Contractor shall be responsible for replacement or refinishing of doors where Contractor's work contributed to rejection or to voiding of manufacturer's warranty.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Subject to compliance with specified requirements, provide products of one of following, or approved equal:
   1. Algoma Hardwoods, Inc.
   2. Eggers Industries, Architectural Door Division
   3. Haley Bros., Inc.
   5. Oregon Door.
   6. V.T. Industries

2.02 FLUSH HOLLOW CORE DOORS

A. Interior Flush Doors:
   1. Furnish interior doors as follows:
      a. Opaque Finished (Painted): Flush veneered, 5 ply minimum, faced both sides with smooth resin fiber Medium Density Overlay (MDO), fully bonded to core, conforming to AWS Custom Grade.
      b. Hollow core flush veneered, 5 ply minimum, faced both sides with smooth resin fiber medium density overlay, fully bonded to core.
   2. Core: manufactured of expanded corrugated kraft fiber with uniform thickness throughout core field
   3. Edge Strips: Closed grain hardwood. kiln-dried birch or other material as indicated complying with AWS requirements.
   4. Full stile edge strip shall be not less that 1-1/2 inches wide, 2 ply stile.
      a. Stiles shall be fully bonded to core.
      b. Outer face stile shall be full length 3/4 inch Birch or Maple.
      c. Inner back stile shall be 3/4 inch of similar species which may have two finger joints fully bonded to core.
   5. Top and bottom edge rails shall be full length and may be of glued up stock of similar species as edge strip, White Fir or Douglas Fir, minimum density 24.33 pounds per cubic foot, or higher
      a. Top rail shall be minimum of 2 inches.
      b. Bottom rail shall be minimum of 5 inches, fully bonded to core.
   6. Crossbanding: Doors shall be furnished with full width crossbanding of properly dried hardwood or engineered fiber composite material, 1/16 inch thick, with density of 52 pounds per cubic foot, or higher.
      a. Provide 2 or 3 ply as required to reduce core telegraphing.
   7. Adhesive and Bonding: Bonding between veneer plies of wood face panel, and between door faces, frame and core unit shall be fabricated with Type I or Type II waterproof adhesives.
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2.03 FINISHING

A. Field Finishing:
   1. Doors Scheduled for Opaque Paint Finish: Factory primed with one coat of
      wood primer indicated in Section 09 9100.

PART 3 – EXECUTION

3.01 MACHINING AND FITTING

A. Provide each door factory machined by manufacturer or qualified distributor
   accurately cut, trimmed, and fitted to its frame and hardware
   1. Including, but not limited to, cut outs, hinges, locks, mortise lock function holes,
      and hardware requiring routing or mortising.

B. Clearances:
   1. Lock and Hinge Stile and Top Rail: 1/8 inch.
   2. Undercut: Top of slab to bottom of door shall be 3/4 inch except where
      otherwise indicated.
   3. Arises shall be rounded to 1/16 inch radius

C. Bevels: 1/8 inch in 2 inches at hinge and lock stiles.

3.02 INSTALLATION

A. Prior to door installation, verify that suitable conditions exist.
   1. Do not proceed with installation until unsatisfactory conditions have been
      corrected.

B. Allow doors to become acclimated prior to hanging.

C. Install Work as specified in Woodwork Institute AWS.
   1. Fit doors to tolerances specified.
      a. Frames must be plumb and square.
   2. Install doors using scheduled hardware.
      a. Install using threaded-to-the-head wood screws as supplied by hardware
         manufacturer.
   3. Drill proper size pilot holes for screws.
      a. Screws for hardware shall not be driven, but screwed into pre-drilled
         holes.
   4. Mortise or drill additional hardware preparations which must be completed in
      field for proper installation.

3.03 MAINTENANCE AND ADJUSTING

A. Ensure doors operate freely, but not loosely, without sticking or binding, without
   hinge-bind conditions, and with hardware properly adjusted and functioning for
   smooth operation.

B. Provide Owner with copies of manufacturer’s product catalog, specification sheets,
   warranty, and proper maintenance procedure for wood doors and their finish.
3.04 CLEANING

A. Exposed surfaces shall be free of scratches, tool marks, stains, dirt and other damage or defect.

B. Remove and legally dispose of rubbish, waste and debris off Project Site.

3.05 PROTECTION

A. Finish of doors shall be adequately protected during construction in order to prevent damage to doors or their finish prior to Substantial Completion.

END OF SECTION 08 1400
SECTION 09 2900
GYPSUM BOARD

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
1. Furnishing materials, labor, and equipment necessary for completion of gypsum board as indicated.
2. Gypsum board systems and accessory components as indicated.

B. Related Sections:
1. Section 06 1000: Rough Carpentry.
2. Section 08 1213: Hollow Metal Frames; knocked down frames.
3. Section 09 9100: Painting

1.02 REFERENCES


B. ASTM International (ASTM):
6. ASTM C 1002 – Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.

C. National Fire protection Association (NFPA):
1. NFPA or UL requirements for fire-rated assemblies per ASTM E119.

D. UL (UL, LLC):
1. Requirements and listings for fire-rated materials and products classification.

E. Gypsum Association (GA):
1. GA 214 – Recommended Levels of Gypsum Board Finish.
1.03 QUALITY ASSURANCE

A. Qualifications:
   1. Installer: Minimum 5 years experience in installing and finishing gypsum board.

B. Finishes: Gypsum wallboard finish shall conform to requirements of GA 214, and as specified herein.
   1. Levels used on the project are described as follows:

<table>
<thead>
<tr>
<th>Level</th>
<th>Joints</th>
<th>Interior Angles</th>
<th>Accessories</th>
<th>Fasteners</th>
<th>Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tape set in compound</td>
<td>Tape set in joint compound</td>
<td></td>
<td></td>
<td>Tool marks and ridges acceptable</td>
</tr>
<tr>
<td>2</td>
<td>Tape set in joint compound and one separate coat of joint compound</td>
<td>Tape embedded in joint compound and wiped to leave a thin coat of compound over tape, and one separate coat</td>
<td>Covered by one separate coat of joint compound</td>
<td>Covered by one separate coat of joint compound</td>
<td>Free from excess joint compound. Tool marks and ridges acceptable.</td>
</tr>
<tr>
<td>3</td>
<td>After taping, cover with two separate coats of joint compound</td>
<td>After taping, cover with one separate coat of joint compound</td>
<td>Covered by 3 separate coats of joint compound</td>
<td>Covered by 3 separate coats of joint compound</td>
<td>Smooth and free of tool marks and ridges *</td>
</tr>
<tr>
<td>4</td>
<td>After taping, cover with 2 separate coats of joint compound</td>
<td>After taping, cover with one separate coat of joint compound</td>
<td>Covered by 3 separate coats of joint compound</td>
<td>Covered by 3 separate coats of joint compound</td>
<td>Smooth and free of tool marks and ridges *</td>
</tr>
<tr>
<td>5</td>
<td>After taping, cover with 2 separate coats of joint compound</td>
<td>After taping, cover with one separate coat of joint compound</td>
<td>Covered by 3 separate coats of joint compound</td>
<td>Covered by 3 separate coats of joint compound</td>
<td>Skim coat of joint compound applied to entire surface. Surface free from tool marks and ridges. **</td>
</tr>
</tbody>
</table>

*At completion of specified taping and finishing, apply one coat of high solids primer as specified hereafter.

**Or use Sheetrock Brand Primer Surfacer “Tuff-Hide” in lieu of skim coat and primer.

1.04 SUBMITTALS

A. Product Data: Manufacturer's catalog data for each product proposed for use.
B. Shop Drawings: Indicating complete suspension system including connections, anchorage and trim features.

C. Material Samples: Minimum 18 inch x 18 inch samples of texture coat of gypsum board panels with edges taped.

1.05 SYSTEM DESCRIPTION

A. Design Requirements: Provide systems capable of deflection as required by 2013 CBC and authorities having jurisdiction.

B. Regulatory Requirements: Comply with 2013 CBC requirements for design and installation.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original, factory sealed packages, containers or bundles bearing brand name and name of manufacturer.

B. Materials shall be kept dry. Gypsum board shall be neatly stacked flat; avoid sagging and damage to edges, ends and surfaces.

C. Use means necessary to protect gypsum board systems before, during and after installation.

1.07 REGULATORY REQUIREMENTS

A. Comply with following standards (Code):
   1. CBC, Chapter 25.

B. Fire-Resistance Ratings: Comply with fire-resistance ratings as shown and as required by governing authorities and codes.
   1. Provide materials, accessories and application procedures which have been listed by UL or tested according to ASTM E 119 for type of construction shown.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. Products of following manufacturers form basis for design and quality intended.
   1. Georgia Pacific G-P Gypsum:

2.02 MATERIALS

A. Gypsum Board:
   1. Glass-Mat Faced Gypsum Board:
      b. Width: 4 feet.
      c. Length: 8 feet.
      d. Weight: 2570 pounds per M square feet.
      e. Edges: Tapered.
      f. Surfacing: Coated glass mat on face, back and long edges.
g. Flexural Strength, Parallel (ASTM C473, ASTM C1396): Not less than 100 lbf.


i. R-Value (ASTM C518): Not less than 0.67.


o. Surface Burning Characteristics: Flame spread/smoke developed, 10/5.

2. Tape: 2 inch, glass mesh tape.


B. Fastenings:

1. ASTM C 1002 self-drilling, self-tapping bugle-head drywall screws:
   a. Type W 1-1/4 inch long for wood framing (for single-layer panels).
   b. Screws shall be given corrosion-resistant treatment.

C. Wire: Galvanized and annealed carbon steel wire:

1. Tie Wire: No. 16 SWG.
2. Hanger Wire: No. 8 SWG, annealed and galvanized.

D. Metal Trim: ASTM C 1047, Paper-Face metal trim and cornerbead fabricated from minimum 26 gage galvanized steel,

1. Trim units shall be of size and type to fit gypsum board construction and shall include corner beads, casings, edge trim and other shapes indicated and required.
   a. USG, Beadex, or National Gypsum Company.
   c. Crimp-on type trim is not allowed.

E. Finishing Materials:

1. High solids primer to be SHEETROCK Brand First Coat manufactured by USG or High-build primer by Sherwin Williams.
2. Texture coat finish material shall be manufactured by the U.S. Gypsum, Hamilton, or Highland Stucco and Lime Products, Inc.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Wood Framing: Refer to Section 06 1000.

B. Metal Trim:

1. Provide following:
   a. Corner beads at outside corners and angles
   b. Metal casing where gypsum board terminates at uncased openings
   c. Metal edge trim where board edges abut horizontal and vertical surfaces of other construction.
2. Install trim in accordance with manufacturer’s directions and secure to framing with joint compound.
   a. Apply trim in longest practical pieces.

C. Gypsum Board:
   1. Install gypsum board in conformance with ASTM C840 and the manufacturer’s recommendations.
   2. Gypsum board shall be cut by scoring and breaking or by sawing, working from face side.
      a. Where board meets projecting surfaces it shall be scribed and neatly cut.
      b. Unless conditions require otherwise, board shall be applied first to ceilings, then to walls.
      c. End joints shall occur over support.
      d. Use panels of maximum practical length so that minimum number of end joints occur.
   3. End joints shall be staggered and joints on opposite sides of partition shall be arranged to occur on different studs.
      a. Joint layout at openings shall be made so that no end joints will align with edges of openings.
   4. Except where specified otherwise, fasteners shall be spaced not less than 3/8 inch from edges and ends of gypsum board.
      a. Do not stagger fasteners at adjoining edges and ends.
   5. Install gypsum board vertically or horizontally.
      a. Attach board with drywall screws spaced not to exceed 8 inches on center around perimeter of boards and 12 inches on center on intermediate studs.
      b. Space screws at 8 inches on centers along top and bottom runners.
      c. Screws shall be driven to provide screwhead penetration just below gypsum board surface without breaking surface layer.
      d. Where electrical outlet and switch boxes are indicated, provide adjustable attachment brackets between studs.
      e. Nails will not be acceptable.
   6. Install gypsum board to ceiling framing with long dimension at right angles to wood framing members.
      a. Attach with specified drywall screws spaced 6 inch to 7 inch on centers across board.
      b. Screws shall be not less than 1/2 inch from side joints and 3/8 inch from butt end joints.
      c. Abutting end joints shall occur over wood framing and end joints of boards shall be staggered.
      d. Support cutouts or openings in ceilings with wood framing.
   7. Install access doors, furnished under separate section, in correct location, plumb or level, flush with adjacent construction, and securely attached to framing.

3.02 TOLERANCES
   A. Install gypsum board flat within 1/8 inch in 10 feet.

3.03 JOINT TREATMENT AND FINISHING
   A. Conform to GA 214-M and following.
   B. Apply tape bedding compound, tape, and finishing cement on joints in gypsum board as required for specified levels of finish.
C. Levels 2 through 5:
   1. Apply joint cement and finishing cement over screw heads.
      a. Treat inside corners with joint cement, tape, and finishing cement.
      b. Treat outside corners with corner beads and finishing cement.
   2. Provide metal casing beads at edges of gypsum board which abut ceiling, wall, or column finish, and elsewhere as required.
      a. Make exposed joints, trims and attachments non-apparent following application of paint or other finishes.
      b. Where joints and fasteners are apparent, correct defects as directed.
   3. Seal raw edges of plumbing openings and boards that have been cut to fit with brushed on sealing compound.
   4. When entire installation is completed and prior to installation of finish materials by other trades, correct and repair broken, dented, scratched or damaged gypsum board.

D. Levels 3 and 4: Apply one coat of high solids primer over entire surface.

E. Level 5: Apply one coat of skim coat over entire surface, followed by one coat of high solids primer over entire surface.
   1. Contractor’s Option: Use Sheetrock Brand Primer Surfacer, Tuff-Hide in lieu of skim coat and high solids primer.

3.04 REQUIRED LEVELS OF FINISH

A. Unless otherwise indicated or specified, levels of finish required shall be as follows:
   1. Level 1: Plenum areas above ceilings, insides of shafts, and other concealed areas.
   2. Level 2: Substrate for tile.
   3. Level 3: Backing for adhered acoustic tile and where textured finish is indicated.
   4. Level 4: Exposed, painted wallboard in classrooms, utility rooms, and areas receiving vinyl wall covering.
   5. Level 5: Exposed, painted wallboard in restrooms and corridors where semi gloss enamel is used.

3.05 CLEAN-UP

A. Upon completion, repair damage caused by Work and remove debris, surplus materials and tools of Work from Project Site.

B. Leave installation clean and ready for finishing.

3.06 REPAIR OF DAMAGED GYPSUM BOARD

A. Prior to painting, examine gypsum board surfaces and perform following as applicable:
   1. Reset protruding or loose fasteners.
   2. For each screws in fractured area or protruding screws, replace with specified screw placed in undamaged area near loose screw.
   3. Remove loose gypsum, paper, and joint compound.
   4. Refinish to match existing texture.
   5. Paint entire wall plane, color to match existing.

END OF SECTION 09 2900
SECTION 09 5100
ACOUSTICAL CEILINGS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Lay-in Mineral Fiber Acoustic Ceiling Panels and related suspension systems.

B. Related Work:
   1. Section 06 1000: Rough Carpentry.
   2. Section 09 2900: Gypsum Board; gypsum board ceilings

C. Related Requirements:
   1. Refer to Division 26 Sections for electrical requirements.

1.02 REFERENCES


B. ASTM International (ASTM):
   2. ASTM C 636 – Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels
   5. ASTM E 1264 – Standard Classification for Acoustical Ceiling Products

C. UL, LLC (UL):

D. Ceilings & Interior Systems Construction Association (CISCA):
   1. CISCA – Ceiling Systems Handbook
   2. CISCA – Acoustical Ceilings Use & Practices

E. Acoustical and Board Products Association (ABPA):
   1. Performance Data: Acoustical Materials

1.03 QUALITY ASSURANCE

A. Installer Qualifications: Experienced installer with minimum 5 years experience in installing acoustical ceiling systems similar in material, design, and extent to that indicated for this Project, with record of successful in-service performance.

B. Design Criteria:
   1. Deflection of finished surface to 1/360 of span or less.
2. 1/8 inch maximum permissible variation from true plane measured from 10-foot straightedge placed on surface of finished acoustical fiber units.

1.04 SUBMITTALS

A. Product Data:
   1. Suspension System for Lay-in Ceiling: Printed data for suspension system components, including load tests.

B. Shop Drawings:
   1. Indicate complete plan layouts and installation details.
   2. Indicate related Work of other sections that is installed in, attached to, or penetrates ceiling areas, such as air distribution and electrical devices.

C. Samples:
   1. Lay-in Panels: 6 inch x 6-inch minimum size.
   2. Lay-in Systems: Sample of assembly system to indicate typical members, connections, splices, wall angle, and colors.

D. Maintenance Materials: Provide extra panels equal to 1 percent of area of each typical module size of acoustical panel, but not less than 8 of each size, style and color.

1.05 PROJECT CONDITIONS

A. Environmental Requirements: Maintain temperature in space at 55 degrees F or above for 24 hours before, during and after installation of materials.

B. Scheduling:
   1. Before concealing Work of other sections, verify required tests and inspections have been completed.
   2. Coordinate with related Work of other sections.
      a. Coordinate location and symmetrical placement of air distribution devices, electrical devices, and penetrations with related Work section.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project Site in original sealed packages.

B. Storage: Store materials in building area where they will be installed, in original package.
   1. Keep clean and free from damage due to water or deteriorating elements.

C. Handle in manner to prevent damage during storage and installation.

1.07 REGULATORY REQUIREMENTS

A. Comply with CBC, Section 2501A.5.2.

1.08 WARRANTY

A. Provide manufacturer’s 10-year material warranty.

B. Provide installer’s 2 year labor warranty.
PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Armstrong World Industries.

B. USG Corporation.

C. Approved equal.

2.02 MATERIALS

A. Ceiling systems shall consist of lay-in acoustical ceiling panels and suspension systems manufactured by same company.

B. 24 inch x 48 inch Module Ceiling System:
   1. Acoustical Ceiling Panels:
      a. Panel Name: Armstrong Item #1729, Fine Fissured mineral fiber ceiling board with Humigard Plus coating.
      b. Panel Size: 24 by 48 inches
      c. Panel Thickness: 5/8 inch
      d. Edge Detail: Square.
      e. Light Reflectance: 0.85 minimum, complying with ASTM E 1477.
      f. CAC: Minimum 35, UL Classified, complying with ASTM E 1414.
      g. Class: UL Class A, in accordance with ASTM E 1264.
      h. NRC: Minimum 0.50, UL Classified, complying with ASTM C 423.
      i. Color: White.
      j. Recycled Content: Minimum 36 percent.
      k. Mold and Mildew Resistance: Panels and faces shall be treated with biocide paint additive to inhibit mold and mildew or anti-microbial solution.

C. Suspension System:
   1. Suspension System Name: Suprafine XL 9/16 inch by Armstrong.
   2. Fire Class: Class A.

D. Brace Attachment Clip: Manufacturers’ standards to fit system furnished for acoustical panels, as indicated.

E. Vertical Strut: USG Donn Compression Post, or equal, or as indicated; types and designs complying with requirements of authorities having jurisdiction and seismic requirements.

F. Hanger Wire: No. 12 gage (9 gage for pendant fixtures), galvanized carbon steel per ASTM A 641, soft tempered, prestretched.

PART 3 – EXECUTION

3.01 PREPARATION

A. Furnish layouts for inserts, clips or other supports and struts required to be installed as Work of other trades that depend upon support by suspended ceiling system.
B. Coordinate related Work to ensure completion prior to installation of clips or fasteners.

C. Lay-In Ceiling Systems: Compare layouts with construction conditions.
   1. Ceiling panels shall be spaced symmetrically about centerlines of room or space, and shall start with panel as required to avoid narrow panels at finish edges unless indicated otherwise.

3.02 INSTALLATION OF SUSPENSION SYSTEMS

A. System shall be complete; with joints neatly and tightly joined and securely fastened
   1. Suspension members shall be installed in true, flat, level plane.
   2. Hanger Wires: 12-gage minimum; larger sizes as indicated or required.
      a. Fasten wires to panel points and structure above per most stringent requirements of fabricator and 2013 CBC and as indicated.
      b. Wires exceeding 1:6 out-of-plumb shall be braced with counter-sloping wires.
      c. Maintain wires 6 inches minimum clear of non-braced ducts, pipes, and other items.
      d. Install wire within 6 inches of ends of main runners and cross-tees at ceiling perimeters.
      e. Where obstructions prevent direct suspension, provide trapezes or equivalent devices
         1) Minimum 1-1/2 inch cold-rolled channels back to back may be installed for spans to 6 feet max.
      f. Wire to be straight, without extraneous kinks or bends and tolerate 200 pound pull without stretching or shifting suspension clip.
   3. Bracing Wires to Resist Seismic Forces: 12 gage minimum, larger sizes as indicated or required.
      a. System for Bracing Ceilings: Lay-In Ceiling Systems: Install one four-wire set of sway-bracing wires and vertical strut for each 144 square feet maximum of ceiling area.
         1) Locate wire-sets and struts at 12 feet maximum on center.
         2) At ceiling perimeters, wire-sets shall be within 6 feet of walls.
      b. Install four-wire sets and struts within 2 inches of cross-runner intersection with main runner
         1) Space wires 90 degrees from each other.
      c. Do not install sway bracing wires at angle greater than 45 degrees with ceiling plane.
      d. Wires shall be tight, without causing ceiling to lift.
      e. Fasten struts in accordance with 2013 CBC requirements.
   4. Provide additional wires, 12 gage minimum, necessary to properly support suspension at electrical devices, air distribution devices, vertical soffits, and other concentrated loads.
   5. Suspension:
      a. Suspension members shall be fastened to 2 adjacent walls and shall be minimum 1/2 inch clear of other walls.
      b. Suspension members not fastened to walls shall be interconnected to prevent spreading, near their free end, with horizontal metal strut or 7445 stabilizer bar or 16-gage taut tie wire.
      c. Provide additional tees or sub-tees to frame openings for lights, electrical devices, and other items penetrating through ceiling, which do not have integral flange to support and conceal cut edges of acoustic panels.
      d. Provide cross-bracing necessary to securely support surface mounted fixtures or other items.
6. Attachment of Wires:
   a. To Metal Deck or Steel Framing Members: Install as required by current code.
   b. To Suspension Members: Insert through holes in members or supporting clips.
   c. Wires to be fastened with tight turns; three tight turns minimum for hanger wires; four tight turns minimum for bracing wires. Turns to be made in a 1-1/2 inches maximum distance.

B. Suspension System for 24 inch x 48 inch, Lay-in Acoustical Ceilings:
   1. Main Runners: Install main runners 48 inches apart; 12 gage hanger wires space 48 inches on center maximum along runners, and within 6 inches of ends.
   2. Install wall moldings.
   4. Sub-Tees: Install at edges of penetrations.

3.03 INSTALLATION OF ACOUSTICAL PANELS

A. Install panels into suspension system.
   1. Partial panels are to be neatly cut and fitted to suspension and around penetrations and obstructions.
   2. Duplicate edges at partial panels
      a. Cuts to be straight.
   3. Repaint cut tiles to match color or as directed by manufacturer for Mylar facing at visually exposed conditions or as required by Architect.

3.04 LIGHT FIXTURES

A. Refer to and coordinate with Division 26 Sections.

B. Fixtures weighing less than 56 Pounds: Install fixtures into suspension systems and fasten earthquake clips to suspension members.
   1. Install minimum 2 slack safety wires, each 12-gage minimum, to each fixture at diagonally opposite corners, to support their weight independent of system.

C. Fixtures weighing more than 56 Pounds: Install fixtures into suspension system and fasten earthquake clips to suspension system members.
   1. Install not less than 4 taut 2 gage wires capable of supporting four times fixture load.

3.06 CLEANING

A. General: After installation of acoustical material has been completed, clean surfaces of material, removing dirt and discolorations.

B. Acoustical Panels: Minor abraded spots and cut edges shall be touched up with same paint as was used for factory applied finish of lay-in panels.

3.07 CLEAN UP

A. Remove and legally dispose rubbish, debris and waste materials off of Project site.
3.08 PROTECTION

A. Protect Work until Substantial Completion.

END OF SECTION 09 5100
SECTION 09 6800
CARPET

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Broadloom Carpet

B. Carpet installation accessories.
   1. Includes resilient base.

1.02 RELATED SECTIONS

A. Section 09 6500: Resilient Flooring; rubber wall base and carpet edge guard

1.03 REFERENCES


B. South Coast Air Quality Management District (SCAQMD):
   1. Rule 1168 – Adhesive and Sealant Applications.

1.04 SUBMITTALS

A. Product Data: Manufacturer's product data for each type of carpet material and installation accessory required.
   1. Include written data on physical characteristics, durability, resistance to fading, and flame resistance characteristics.

B. Samples for Verification Purposes: Showing full range of color, texture, and pattern variations expected.
   1. Prepare samples from same material to be used for Project.
   2. Minimum of four 24 by 24 inch samples of each type of carpet.

C. Accessories: Minimum of four 12 inch long sample of carpet edge guard.

D. Certification: Manufacturer's written certification that carpet has passed required flame spread tests and achieved specified flame spread rating.

E. Maintenance Data: Manufacturer's printed recommendations for care, cleaning and maintenance of carpeting in optimum conditions under anticipated traffic and use conditions.

F. Seam Diagram: Submit carpet layout and seaming drawings, clearly indicating carpet directions, locations and methods of joining seams, and locations and types of edge strips.
   1. Indicate columns, doorways, enclosing walls/partitions, built-in cabinets and locations where cut-outs are required in carpet.
   2. Revise seam diagrams as required.
3. Do not install carpet until written acceptance of seaming diagram has been received.

G. Reports:
1. Provide test results for concrete moisture vapor emission and pH testing of concrete in chart form listing test dates, start/stop times, start/stop weight, weight gain in grams, moisture vapor emission values, and pH levels
2. Provide test results for concrete in-situ relative humidity and pH testing in chart form listing test dates, time, depth of test well, in-situ temperature, relative humidity, and pH levels
3. List test locations on chart and show same on 8-1/2 by 11 inch site map
   a. Make such map available to testing agency
4. Deliver results to Owner, Architect, Construction Manager, and flooring contractor.

1.05 QUALITY ASSURANCE

A. Manufacturer's Representative: Obtain carpeting materials from only manufacturers who will, when requested, send qualified technical representative to Project Site, to advise installer of proper installation procedures.

B. Work is to be performed by competent mechanics directly employed by Contractor, and fully experienced in first class commercial installation of type required by these specifications.

C. Provide only carpet which has passed following tests:
   2. Critical Radiant Flux (Flame Spread): ASTM E 648 Class 1

D. Substitutions: Carpet submitted for approval as equal to specified carpet must be equal in every respect, including color selection.
   1. Include full range of carpet colors and manufacturer's written specification.

E. Pre-Installation Meeting:
   1. Schedule meeting with Owner, Architect and General Contractor; arrange for attendance by carpet installer and carpet manufacturers' technical representatives.
   2. Meeting to include, but not limited to, following:
      a. Review of calcium chloride and pH test results on floor slabs.
      b. Adhesive application instruction.
      c. Scheduling and procedures for periodic field inspections by carpet manufacturers' technical representatives.
   3. Record minutes of meeting and promptly distribute copies of minutes to attendees and other interested parties as may be necessary.
   4. Record issues resolved during meeting; include copies of Drawings and application instructions used in meeting; record changes on Drawings and application instructions made at meeting.
1.06 PROJECT CONDITIONS

A. Space Enclosure and Environmental Limitations: Do not install carpet until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver carpet and accessories until notification is received that buildings or spaces are ready for installation of carpet.

B. Deliver carpeting materials in original mill protective wrapping with mill register numbers and tags attached.
   1. Store inside, in well ventilated area, protected from weather, moisture and soiling.
   2. Lay flat with continuous blocking off ground.
   3. Deliver tags to job inspector along with a sample of carpet cut from each bale.

1.08 REMNANTS

A. Leave usable carpet remnants with Owner.
   1. Tag each piece by size and prepare inventory of materials.
   2. Provide secure vandalproof storage until Owner accepts materials.

1.09 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.
   1. Provide required overrun exclusive of carpet needed for proper installation, waste and usable scraps.
   2. Deliver and store at Owner's direction.
   3. Carpet: Before installation begins, furnish quantity of full size units equal to 5 percent of amount installed, but not less than 10 square yards.

1.10 WARRANTY

A. Provide special project warranty, signed by Contractor, installer and manufacturer (Carpet Mill), agreeing to repair or replace defective materials and workmanship of carpeting work during specified warranty periods following substantial completion; attach copies of product warranties.
   1. 25 year non-prorated limited warranty against excessive surface wear and static delamination, edge ravel, zipper, edge ravel, zipper, and backing resiliency loss

B. Adhesive: Provide manufacturer's warranty for pressure sensitive adhesive to be free from manufacturing defects for period of one year from date of substantial completion.
PART 2 – PRODUCTS

2.01 CARPET

A. Carpet Data: Detailed requirements for each required type of carpet is specified in Article 3.08 at end of Section.
   1. Extent of each type of carpet is shown on Drawings and scheduled.
   2. Provide carpet complying with CBC Chapter 11B-302.2 and 11B-303.

B. Carpet Color/Pattern Texture: Match Architect’s samples or match specified manufacturer’s stock carpet color, pattern and texture.

C. Dyeing: Yarn to be from same dye lot.

D. Environmental Requirements: Provide carpet that complies with testing and product requirements of Carpet and Rug Institute (CRI) Green Label Plus testing program.

2.02 ACCESSORIES

A. Carpet Edge Guard, Nonmetallic: Comply with requirements in Section 09 6500 and CBC Chapter 11B.

B. Concrete Slab Primer: Henry 366 Floor Primer and Latex Liquid Additive by W.W. Henry Company, or approved equal as recommended by flooring manufacturer.

C. Trowelable Underlayment and Patching Compounds: Latex-modified, Portland cement based formulation
   1. Henry 547 Universal Underlayment with Henry 546 Feather Edge Additive, if required, by W.W. Henry Company, or approved equal as recommended by flooring manufacturer.

D. Adhesives:
   1. Carpet Adhesive: Water resistant, mildew resistant, nonstaining type adhesive as recommended by carpet manufacturer to suit products and subfloor conditions indicated, which complies with flammability requirements for installed carpet.
   2. VOC Content: Comply with requirements of SCAQMD Rule 1168.
      a. Include printed statement of VOC content and documentation of compliance with requirements for Carpet and Rug Institute (CRI) Green Label Plus testing program

E. Seaming Cement: Hot-melt seaming adhesive or similar product recommended by carpet manufacturer, for taping seams and buttering cut edges at backing to form secure seams and prevent pile loss at seams.

F. Miscellaneous Materials: Provide types of adhesives and other accessory items recommended by carpet manufacturer and installer for conditions of installation and use, without failure during life of carpet.

2.03 RESILIENT BASE

A. Rubber base: Conform to ASTM F 1861; Group 1, solid (homogeneous); Type TS, thermoset vulcanized rubber; 4-inch high unless otherwise indicated, integral colors as selected, non-shrinking, 1/8 inch thick, with matching molded corners and end stops.
1. Acceptable Manufacturers:
   a. Johnsonite
   b. Burker Flooring
   c. Roppe
2. Thickness: 1/8 inch minimum.
3. Height: As indicated.
4. Length: Provide in rolls. Pre-cut 4 foot strips are not acceptable.
5. Style:
   a. Straight (toe-less) base at carpet.
6. Color: As scheduled

B. Base Adhesive: Water based, low odor type formulated specially for use with rubber base, and manufactured or recommended by manufacturer of rubber base.

PART 3 - EXECUTION

3.01 EXAMINATION AND TESTING

A. Examine substrates, areas, and conditions for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance.
   1. Verify that substrates and conditions are satisfactory for carpet installation and comply with requirements specified.
   2. Report to Architect, in writing, prevailing conditions that will adversely affect satisfactory execution of Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.
   1. Starting Work constitutes acceptance of existing conditions.
   2. Correction of unsatisfactory and defective work subsequently encountered will be responsibility of Contractor at his expense.

3.02 PREPARATION – GENERAL

A. Clear away debris from concrete surfaces to receive carpet.

B. Comply with CRI 104, Section 6.2 – Site Conditions; Floor Preparation, and carpet manufacturer's written installation instructions for preparing substrates indicated to receive carpet installation.

C. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.

D. Remove coatings, other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents.
   1. Use mechanical methods recommended by carpet adhesive manufacturer.

E. Broom and vacuum clean substrates to be covered immediately before installing carpet.
   1. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust.

F. Sequence carpeting with other work so as to minimize possibility of damage and soiling of carpet during remainder of construction period.
3.03 INSTALLATION – GENERAL

A. Install carpet in following manufacturer's instructions, including manufacturer's instructions and recommendations for seam locations and direction of carpet.
   1. Maintain uniformity of direction and lay of pile.

B. Provide cut-outs where required, and bind cut edges properly where not concealed by protective edge guards or overlapping flanges.

C. Extend carpet into following areas:
   1. Under open-bottomed and raised-bottoms obstructions, and under removable flanges of obstructions.
   2. Into closets and alcoves of rooms indicated to be carpeted, unless another floor finish is indicated for such spaces.
   3. Under movable furniture and equipment, unless otherwise indicated.

D. Install carpet edge guard at every location where edge of carpet is exposed to traffic, except where another device, such as expansion joint cover system or threshold, with integral carpet binder bar, is indicated
   1. Anchor edge guards to substrate.
   2. Comply with requirements in Section 09 6513 and CBC Chapter 11B-303.

E. Expansion Joints: Do not bridge building expansion joints with continuous carpeting, provide for movement.

F. Piecing: Use full sizes of carpet for applications where use of smaller size would cause an extra seam.
   1. Use of small pieces in areas where larger piece could be used is not permitted.

3.04 GLUED-DOWN INSTALLATION-DIRECT TO FLOOR SLAB

A. Floor Preparation:
   1. Surfaces to receive carpet shall be dry, free of grease, wax and foreign matter and thoroughly cleaned with commercial vacuum cleaner.

B. Fit sections of carpet into each space prior to application of adhesive.
   1. Trim edges and butter cuts with seaming cement.

C. Apply adhesive uniformly to substrate following manufacturer's instructions.
   1. Butt carpet edges tightly together to form seams without gaps.
   2. Roll lightly to eliminate air pockets and ensure uniform bond.
   3. Remove adhesive promptly from face of carpet.

3.07 CLEANING AND PROTECTION

A. Remove debris from installation, carefully sorting pieces to be saved from scraps to be disposed of.

B. Remove adhesive from carpet surface with manufacturer's recommended cleaning agent.
   1. Replace carpet which cannot be cleaned.

C. Vacuum carpet using commercial machine with face-beater element. Remove protruding face yarn.
D. Protect carpet during remainder of construction period, so that carpet will be in undamaged and unsoiled condition at time of acceptance.
   1. Use non-staining material for protective cover.

E. Maintenance Materials: Deliver specified overrun and usable scraps of carpet to Owner's designated storage space, properly packaged (paper wrapped) and identified.
   1. Usable scraps are defined to include roll ends of less than 9 feet in length, and pieces of more than 3 sq. ft. area and more than 8 inches wide.
   2. Dispose of smaller pieces as "construction waste" in accordance with requirements of Section 01 7419

3.08 CARPET DATA

A. Carpet Designation: CPT-1
   1. Manufacturer/Quality: Mannington Commercial, or approved equal.
   2. Style: Scena
   3. Face Yarn: Invista Antron Legacy Type 6,6 Four Hole, Hollow Filament Nylon, with Permanent Stain and Bleach Protection, Static Control, and Duratech Soil Resistant Treatment.
   4. Construction: Patterned Loop
   7. Color: St. Croix – No. 3411
   8. Gauge: 5/64inch
   9. Stitches: 9.8 per inch
   10. Pile Thickness: 0.118 inch
   11. Tufted Yarn Weight: 21 Ounces Per Square Yard.
   12. Density:
       a. Average Density: 6,406
       b. Weight Density: 134,542
   13. Primary Backing: 100 percent Synthetic
   15. Width: 12 feet, 6 inches (Roll)
   17. Flame Spread: Critical radiant flux to meet Class I, 0.45 watts/sq. cm. as tested by ASTM E 648 or NFPA 253.
   18. Smoke Developed Index: Less than 450, per ASTM E 662.
   19. Electrostatic Propensity: Less than 3.0 KV per AATCC 134.

END OF SECTION 09 6800
SECTION 09 9100

PAINTING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Surface preparation and field painting of following:
      a. Exposed exterior items and surfaces.
      b. Exposed interior items and surfaces.
      c. Surface preparation, priming, and finish coats specified in this Section are in
         addition to shop priming and surface treatment specified in other Sections.

B. Related Sections:
   1. Section 07 9200: Joint Sealants
   2. Section 08 1113: Hollow Metal Frames; prefinished frames.
   3. Section 09 2900: Gypsum Board
   4. Section 09 9600: High Performance Coatings

1.02 REFERENCES

A. South Coast Air Quality Management District (SCAQMD):
   1. SCAQMD Rule 1113 – Architectural Coatings
   2. SCAQMD Rule 1168 – Adhesive and Sealant Applications

1.03 QUALITY ASSURANCE

A. Approved Equal: Provide materials or products specified by trade name as specified.
   1. Interpret references to brand names as establishing standard of quality.
      a. Such interpretation is not to be construed as limiting competition.
   2. Presume brand names, where used in specifications, to be followed by words “or
      approved equal”.
   3. Such approval will be granted only as set forth in Contract Documents and with
      certification that materials are equal or superior to brand named in specifications
      in construction, efficiency, and utility.
      a. In making submittals for approval as equal, include manufacturer’s product
         data sheet for each product indicating composition and percent by weight.

1.04 SUBMITTALS

A. Product Data: For each paint system specified; include primers.
      a. Indicate each material and cross-reference specific coating, finish system,
         and application.
      b. Identify each material by catalog number and general classification.
      c. Include manufacturer’s name, product name and number; including primers,
         thinners, and coloring agents, together with manufacturers’ catalog data fully
         describing each material as to content, recommended installation, and
         preparation methods. Identify surfaces to receive various paint materials.
2. Manufacturer’s Information: Provide manufacturer’s technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.

3. Certification by manufacturer that products supplied comply with local regulations controlling use of Volatile Organic Compounds (VOC).

B. Samples for Verification: After receipt of Architect’s Color Schedule, submit following for Architect’s review for color and texture only:

1. Stepped Samples: Defining each separate coat, including primers.
   a. Use representative colors when preparing samples for review.
   b. Resubmit until required sheen, color, and texture are achieved.

2. Provide list of materials and applications for each coat of each sample.
   a. Label each sample for location and application.

3. Provide minimum of four 8-1/2 by 11 inch painted samples of each color and material, with texture to simulate actual conditions.
   a. On Metal – Provide minimum of four 4 by 8 inch samples for each type of finish and color, defining prime and finish coat.
   b. Do not proceed with painting work until color samples have been accepted.

C. Field Sample: When and as directed by Architect, apply one complete coating system for each color, gloss and texture required.

1. When approved, sample panel areas will be deemed incorporated into Work and will serve as standards by which subsequent Work of this Section will be judged.

D. Provide list of solid volume factors for each type of material if so requested by Architect.

1.05 DEFINITIONS

A. “Paint” as used in this Section means coating systems materials, including primers, emulsions, enamels, stains, sealers, and other applied materials whether used as prime, intermediate, or finish coats.

1.06 SYSTEM DESCRIPTION

A. Paint exposed surfaces except where material is obviously intended and specifically noted as surface not to be painted:

1. Where items or surfaces are not specifically mentioned, paint item or surface same as adjacent similar materials or surfaces whether or not schedules indicate colors.
   a. When system, color, or finish is not designated, Architect will select from standard colors and finishes available.
   b. Refer to Finish Schedules and notations on Drawings.
   c. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron work (unless scheduled to receive high performance coating), conduit, and metal surfaces of mechanical and electrical equipment as indicated.

B. Work Not to be Painted: In general, following items will not require finishing unless specifically specified, scheduled, or indicated:

1. Flexible conduit connections to equipment, miscellaneous nameplates, stamping, and instruction labels and manufacturer’s data.

2. Do not paint moving parts of operating units, including, but not limited to:
a. Mechanical and electrical parts, such as valves and damper operators, linkages, sensing devices, motor and fan shafts.

3. Do not paint code required labels, such as Underwriters’ Laboratories and Factory Mutual, or equipment identification, performance rating, name, and nomenclature plates.

4. Concealed Surfaces: Painting is not required on wall or ceiling surfaces in concealed and inaccessible areas such as pipe spaces and duct shafts, as applicable to Project.

5. Paint exposed piping, ductwork, equipment, and other such items as designated or required.

6. Finish Hardware, except prime coated items.

7. Exterior and interior metal stairs and walking surfaces scheduled to receive high performance coatings specified in Section 09 9600.

C. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for metal fabrications, hollow metal work and similar items.

1.07 PROJECT CONDITIONS

A. Apply primers and paints only when temperature of surfaces to be painted and surrounding air temperatures are within range permitted by paint manufacturer’s printed instructions.

B. Do not apply paint in rain, fog, mist or to damp or wet surfaces; or when relative humidity exceeds 85 percent, unless otherwise specified by paint manufacturer.

C. Do not apply paint, interior, or exterior, when temperature is below 50 degrees F or above 90 degrees F, or when dust conditions are unfavorable for application.

D. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature ranges specified by paint manufacturer during application and drying periods.

E. Painting Work by Other Trades: Examine Drawings and Specifications, including requirements specified in other sections for painting work by other trades.
   1. Notify Architect in writing of conflicts between Work of this Section and that of other trades and sections, and errors, omissions, or impractical requirements.
   2. Paint or finish surfaces that are left unfinished by requirements of their specification as Work of this Section.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project Site in original, new, and unopened packages and containers bearing manufacturer’s name and label, and following information:
   1. Name or title of material.
   2. Product Description (Generic Classification or Binder Type).
   3. Federal Specification number, if applicable.
   4. Manufacturer’s stock number and date of manufacture.
   5. Manufacturer’s name
   6. Contents by volume, for major pigment and vehicle constituents.
   7. Thinning instructions.
   8. Application instructions.
   9. Color name and number.
10. VOC Content.
11. Concurrently provide local representative of approved paint products with copies of invoices of purchased materials.

B. Storage and Mixing of Materials: Store and mix paint materials in single suitable place in compliance with health and fire regulations.
   1. Open and mix ingredients on premises in presence of Project Inspector.
   2. Maintain such storage spaces clean and neat.
   3. Remove oily rags, waste, and like materials from building each night and take every precaution to avoid danger of fire.

1.09 REGULATORY REQUIREMENTS

A. Codes and Standards: Conform work and materials to regulations of State Fire Marshal, Safety Color Coding in conformance with OSHA, and local or State Ordinances having jurisdiction.
   1. Conform to most stringent requirements and authorities having jurisdiction.

B. Comply with applicable codes and regulations of governmental agencies having jurisdiction including those having jurisdiction over airborne emissions and industrial waste disposal.
   1. Where those requirements conflict with this Specification, comply with more stringent provisions.
   2. Regulatory changes may affect formulation, availability, or use of specified coatings.
      a. Confirm availability of coatings to be used prior to Project bid and before start of painting on Project.
   3. Comply with current applicable regulations of California Air Resources Board (CARB), South Coast Air Quality Management District (SCAQMD), and Environmental Protection Agency (EPA), as applicable.

1.10 MAINTENANCE STOCK

A. Upon completion of Work of this Section, deliver to owner, extra stock consisting of one gallon of each color, type, and gloss of finish (topcoat) paint used in Work.
   1. Tightly seal each container and clearly label contents and location where used.

PART 2 – PRODUCTS

2.01 MATERIAL QUALITY

A. Provide best quality commercial grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers.
   1. Materials not displaying manufacturer’s identification as standard, best grade product will not be acceptable.

B. Furnish products of only one paint manufacturer unless otherwise specified or approved.
   1. Provide primers, thinners, coloring agents, and catalysts for each painting system as approved for use by manufacturer of paint, except for materials furnished with shop prime coat by other trades.
   2. Use approved thinners only within recommended limits.
C. Factory mix paint materials to correct color, gloss, and consistency for installation to maximum extent feasible.

D. Do not use paints in Work which have been packaged longer than six months, except when such products are known to have long package stability when unopened and only when guaranteed by manufacturer.

2.02 MANUFACTURERS

A. Manufacturer's catalog names and numbers are used to aid in establishing kind and quality of material required and are not used as indication of color desired.
   1. Colors scheduled are based on those of Frazee Paint, div. of Sherwin-Williams.

   1. Equivalent opaque finish products manufactured by one of following will be acceptable, subject to conformance with specified requirements:
      a. Frazee Paint
      b. Pittsburgh Paints, by PPG Architectural Coatings, div. of PPG Industries
      c. Sherwin-Williams Company
      d. Vista Paint Corporation

2.03 COLORS AND FINISHES

A. Surface treatments and finishes are shown on Drawings and indicated in Schedules on Drawings. Paint colors are shown on Architect’s Color Schedule.

B. Colors required or listed by Architect are not necessarily stock colors available in one particular manufacturer’s range.
   1. Non-availability of colors selected by Architect will be sufficient reason to disqualify manufacturer not capable of providing such colors.

C. Paint Coordination: Provide finish coats which are compatible with prime paints used.
   1. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates.
   2. Upon request from other subcontractors, furnish information on characteristic of specified finish materials, to ensure that compatible prime coats are used.
   3. Provide barrier coats over incompatible primers or remove and reprime as required.

2.04 PAINTABLE CAULK

A. Acrylic latex, one-part, non-sag, mildew resistant, non-bleeding and non-staining, acrylic emulsion component compound conforming to ASTM C 834, Type OP, Grade NS, formulated to be paintable.
   1. For use as interior caulk in nonworking joints only.
   2. Must be able to accommodate joint movement of not more than 5 percent in both extension and compression for total of 10 percent.
   3. Backup and Bond Breaker: Products recommended by caulking manufacturer.
   4. Provide one of following products:
      a. AC-20: Pecora Corporation.
c. GE RCS20: Momentive Performance Materials.
5. VOC compliant per SCAQMD Rule 1168.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine substrates and conditions under which painting will be performed for compliance with requirements for application of paint.
   1. Do not begin paint application until unsatisfactory conditions have been corrected and surfaces scheduled to receive paint are thoroughly dry.

B. Starting of painting will be construed as applicator’s acceptance of surfaces and conditions within particular area.

3.02 SURFACE PREPARATION

A. Clean and prepare surfaces to be painted following paint manufacturer’s written instructions and as specified, for each particular substrate condition.

B. Clean surfaces to be painted before applying paint or surface treatments.
   1. Remove oil and grease prior to mechanical cleaning.
   2. Program cleaning and painting so contaminants from cleaning process will not fall onto wet, newly painted surfaces.
   3. Cover surfaces and equipment as necessary to prevent contaminants from cleaning process from falling onto equipment.

C. Clean floors and surfaces in room being painted of loose dirt and dust before painting is started.

D. Moisture Content: Measure moisture content of surfaces using electronic moisture meter.
   1. Do not apply finishes unless moisture content of surfaces are below maximum levels specified, or as otherwise recommended by manufacturer.

E. Remove hardware, hardware accessories, switch and receptacle plates, surface-mounted lighting fixtures, escutcheons and plates, surface-mounted equipment, free-standing equipment blocking access to painted surfaces, and other items as required prior to surface preparation and painting operations.
   1. Following completion of painting of each space or area, reinstall removed items.

F. Provide barrier coats over incompatible primers or remove and reprime.

G. Gypsum Board: Remove dust, loose particles or other matter that would prevent proper paint adhesion.
   1. Check to see that joints and screw heads have been properly covered with joint compound and sanded smooth and flush with adjacent surfaces.
   2. Before finishing untextured smooth gypsum board, use damp sponge along edge of joints where nap of paper has been raised by sanding.

H. Wood: Ensure that surfaces are clean and dry.
   1. Sandpaper wood (except saw-textured wood, if specified) smooth to provide even surface and then dust off and wipe clean.
2. Touch up knots and pitch pockets with shellac on interior wood and with outside sealer on exterior work.
3. After priming coat has been applied, thoroughly fill nail holes, irregularities and cracks; use plastic wood filler for stained or natural finish and putty for painted work.

I. Ferrous Metals: Clean ungalvanized ferrous metal surfaces that have not been shop coated or are not otherwise specified to receive high performance coatings.
   1. Remove oil, grease, dirt, loose mill scale, and other foreign substances.
   2. Use solvent (SSPC SP1) or mechanical cleaning methods (SSPC SP2 and SP3) that comply with The Society for Protective Coatings (SSPC) recommendations.
   3. Where rust or scale is present, wire brush and sandpaper clean.
   4. Clean field welds and abraded portions of field welded and erected ferrous metal components.

J. Galvanized Surfaces: Clean galvanized surfaces with non-petroleum-based solvents (SSPC SP1) so surface is free of oil and surface contaminants.
   1. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
   2. Spot prime field connections, welds, soldered joints, and burned and abraded portions.
   3. Factory finished surfaces indicated to be repainted shall be sanded or etched to increase adherence of finish coats.
   4. Refer to requirements in Section 09 9600 for preparation and paint of existing exterior galvanized surfaces.

K. Paintable Caulk Installation:
   1. Comply with general sealant installation requirements in Section 09 9200.
   2. Use only for caulking of followings joints in dry areas:
      a. Perimeter caulking of interior door frames.
   3. Joint Design: Width of joint should be approximately 12 times anticipated movement and fall within range of 1/4 inch to 3/4 inch

3.03 EXISTING PAINTED SURFACES

A. Before painting or finishing over existing paint or finishes, paint small inconspicuous locations representing each condition to test for compatibility.
   1. Where problems are encountered, do not proceed without Architect's instructions.

B. Previously Painted Surfaces to Receive New Paint Coatings: Clean, prepare and repaint existing materials as indicated.
   1. Sand rough areas and feather edge chipped paint.
   2. Spackle and sand nail holes and like defects.
   3. Wash existing painted surfaces with strong solution of biodegradable detergent and rinse with clean water.
   4. Allow surfaces to dry thoroughly before paint is applied.
   5. Clean and dust surfaces thoroughly and spot prime bare, abraded or touched-up areas.

C. Do not apply water-base paints over existing oil-based painted surfaces unless surface has been "scuff-sanded" and properly primed with paint manufacturer's recommended primer.
   1. Test original surfaces to verify where oil-based paints were used.
D. Apply coatings conforming to respective schedules listed herein, except that pretreatments, sealers, fillers and prime coats need not be provided on surfaces where existing coatings are soundly adhered and in good condition.

3.04 MATERIAL PREPARATION

A. Mix and prepare painting materials in field following manufacturer’s directions.

B. Store materials not in actual use in tightly covered containers.
   1. Maintain containers used in storage, mixing and application of paint in clean condition, free of foreign materials and residue.

C. Stir materials before application to produce mixture of uniform density, stir as required during application.
   1. Do not stir surface film into material.
   2. Remove film and, if necessary, strain material before using.

3.05 APPLICATION

A. Apply paint following manufacturer’s directions.
   1. Use applicators and techniques best suited for substrate and type of material being applied.
   2. Mix to proper consistency.
   3. On brush-applied work brush out smooth leaving minimum of brush marks, with paint uniformly flowed on.

B. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, and conditions otherwise detrimental to formation of durable paint film.

C. Apply paint to clean, dry, prepared surfaces only.
   1. Apply paint material evenly, smoothly flowed on without runs, sags, or holidays.

D. Provide finish coats compatible with primers used.

E. Minimum Coating Thickness: Apply each material at not less than manufacturer’s recommended spreading rate, to provide a total dry film thickness of not less than 5.0 mils for entire coating system of prime and finish coats for 3 coat work.
   1. Provide total dry film thickness of not less than 3.5 mils for entire coating system of prime and finish coat for 2 coat work.

F. Number of coats and film thickness required is same regardless of application method.
   1. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer.
   2. Sand between applications where sanding is required to produce even smooth surface following manufacturer’s directions.

G. Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance.
   1. Give special attention to ensure that surfaces, including edges, corners, crevices, welds, and exposed fasteners, receive dry film thickness equivalent to that of flat surfaces.
2. Number of coats specified herein are minimum to be applied.
   a. Apply additional coats in event full coverage is not obtained or required total
      thickness of paint does not comply with mil thickness recommended by paint
      manufacturer.

H. Paint surfaces behind movable equipment and furniture same as similar exposed
   surfaces.

I. Included Work: Finish tops, bottoms, and edges of doors same as balance of door.
   1. Where walls are specified to be painted, include columns, arrises, reveals, soffits,
      returns, and like surfaces.

J. Priming: Where shop coats and touch-up painting are specified under other sections
   of Work, omit prime coat.

K. Completed Work: Match approved samples for color, texture, and coverage.
   1. Remove, refinish, or repaint work not in compliance with specified requirements.

3.06 CLEANING AND PROTECTION

A. Cleanup: At end of each work day, remove empty cans, rags, rubbish, and other
   discarded paint materials from Project Site.
   1. Remove paint, varnish and brush marks from glazing material
   2. Upon completion of painting work, wash and polish glazing material both sides.
      a. Glazing material, which is damaged, shall be removed and replaced with new
         material.

B. Protection: Protect work of other trades, whether to be painted or not, against damage
   by painting.
   1. Correct damage by cleaning, repairing or replacing, and repainting, as acceptable
      to Architect.

C. Protect floors and adjacent surfaces from paint smears, spatters and droppings.
   1. Use dropcloths to protect floors.
   2. Cover fixtures and mask off areas where required.

D. Provide “Wet Paint” signs and barricades to protect newly painted finishes.
   1. Remove temporary protective wrappings provided by others for protection of their
      work, after completion of painting operations.

E. At completion of work of other trades, touch-up and restore damaged and defaced
   painted surfaces.

3.07 PAINT SYSTEM SCHEDULES – GENERAL

A. Provide following paint systems for substrate indicated.
   1. Products must meet or exceed current applicable regulations of agencies listed in
      Regulatory Requirements Article.
3.08 SCHEDULE OF EXTERIOR PAINT SYSTEMS

A. Paint System Type 1:
   1. Type and Gloss: Water-based Acrylic Urethane; Semi-Gloss
   2. Use: Exterior wood.
      a. Primer: EZ-PRIME Premium, Exterior Wood Primer (EZPR00)
      b. 2nd Coat: EVERSHEILD, Exterior Eggshell (EVSH30)
      c. 3rd Coat: EVERSHEILD, Exterior Eggshell (EVSH30)

B. Paint System Type 2:
   1. Type and Gloss: Water-based Acrylic Urethane; Eggshell
   2. Use: Exterior Metal doors and frames, except where otherwise specified.
      a. Primer: ULTRA-GRIP Interior/Exterior Flat UGPR00-1
      b. 2nd Coat: ULTRASHIELD DTM Semi-Gloss ULDM 50
      c. 3rd Coat: ULTRASHIELD DTM Semi-Gloss ULDM 50

3.08 SCHEDULE OF INTERIOR PAINT SYSTEMS

A. Paint System Type 3:
   1. Type and Gloss: Water-based Acrylic Urethane; Semi-Gloss
   2. Use: Interior concrete walls and other surfaces indicated.
      a. Primer: ULTRA-GRIP Interior/Exterior Flat UGPR00-1
      b. 2nd Coat: ULTRASHIELD DTM Semi-Gloss ULDM 50
      c. 3rd Coat: ULTRASHIELD DTM Semi-Gloss ULDM 50

B. Paint System Type 5:
   1. Type and Gloss: Water-based Acrylic Urethane; Semi-Gloss
   2. Use: Interior ferrous metal surfaces indicated.
      a. Primer: ULTRA-GRIP Interior/Exterior Flat UGPR00-1
      b. 2nd Coat: ULTRASHIELD DTM Semi-Gloss ULDM 50
      c. 3rd Coat: ULTRASHIELD DTM Semi-Gloss ULDM 50

C. Paint System Type 14:
   1. Type and Gloss: Semi-Gloss
   2. Use: Wood Doors, Opaque (Medium Density Overlay).
   3. Roller application on doors with shortnap roller.
      a. Primer: W600 Ecoshield Zero-VOC Latex Primer
      b. 2nd and 3rd Coats: W603 Ecoshield Semi-Gloss or SPMA50 Suprema Interior Semi-Gloss

D. Paint System Type 20:
   1. Type and Gloss: Eggshell
   2. Use: Gypsum Board
      a. Primer: W600 Ecoshield Zero-VOC Latex Primer
      b. 2nd and 3rd Coats: W602 Ecoshield Low Sheen or SPMA40 Suprema Low Sheen

3.09 SPECIAL TREATMENT OF SPECIFIC SURFACES

A. Mechanical and Electrical Work:
   1. Paint exposed surfaces of, but not limited to following:
      a. Exterior factory-primed equipment, apparatus, pipes and fittings, vents, miscellaneous supports and hangers, electrical conduit, fittings, pull boxes, outlet boxes.
b. Other unfinished surfaces of mechanical and electrical
   Work, miscellaneous factory-primed metal cabinets, panels, and access
doors and panels.

END OF SECTION 09 9100
SECTION 09 9600
HIGH PERFORMANCE COATINGS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Field preparation, priming, and painting of following:
      a. Exterior chain link fence posts, rails, and gate frames.
      b. Exterior decorative metal fence and gates.

B. Related Sections:
   1. Section 05 5500: Metal Fabrications; decorative metal fence and gates
   2. Section 09 9100: Painting; ferrous metal not specified to receive high performance coating.
   3. Section 32 3113: Chain Link Fence and Gates

1.02 REFERENCES

A. South Coast Air Quality Management District (SCAQMD):
   1. SCAQMD Rule 1113 – Architectural Coatings

B. The Society for Protective Coatings (SSPC):
   1. SSPC SP 1 – Solvent Cleaning.
   2. SSPC SP 2 – Hand Tool Cleaning.
   3. SSPC SP 3 – Power Tool Cleaning.
   4. SSPC SP 6 – Commercial Blast Cleaning.

1.03 QUALITY ASSURANCE

A. Applicator Qualifications: Engage experienced applicator who has completed high performance coating system applications similar in material and extent to that indicated for this Project with record of successful in-service performance.

B. Source Limitations: Obtain primers for each coating system from same manufacturer as finish coats.

C. Coating manufacturer shall conduct periodic inspections of surface preparation and coating operations as necessary.

D. Coating manufacturer shall notify Architect if Contractor fails to meet specification.

1.04 SUBMITTALS

A. Product Data: For each coating system specified; including primers.
a. Indicate each material and cross-reference specific coating, finish system, and application.
b. Identify each material by manufacturer’s catalog number and coating material proposed for use.

2. Manufacturer’s Information: Provide manufacturer’s technical information, including instructions for handling, storing and applying each coating material proposed for use.

3. Certification by manufacturer that products supplied comply with local regulations controlling use of Volatile Organic Compounds (VOC).

B. Samples:
   1. Applied finishes on steel, for color and finish.
   2. Provide minimum 4 by 8 inch pieces, and 8 inch lengths of larger sizes as required to show finished work.

C. Qualification Data: For firms and persons specified in “Quality Assurance” Article to demonstrate their capabilities and experience.
   1. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.05 WARRANTIES

A. Special Finish Warranty: Manufacturer’s standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period.
   1. Warranty does not include normal weathering.
   2. Warranty Period: 10 years from date of Substantial Completion for Type A coating system.

B. Completed high performance coatings shall be jointly warranted by respective coating manufacturer and coating applicator to meet weathering tests and performance requirements as specified.
   1. Coating applicator must apply for coating warranty at time of application.

PART 2 PRODUCTS

2.01 MANUFACTurers

A. Basis-of-Design Products: High Performance Coatings on steel are based on following systems as manufactured by The Carboline Company or approved equal as defined in Section 01 1600.
   1. Type A: Cycloaliphatic Amine Epoxy/Aliphatic Polyurethane System for exterior metal consisting of existing and new galvanized fence components and new primed decorative metal fence components.

B. Subject to compliance with specified requirements, comparable products may be submitted by alternate manufacturers in accordance with requirements for product substitutions specified in Section 01 1600 and following:
   1. Submit items listed under Submittals and as specified in Section 01 3300, for evaluation of proposed system.
   2. Tests shall have been made for identical systems within ranges of specified performance standards and criteria for application to specified substrates.
   3. Acceptance is also subject to availability of acceptable color matching specified color.
   4. Copy of manufacturer's minimum 10 year finish and material warranty.
2.02 COATING MATERIALS – GENERAL

A. Material Compatibility: Provide primers and finish coat materials that are compatible with one another and substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer’s highest grade of various high performance coatings specified; of uniform color throughout and color-fast.

C. Materials not displaying manufacturer’s product identification are not acceptable.

D. Coating manufacturers and coating applicators shall develop jointly methods and procedures for surface preparation, priming, and finish coating of materials.

2.03 HIGH-PERFORMANCE FIELD APPLIED COATING SYSTEMS

A. High Performance Coating System Type A:
   1. High performance pigmented two component field applied system consisting of Cycloaliphatic Amine Epoxy/Aliphatic Polyurethane System, which meets or exceeds following performance provisions for minimum of ten years:
      a. Resistant to chalking, marring, abrasion and ultraviolet deterioration.
      b. Repel surface dirt and contaminates.
   2. Provide two coat system consisting of:
      a. Primer Coat: Carboline Carboguard 890 VOC Cycloaliphatic Amine Epoxy at 4.0 to 6.0 mils dry film thickness; VOC: 100 g/l
      b. Finish Coat: Carbothane 133 MC Aliphatic Acrylic-Polyester Polyurethane at 3.0 to 5.0 mils dry film thickness; VOV: 97 g/l
         1) Color: As selected by Architect.
   3. Apply Coating System Type A to:
      a. Existing and new chain link fence posts, rails, and gate frames.
      b. New decorative metal fence, including posts, pickets, and gates.
      c. Miscellaneous fence components, including hardware mounting plates and kickplates.

2.04 PERFORMANCE REQUIREMENTS

A. Provide coating systems suitable for application to steel.

B. Conform to applicable performance standards of following where referenced in specification:
   2. ASTM International (ASTM).
   3. The Society for Protective Coatings (SSPC).

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

A. Surfaces to receive high performance coating must be free of grinding marks and weld splatter. Welds are to be ground smooth.

B. Finish visible surfaces of exposed work; defined as surfaces which will be exposed to view from exterior and in interior of completed building.
C. Perform finishing after fabrication, forming, fitting, and welding have been completed.

D. Finishes on exposed work shall be uniform in appearance; members are to match each other exactly throughout installed work.

E. Specified finishes establish type and quality required; finishes are subject to Architect’s acceptance.

3.02 FIELD CLEANING AND PAINTING OF EXPOSED STEEL

A. Surfaces to receive high performance coating must be free of grinding marks and weld splatter. Welds are to be ground smooth.

B. Clean surfaces in accordance with SSPC-SP 2 or SP 3 as required and touch up primer as necessary.

3.03 CLEANING

A. Comply with Section 01 7423 and following:
   1. Clean in accordance with coating manufacturer’s recommendations.
   2. Do not use materials or methods which may damage finishes or surrounding construction.

3.04 PROTECTION

A. Protect finished surfaces from damage until acceptance by Owner.

END OF SECTION 09 9600
SECTION 10 1400

SIGNAGE

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Furnishing materials, labor, and equipment necessary for completion of signage as indicated on Drawings and as specified.
   2. Types of signage include, but is not limited to following:
      a. Exterior regulation and directional signage.

B. Related Sections:
   1. Section 32 0523: Concrete for Exterior Improvements; footing for exterior signs.
   2. Section 05 5000: Metal Fabrications; monument signs.
   3. Section 32 1732: Pavement Markings; accessible parking striping

1.02 REFERENCES


1.03 QUALITY ASSURANCE

A. Uniformity of Manufacturer: For each separate type of sign required, obtain signs from one source from single manufacturer.

B. Accessibility:
   1. Comply with CBC, Chapter 11B.
   2. Provide tactile exit signage complying with CBC 1003.2.8.6.

1.04 SUBMITTALS

A. Product Data: Manufacturer's technical data and installation instructions for each type of sign required.

B. Samples: Each sign form and material showing finishes, colors, surface textures and qualities of manufacturer and design of each sign component including graphics.
   1. Full-size sample units, if requested by Architect.
   2. Acceptable units may be installed as part of Work.

C. Shop Drawings: For fabrication and erection of signs.
   1. Include plans, elevations, and large scale details of sign wording and lettering layout.
   2. Show anchorages and accessory items.
   3. Furnish location template drawings for items supported or anchored to permanent construction.
1.05 DEFINITIONS

A. Accessible Route: Continuous unobstructed path that complies with 2013 California Building Code (CBC).

B. Characters: Letters, numbers, punctuation marks, and typographic symbols.

C. Circulation Path: Exterior or interior way of passage from one place to another for pedestrians, including, but not limited to, walks, hallways, courtyards, stairways, and stair landings.

D. Common Use: Interior and exterior rooms, spaces, or elements made available for occupancy by students, staff, or others visiting or utilizing facilities.

E. Facility: Portions of buildings, structures, site improvements, complexes, equipment, roads, walks, passageways, parking lots, or other real or property located on Project Site.

F. ISA: International Symbol of Accessibility

G. Pictogram: Pictorial symbol, which is recognized as representing activities, facilities, or concepts.

H. Sign: Architectural element composed of displayed text, symbolic, tactile or pictorial information.

I. Space: Definable area, such as room, toilet room, hall, assembly area, entrance, storage room, alcove, courtyard, or lobby.

J. Tactile: Object that can be perceived through sense of touch.

1.06 SYSTEM DESCRIPTION

A. Comply with most stringent requirements of 2013 CBC, Chapter 11B for following:
1. Tactile character type and size.
2. Finish and contrast.
3. Raised and visual characters.
4. Visual character and line spacing height and installation height.
5. Braille: California (Contracted) Grade 2 Braille shall be used wherever Braille is required.
6. Tactile sign installation height and location.
7. Parking lot entrance signs and accessible parking space identification signs.
8. Circulation path signs leading from public right of ways, public transportation, and parking lots.
9. Accessible building entrances shall be identified with ISA per CBC Section 11B-216.6.
10. Each permanent room and space identified by sign shall have sign installed adjacent to door it identifies, with raised characters and Braille.
11. Tactile exit signs shall be required per CBC Section 1011.3
12. Directional signs for inaccessible restrooms shall be installed at decision points directing disabled people to accessible restrooms.
13. Signs indicating provision of special equipment for hearing impaired (i.e. TTY phone, volume control phones, and Assistive Listening Systems.)
PART 2 – PRODUCTS

2.01 GENERAL

A. Letter Style: Helvetica Medium.

B. Uppercase Letters, san serif.

2.02 PLASTIC SIGNS

A. Basis-of-Design: Design for interior plastic room signs is based on Best Sign Systems standard HC 300 ADA System plaque signs and accessories as manufactured by Best Manufacturing Co., Montrose, CO.

B. Subject to compliance with specified requirements, provide named product or comparable product by one of following manufacturers:
   1. Mohawk Sign Systems, Schenectady, NY
   2. Karman, Ltd., Canoga Park, CA

C. Subject to compliance with specified requirements, comparable products may be submitted by alternate manufacturers in accordance with requirements for product substitutions specified in Section 01 6000 and following:
   1. Submit items listed in “Submittals” Article and as specified in Section 01 3300, for evaluation of proposed system.
   2. Complete project shop drawings for similar project may be submitted for evaluation purposes, however shop drawings specific to this Project will be required from successful bidder.
   3. Copy of manufacturer's finish and material warranty.

D. Material: Plaque stock of laminated phenolic and melamine plastic (MP) for interior signs and fiberglass (FP) for exterior signs suited for graphic sandblast process.
   1. Sign stock with face and core plies suited for integral raised profile of text and braille, in finishes and color combinations indicated or, if not indicated, as selected from manufacturer's standards.
   2. NEMA rated self-extinguishing.
   3. Thickness: 1/4 inch.
   4. Edges: Square cut.
   5. Corners: As indicated on Drawings.

E. Finish and Contrast: Matte finish with color of characters and symbols contrasting with background by minimum of 70 percent, and have non-glare finish per CBC Sections 11B-703.5.1, 11B-703.6.2, and 11B-703.7.1
   1. Colors as selected by Architect.

F. Raised (Tactile) and Visual Characters:
   1. Provide raised characters of 1/32 inch minimum depth above background, uppercase sans serif, and minimum of 5/8 inch and maximum of 2 inches high, based on height of uppercase letter “I”, complying with CBC Sections 11B-703.2 and 11B-703.2.5
      a. Accompanied by California Contracted Grade 2 Braille complying with CBC Section 11B-703.2.
   2. Proportions: Characters shall be selected from fonts where width of uppercase letter "O" is 60 percent minimum and 110 percent maximum of height of uppercase letter "I" per CBC Sections 11 B-703.4 and 11 B-703.6
3. Stroke Thickness: Stroke thickness of uppercase letter "I" shall be 15 percent maximum of height of character per CBC Section 11 B-703.4 and 11B-703.6
4. Format: Text shall be in horizontal Format per CBC Sections 11 B-703.2 and 11 B-703.5
5. Raised Character and Line Spacing: Character spacing shall be measured between two closest points of adjacent raised characters within message, excluding word spaces.
   a. Where characters have rectangular cross sections, spacing between individual raised characters shall be 1/8 inch minimum and 4 times raised character stroke width maximum, complying with CBC Sections 703.2.7 and 703.2.8.
   b. Where characters have other cross sections, spacing between individual raised characters shall be 1/16 inch minimum and 4 times raised character stroke width maximum at base of cross sections, and 1/8 inch minimum and 4 times raised character stroke width maximum at top of cross sections.
   c. Characters shall be separated from raised borders and decorative elements 3/8 inch minimum.
   d. Spacing between baselines of separate lines of raised message shall be 135 percent minimum and 170 percent maximum of raised character height per CBC Section 11 B-703.2
6. Visual Character and Line Spacing: Visual character spacing on sign shall be measured between two closest points of adjacent characters, excluding word spaces.
   a. Spacing between individual characters shall be 10 percent minimum and 35 percent maximum of character height.
   b. Spacing between the baselines of separate lines of characters within message shall be 135 percent minimum and 170 percent maximum of character height per CBC Section 11B-703.5
7. Visual Character Height and Installation Height: Minimum character height shall comply with CBC Table 11 B-703.5.5
8. Viewing distance shall be measured as horizontal distance between character and obstruction preventing further approach towards sign.
9. Character height shall be based on uppercase letter "I".
   a. Visual characters shall be installed at 40 inches minimum above finish floor or ground except for elevator car controls, floor-level exit signs and emergency procedures information per CBC Section 11 B-703.5.
10. Visual Character Case and Style: Visual characters on sign shall be uppercase or lowercase or combination of both and conventional in form.
   a. Characters shall not be italic, oblique, script, highly decorative, or of other unusual forms per CBC Section 11 B-703.5
11. Visual Character Stroke Thickness: Stroke thickness of uppercase letter "I" shall be 10 percent maximum of height of character per CBC Section 11 B-703.5
12. Provide pictograms, where required, complying with CBC Section 11B-703.6.
13. Symbol of accessibility (ISA), shall comply with CBC Section 11B-703.7.

G. Braille: California (Contracted) Grade 2 Braille shall be used wherever Braille is required, complying with CBC Sections 11B-703.3 and 11B-703.4
   1. Dots shall be 0.100 inch on center in each cell with 0.300 inch space between cells, measured from second column of dots in first cell to first column of dots in second cell.
   2. Dots shall be raised minimum of 0.025 inch above background.
3. Braille dots shall be domed or rounded per CBC Sections 11B-703.3 and 11B-703.3.1
4. Braille shall be positioned below corresponding text in horizontal format, flush left or centered.
5. Multi-lined text, Braille shall be placed below entire text.
6. Braille shall be separated 3/8 inch minimum and 1/2 inch maximum from other tactile characters, and 3/8 inch minimum from raised borders and decorative elements. per CBC Section 11 B-703.3

H. Applied copy not acceptable.
I. Provide plastic signs as indicated in schedule and details on Drawings:

2.03 PARKING LOT ENTRANCE AND ACCESSIBLE PARKING SPACE IDENTIFICATION SIGNS

A. Sign Requirements:
   1. Parking Lot Entrance Signs:
      a. Comply with CBC Chapter 11B, 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 reflective sign featuring ISA, which shall comply with CBC, Chapter 11B.
      a. Van accessible spaces shall be identified by including term “Van Accessible” below pictogram on same sign, or separate sign with words shall be installed below ISA sign peri CBC Section 11B-502.6

B. Sign Fabrication:
   1. Fabricate signs of 3M Scotchlite Brand reflective sheeting laminated to 18 gage galvanized heavy-duty steel.
   2. Size: Minimum 17 inches x 22 inches.
   3. White reflective graphics on dark blue reflective background.
   4. Character styles and proportions shall be minimum of one inch high.
   5. Provide with ISA, minimum 8 inches high.
   6. Posts: Provide 0.050 inch thick aluminum, or 14 gage galvanized steel, square tube, 2-1/4 inches square, punched.
      a. Furnish with corrosion and tamper resistant fasteners.

C. Sign Installation and Mounting:
   1. Install Parking Lot Entrance Signs on wall or pole in conspicuous place at each entrance to off-street parking facilities, or immediately adjacent to, and visible from each accessible stall or space.
   2. Install Parking Space Signs as follows:
      a. On wall or pole at head of each accessible parking space.
      b. In public way, with bottom edge of sign minimum of 80 inches above pavement or ground.
      c. In planting area, parking strip, or on wall, with bottom edge of sign minimum of 60 inches above pavement or ground.
   3. Comply with requirements of Section 32 0523 for concrete footings for posts.

D. Painting and Striping:
   1. Reserved parking spaces shall be identified by ISA at foot of space in compliance with CBC, Chapter 11B.
      a. Access aisles shall be striped as required.
2. Perform painting and striping in accordance with requirements in Section 32 1723.

2.03 ACCESSIBLE PATH OF TRAVEL SIGNS

A. Accessible Path of Travel Signs:
1. Circulation paths of travel with stairs or other obstacles leading from public right of ways, public transportation, and parking lots, that are not accessible, or do not lead to accessible entrances to building.
   a. Locate accessible route signage at decision points compliant with CBC Chapter 11B directing people with disabilities to accessible routes or entrances.
   b. Locate and install signs so steps will not have to be retraced.
2. Graphics: White on dark blue background; non-glare, high contrast signs.
   a. Conform to requirements of CBC Chapter 11B
   b. ISA minimum 4-1/2 inches high.
3. Installation Location and Mounting:
   a. Mount sign on post or wall with lower edge of sign between 48 inches and 60 inches above ground or surface.
4. Comply with requirements of Section 32 0523 for concrete footings for posts.

2.05 INFORMATIONAL SIGNS

A. Room Identification Signs:
1. Toilet Room identification signs shall include gender pictogram in 6 inch high field.
   a. Pictogram field shall be located above raised character and Braille text on tactile sign, which is to be located adjacent to latch side of the door, per CBC Chapter 11B.
   b. Where there is not adequate space for sign immediately adjacent to door, and door opens inward, gender pictogram, ISA, and raised characters and Braille can be included on geometric sign installed on door

PART 3 – EXECUTION

3.01 INSTALLATION

A. General: Locate sign units and accessories where shown, scheduled, or directed by Architect.
1. Use mounting methods shown or selected by Architect.
2. Comply with manufacturer's instructions, CBC Chapter 11 B, for buildings and facilities.

B. Install level, plumb, and at proper height with sign surfaces free from distortion or other defects in appearance.
1. Cooperate with other trades for installation to finish surfaces.
2. Repair or replace damaged units as directed by Architect.

C. Tactile Sign Installation Height and Location:
1. Tactile characters on signs shall be located minimum 48 inches above finish floor or ground surface, measured from baseline of lowest Braille cells and 60 inches maximum above finish floor or ground surface, measured from baseline of highest line of raised characters.
2. Locate tactile signs on approach side of door at entry or exit, and allow for reach within 0 inches of required clear floor space per CBC Section and Figure 11B-703.4.2.
   a. Where tactile sign is provided at door, sign shall be located on wall alongside door at latch side.
   b. When at double doors with one active leaf, sign shall be located on inactive leaf.
   c. When at double doors with two active leafs, sign shall be located to right of right hand door.
   d. Where there is no wall space at latch side of single door or at right side of double doors, signs shall be located on nearest adjacent wall.
   e. Signs containing tactile characters shall be located so that clear floor space of 18 inches minimum by 18 inches minimum, centered on tactile characters, is provided beyond arc of door swing between closed position and 45 degree open position per CBC Section 11B-703.4.

F. Plastic Signs: Mount sign with aluminum T-type bracket, finish to match adjacent surface or adhesive mount with adhesive recommended by sign manufacturer for substrate applied to.
   1. Locate signs so that person may approach within 3 inches of sign without encountering protruding objects or standing within swing of door per CBC Chapter 11B.

3.02 CLEANING AND PROTECTION

A. At completion of installation, clean soiled sign surfaces in accordance with manufacturer’s instructions.
   1. Protect units from damage until acceptance by Owner.

END OF SECTION 10 1400
SECTION 10 4400
FIRE PROTECTION SPECIALTIES

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Fire extinguishers
B. Fire extinguisher cabinets

1.02 REFERENCES

A. California Code of Regulations:
   1. Title 19 – Public Safety
   2. Title 24, 2013 edition:
      b. Part 9 – California Fire Code (CFC).

B. National Fire Protection Association (NFPA):

1.03 QUALITY ASSURANCE

A. Provide portable fire extinguishers, cabinets and accessories by one manufacturer, unless otherwise acceptable to Architect.

B. UL-Listed Products: Provide new portable fire extinguishers which are UL Listed and bear UL "Listing Mark" for type, rating, and classification of extinguisher indicated.

C. Provide fire extinguishers as required by CCR, Title 19 and NFPA 10.

1.04 SUBMITTALS

A. Product Data: Manufacturer's technical data and installation instructions for portable fire extinguishers required.
   1. For fire extinguisher cabinets include roughing-in dimensions, and details showing mounting methods, relationships to surrounding construction, door hardware, cabinet type and materials, trim style and door construction, style and materials.
   2. Where color selection by Architect is required include color charts showing full range of manufacturer's standard colors and designs available.

B. Samples: Minimum of four, 6 inch square, of each required finish.
   1. Prepare samples on metal of same gage as metal to be used in Work.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with specified requirements, provide products of one of following:
1. JL Industries.
2. Larsen's Mfg. Co. (Basis-of-Design)
3. Potter-Roemer Inc.
4. Standard Fire-West

**2.02 FIRE EXTINGUISHERS (FE)**

A. General: Provide fire extinguishers for each extinguisher cabinet and other locations indicated, in colors and finishes selected by Architect from manufacturer's standard which comply with requirements of governing authorities.

B. Multi-Purpose Dry Chemical Type: UL-rated 2-A:10:B:C, 5 lb. nominal capacity, in enameled steel container, for Class A, Class B and Class C fires.

**2.03 FIRE EXTINGUISHER CABINETS (FEC)**

A. General: Provide fire extinguisher cabinets where indicated, of suitable size for housing fire extinguishers of types and capacities indicated.

1. Comply with CBC Chapters 11B-205 and 11B-403.5.1

B. Construction: Manufacturer's standard enameled steel box, with trim, frame, door and hardware to suit cabinet type, trim style, and door style indicated.

1. Weld joints and grind smooth.
2. Miter and weld perimeter door frames.

C. Cabinet Type: Suitable for mounting conditions indicated, of following types:

1. Recessed: Cabinet box (tub) fully recessed in walls of sufficient depth to suit style of trim indicated.

D. Trim Style: Fabricate trim in one piece with corners mitered, welded and ground smooth.

1. Exposed Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend).
   a. Flat Trim: Square edges with backbend of 5/16

E. Door Material and Construction: Manufacturer's standard door construction, of material indicated, coordinated with cabinet types and trim styles selected.

1. Stainless Steel: Manufacturer's standard stainless steel door construction.

F. Door Style: Manufacturer's standard design as indicated below and on Drawings.

1. Duo-Panel: Float glass, 1/8 inch thick, unless otherwise indicated.

G. Door Hardware: Provide manufacturer's standard door operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide surface mounted door pull with Larsen-Loc.
2. Provide concealed or continuous type hinge permitting door to open 180 degrees.


1. Model No. 2409-R1 for non-rated cabinets.
2.04 FACTORY FINISHING OF FIRE EXTINGUISHER CABINETS

A. General: Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations except as otherwise indicated.
   1. Apply finishes in factory after products are assembled.
   2. Protect cabinets with plastic or paper covering, prior to shipment.

B. Painted Finish for Box:
   1. Preparation: Clean surfaces of dirt, grease, and loose rust or mill scale.
      a. Apply finish to surfaces of fabricated and assembled units, whether exposed or concealed when installed, except those surfaces specified to receive another finish.
   2. Baked Enamel Finish: Immediately after cleaning and pretreatment, apply manufacturer's standard baked enamel coating.
      a. Provide manufacturer's standard white color.

C. Stainless Steel Finish for Doors and Trim: No.4 polished finish.
   1. Furnish with paper masking to protect finish.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where recessed cabinets are to be installed.

B. Examine fire extinguishers for proper charging and tagging.
   1. Remove and replace damaged, defective, or undercharged units.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Comply with manufacturer's written instructions for installing fire extinguishers and cabinets.

B. Install in locations and at mounting heights indicated, or if not indicated, at heights to comply with applicable regulations of governing authorities.
   1. Mount fire extinguishers with handles 48 inches above finished floor.
   2. Prepare recesses for cabinets as required by type and size of cabinet and style of trim and to comply with manufacturer's instructions.
   3. Fasten cabinets to structure, square and plumb.

3.03 IDENTIFICATION

A. Identify fire extinguisher in cabinet with vertical die-cut lettering spelling "FIRE EXTINGUISHER".
   1. Provide lettering on door as indicated.
   2. Letter Color: Black
SECTION 26 0500
COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.01 SCOPE

A. 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 Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to, the following:
   1. Examine all other Sections for work related to those other Sections and required to be included as work under this Section.
   2. Electrical General Provisions and requirements for electrical work.
   3. Division-1; General Requirements; General Conditions.

B. Organization of the Specifications into Divisions, Sections and Articles, and arrangement of Drawings shall not control the CONTRACTOR in dividing the Contract Work among Subcontractors or in establishing the extent of work to be performed by any trade.

1.02 GENERAL SUMMARY OF ELECTRICAL WORK

A. The Specifications and Drawings are intended to cover a complete installation of systems. The omission of expressed reference to any item of labor or material for the proper execution of the work in accordance with present practice of the trade shall not relieve the CONTRACTOR from providing such additional labor and materials.

B. Refer to the Drawings and Shop Drawings of other trades for additional details, which affect the proper installation of this work. Diagrams and symbols showing electrical connections are diagrammatic only. Wiring diagrams do not necessarily show the exact physical arrangement of the equipment.

C. Before submitting a bid, the CONTRACTOR shall become familiar with all features of the Building Drawings and Site Drawings, which may affect the execution of the work. No extra payment will be allowed for failure to obtain this information.

D. If there are omissions or conflicts between the Drawings and Specifications, clarify these points with the District’s Representative before submitting bid and before commencing work.

E. Provide work and material in conformance with the Manufacturer’s published recommendations for respective equipment and systems.

1.03 LOCATIONS OF EQUIPMENT

A. The Drawings indicate diagrammatically the desired locations or arrangements of conduit runs, outlets, equipment, etc., and are to be followed as closely as possible. Proper judgment must be exercised in executing the work so as to secure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structure conditions encountered.
B. In the event changes in the indicated locations or arrangements are necessary, due to developed conditions in the building construction or rearrangement of furnishings or equipment, such changes shall be made without cost to the Contract, providing the change is ordered before the conduit runs, etc., and work directly connected to same is installed and no extra materials are required.

C. Coordinate and cooperate in every way with other trades in order to avoid interference and assure a satisfactory job.

D. The location of the existing utilities, building, equipment and conduit shown on the Drawings is approximate. Verify exact locations and routing of existing systems by potholing all trench routes prior to digging the trench. Pothole at least 100 feet ahead of the actual trenching to allow space to alter the new conduit routing to accommodate existing conditions.

E. Underground Detection Services Existing Utility Structures
   1. Detection/location services shall be provided utilizing the latest detection equipment available. Services shall be performed by a company regularly engaged in the business of existing Underground Utility Structure Detection for the past 5-years.
   2. Prior to excavation and prior to directional boring the following work shall be performed:
      a. Contractor to mark excavating and trenching/directional boring locations and indicate width and depth.
      b. Locate, by way of vertical and horizontal control dimensions, existing subgrade petroleum product pipes, process piping, conduits, sewer, water, gas, storm drain, electrical, telephone, and irrigation lines in the affected areas of Contract construction work.
      c. Arrange and meet with the District’s Representative to review existing underground conditions.
      d. The proposed route of each excavation shall be continuously surveyed along the entire excavation path using Ground-Penetrating Radar (GPR) operating from the surface grade. The GPR shall detect and map existing underground metal and non-metal, both private and public utility lines, pipes, conduits, conductors, etc. The GPR shall identify the horizontal and vertical location of existing underground conditions located at a depth of up to three (3) meters below finish grade and located with a vertical and horizontal accuracy within ±12-inches of actual condition. The Contractor shall add this information to the existing conditions site plan.
   3. Exercise extreme caution in directional boring, excavating and trenching on this site to avoid existing underground utilities and structures, and to prevent hazard to personnel and/or damage to existing underground utilities or structures. The Contract Documents, Drawings and Specifications do not include necessary components for construction safety, which is the responsibility of the CONTRACTOR.
   4. Repair/replace, without additional cost to the Contract, and to the satisfaction of the District any existing work damaged that was identified in the Record Drawings provided; Identified by the District’s Representative; Identified by the Underground Detection Services performed; or any existing work damaged as a result of failure to comply with all the referenced requirements.
5. The CONTRACTOR shall contact Common Ground Alliance (CGA) telephone #811 “Know What’s Below-Call Before You Dig” and Underground Service Alert (USA), not less than 72-hours prior to excavation. Contractor shall not excavate until verification has been received from CGA and USA that existing underground utilities serving the site have been located, identified, and marked.

F. The locations of existing underground utilities, where shown on Drawings, are shown diagrammatically and have not been independently verified by the District, the District’s Representative, the Architect/Engineer. The District, the District’s Representative, and the District’s Architect/Engineer are not responsible for the location of underground utilities or structures, whether or not shown or detailed and installed under this or any other Contracts. The CONTRACTOR shall identify each existing utility line prior to excavation and mark the locations on the ground of each existing utility line.

1.04 PERMITS

Take out and pay for all required Permits, Inspections and Examinations without additional cost to the DISTRICT.

1.05 QUALITY ASSURANCE

A. Work and Materials shall be in full accordance with the latest rules and regulations as follows. The following publications shall be included in the Contract Documents requirements. If a conflict occurs between the following publications and any other part of the Contract Documents, the requirements describing the more restrictive provisions shall become the applicable Contract definition:

2. California Part 3 "California Electrical Code" CEC, Title 24 and Title 8 "Division of Industrial Safety".
4. California Fire Code – CFC
9. Underwriter’s Laboratory – UL.
10. Other applicable State and Local Government Agencies Laws and Regulations.
11. Electrical Installation Standards National Electrical Contractors Association (NECA) and National Electrical Installation Standards (NEIS):
   a. NECA/NEIS-1: Standard of Practices for Good Workmanship in Electrical Contracting
   b. NECA/NEIS-101: Standard for Installing Steel Conduit (Rigid, IMC, etc.)
   c. NECA/NEIS-104: Recommended Practice for Installing Aluminum Building Wire and Cable
   d. NECA/NEIS-105: Recommended Practice Installing Metal Cable Trays
   e. NECA/NEIS-111: Recommended Practice Installing Nonmetallic Raceways
   f. NECA/NEIS-230: Recommended Practice for Installing Motors
   g. NECA/FOA-301: Standards for Installing and Testing Fiber Optic Cables
   h. NECA/NEIS-305: Standard for Fire Alarm System Job Practice
   i. NECA/NEIS–331: Standards for Installing Building and Service Entrance Grounding
   j. NECA/NEIS–400: Recommended Practice for Installing and Maintaining Switchboards

COMMON WORK RESULTS FOR ELECTRICAL
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k. NECA/NEIS-402: Recommended Practice for Installing and Maintaining Motor Control Centers
l. NEIS/NECA and EGSA-404: Recommended Practice for installing Generator Sets
m. NECA/NEIS-405: Recommended Practices for installing and Commissioning Interconnected Generation Systems
n. NECA/NEIS-407: Recommended Practice for Installing Panelboards
o. NECA/NEIS-408: Recommended Practices for Installing Busway
p. NECA/NEIS-409: Recommended Practice for Installing and Maintaining Dry-Type Transformers
q. NEIS/NECA and IESNA-500: Recommended Practice for Installing indoor Commercial Lighting Systems
r. NEIS/NECA and IESNA-501: Recommended Practice for Installing Exterior Lighting Systems
s. NEIS and IESNA-502: Recommended Practice for Installing Industrial Lighting Systems
t. NECA/BICSI-568: Standards for Installing Commercial Building Telecommunications System
u. NECA/NEIS-600: Recommended Practice Installing Medium-Voltage Cable

B. All Material and Equipment shall be new and shall be delivered to the site in unbroken packages. All material and equipment shall be listed and labeled by Underwriters Laboratories or other recognized Testing Laboratories, where such listings are available. Comply with all installation requirements and restrictions pertaining to such listings.

C. Work and Material shown on the Drawings and in the Specifications are new and included in the Contract unless specifically indicated as existing or N.I.C. (not in Contract).

D. Keep a copy of all applicable Codes and Standards available at the job site at all times for reference while performing work under this Contract. Nothing in Plans or Specifications shall be construed to permit work not conforming to the most stringent of Building Codes.

E. Where a conflict or variation occurs between applicable Codes, Standards and/or the Contract Documents, the provisions of the most restrictive provision shall become the requirement of the Contract Documents.

1.06 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. General
1. Review of CONTRACTOR’S submittals is 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 quantities; dimensions which shall be confirmed and correlated at the job site; fabrication processes and techniques of construction; coordination of work with that of all other trades and satisfactory performance of their work.
2. The CONTRACTOR shall review each submittal in detail for compliance with the requirements of the Contract Documents prior to submittal. The CONTRACTOR shall "Ink Stamp" and sign each item of the submittal with a statement "CERTIFYING THE SUBMITTAL HAS BEEN REVIEWED BY THE CONTRACTOR AND COMPLIES WITH ALL THE REQUIREMENTS OF THE CONTRACT DOCUMENTS". The CONTRACTOR shall clearly and specifically identify each individual proposed substitution, substitution of equal or proposed deviation from the requirements of the Contract Documents with a statement "THIS ITEM IS A SUBSTITUTION". The burden of research, preparation of calculations and the furnishing of adequate and complete Shop Drawings information to demonstrate the suitability of CONTRACTOR’S proposed substitutions and suitability of proposed deviations from the Contract Documents is the responsibility of the CONTRACTOR.

3. Departure from the submittal procedure will result in resubmittals and delays. Failure of the CONTRACTOR to comply with the submittal requirements shall render void any acceptance or any approval of the proposed variation. The CONTRACTOR shall then be required to provide the equipment or method without variation from the Contract Documents and without additional cost to the Contract.

4. The CONTRACTOR at no additional cost or delays to the Contract shall remove any work, material and correct any deficiencies resulting from deviations from the requirements of the Contract Documents not approved in advance by the DISTRICT prior to commencement of work.

5. Shop Drawings submitted by the CONTRACTOR, which are not specifically required for submittal by the Contract Documents, or CONTRACTOR Shop Drawings previously reviewed and resubmitted without a written resubmittal request to the CONTRACTOR, will not be reviewed, considered, or commented on. The respective Shop Drawing submittal/resubmittal will not be returned to the CONTRACTOR and will be destroyed without comment or response to the CONTRACTOR. The respective submittal shall be considered null and void as being not in compliance with the requirements of the Contract Documents.

6. Refer to Division-1 for additional requirements.

B. Material Lists and Shop Drawings

1. Submit material list and Equipment Manufacturers for review within 35 days of award of Contract. Give name of Manufacturer and where applicable, brand name, type and/or catalog number of each item. Listing of more than one Manufacturer for any one item of equipment, or listing items "as specified", without both make and model or type designation, is not acceptable. Shop Drawings shall not be submitted before review completion of Manufacturers list. The right is reserved to require submission of samples of any material whether or not particularly mentioned herein.

2. After completion of review of the Material and Equipment Manufacturers list, submit Shop Drawings for review. Shop Drawings shall be submitted in completed bound groups of materials (i.e., all lighting fixtures or all switchgear, etc.). The CONTRACTOR shall verify dimensions of equipment and be satisfied as to fit and that they comply with all code requirements relating to clear working space about electrical equipment prior to submitting Shop Drawings for review. Submittals, which are intended to be reviewed as substitution or departure from the Contract Documents, must be specifically noted as such. The requirements of the Contract Documents shall prevail regardless of the acceptance of the submittal.
3. Shop Drawings shall include catalog data sheets, instruction manuals, Dimensioned Plans, Elevations, Details, Wiring Diagrams, and descriptive literature of component parts where applicable. Structural Calculations and Mounting Details, signed by a Structural ENGINEER registered by the State of California, shall be submitted for all equipment weighing over 400-pounds, and shall be in compliance with Title 21 of the California Code of Regulations.

4. Each Shop Drawing item shall be identified with the Specification Section and paragraph numbers, lighting fixture types and Drawing Sheet numbers; the specific Shop Drawing is intended to represent. Shop Drawings 11-inches by 17-inches or smaller in size shall be bound in three (3) ring binders. Divider tabs shall be provided in the three (3) ring binders identifying and separating each separate Shop Drawing submittal item. Shop Drawings larger than 11-inches by 17-inches, Shop Drawing pages/sheets submittals shall be sequentially numbered with unique alphanumeric numbering system to facilitate correspondence referencing identification of individual sheets.

5. The time required to review and comment on the CONTRACTOR'S submittals will not be less than 14 calendar days, after receipt of the submittals at the office of FBA Engineering. The review of CONTRACTOR submittals and return to CONTRACTOR of submittals with review comments will occur in a timely manner conditioned upon the CONTRACTOR complying with all of the following:
   a. The submittals contain complete and accurate information, complying with the requirements of the Contract Documents.
   b. CONTRACTOR'S submittals are each marked with CONTRACTOR'S approval "stamp", and with CONTRACTOR signatures.
   c. The submittals are received in accordance with a written, shop drawing submittal schedule for each submittal. The CONTRACTOR distributes the schedule not less than 35-calendar days in advance of the Shop Drawing Submittals, and the schedule identifies the calendar dates, the CONTRACTOR will deliver the various submittals for review.

6. Shop Drawings shall include the Manufacturers projected days for shipment from the factory of completed equipment, after the CONTRACTOR releases the equipment for production. It shall be the responsibility of the CONTRACTOR to insure that all material and equipment is ordered in time to provide an orderly progression of the work. The CONTRACTOR shall notify the District’s Representative of any changes in delivery, which would affect the Project completion date.

7. Submittal Identification
   a. Each submittal shall be dated: with submittal transmission date; sequentially numbered and titled with submittal contents identification and applicable Specification/Drawing references (i.e., Submittal dated: 5/12/98 Submittal #4 Contents: Branch circuit panelboards Sheet #E5.1 and transformers Specification Section 26 0505 Paragraph 2.11, etc.).
   b. Each resubmittal shall be dated: with original submittal date and resubmittal transmission dates; sequentially numbered with original submittal number and sequential resubmittal revision number and titled with submittal contents identification and applicable Specifications/Drawing references (i.e., Original Submittal Date: 5/12/98 Resubmittal Date: 10/9/98 Original Submittal #4 resubmittal Revision R2 Contents: Transformer resubmittal Specification Section – 26 0505 Paragraph 2.11, etc.).
   c. Contractor shall provide a written response narrative with each resubmittal. Describe each response-action, resubmittal addition, change and deletion. Correspond each response to A/E specific review comment.
C. The CONTRACTOR shall be responsible for incidental, direct and indirect costs resulting from the CONTRACTOR’S substitution of; or changes to; the specified Contract Materials and Work.

D. The CONTRACTOR shall pay, upon request by the District’s Representative, a fee for the District’s Representative time involved in the review of substitution submittals and design changes resulting from the CONTRACTOR’S requested substitutions. The fee shall be not less than $125.00 per hour but, in no case, less than stated in Division-1, whichever is greater.

E. Maintenance and Operating Manuals
   1. The CONTRACTOR shall furnish three (3) copies of type-written maintenance and operating manuals for all electrical equipment, fire alarm equipment, sound system equipment, etc., to the District.
   2. Instruct the District’s Personnel in correct operation of all equipment at completion of project. Provide the quantity and duration of instruction class as specified; but in no case less than two (2) 4-hour duration separate instruction classes for each individual equipment group furnished as part of the Contract. Instruction classes shall be presented by Manufacturer’s Authorized Field Service ENGINEER at the project site. Instruction class size shall be at the District’s discretion, not less than one (1) or more than fifteen (15) students shall attend each instruction session. Submit fifteen (15) written outline copies of the proposed instruction class curriculum, 14-days prior to the class-scheduled dates.
   3. Maintenance and operating manuals shall be bound in three-ring, hard-cover, plastic binders with table of contents. Manuals shall be delivered to the District’s Representative, with an itemized receipt.

F. Portable or Detachable Parts: The CONTRACTOR shall retain in his possession, and shall be responsible for all portable and detachable parts or portions of the installation such as fuses, keys, locks, adapters, locking clips, and inserts until final completion of Contract Work. These parts shall then be delivered to the District’s Representative with an itemized receipt.

G. Record Drawings (ADDITIONAL REQUIREMENTS)
   1. Provide and maintain in good order a complete set of Electrical Contract "Record" prints. Changes to the Contract to be clearly recorded on this set of prints. At the end of the Project, transfer all changes to one set of transparencies to be delivered unfolded to the District’s Representative.
   2. The actual location and elevation of all buried lines, boxes, monuments, vaults, stub-outs and other provisions for future connections shall be referenced to the building lines or other clearly established base lines and to approved bench marks. If any necessary dimensions are omitted from the Record Drawings, the CONTRACTOR shall, at the Contractor’s own expense, do all excavation required to expose the buried work and to establish the correct locations.
   3. The CONTRACTOR shall keep the "Record" prints up to date and current with all work performed.
   4. Refer to Division-1 for additional requirements.
1.07 CLEANING EQUIPMENT, MATERIALS, PREMISES

All parts of the equipment shall be thoroughly cleaned of dirt, rust, cement, plaster, etc., and all cracks and corners scraped out clean. Surfaces to be painted shall be carefully cleaned of grease and oil spots and left smooth, clean and in proper condition to receive paint finish.

1.08 PROJECT CONDITIONS - PROTECTION

Protect all work, materials and equipment from damage from any cause whatever and provide adequate and proper storage facilities during the progress of the work. Provide for the safety and good condition of all the work until final acceptance of the work by the District and replace all damaged or defective work, materials, and equipment before requesting final acceptance.

1.09 EXCAVATION, CUTTING, BACKFILL AND PATCHING ADDITIONAL REQUIREMENTS

A. General
   1. Perform excavation, cutting, backfill, core drilling, directional boring, and patching of the construction work required for the proper installation of the electrical work.
   2. Patching shall be of the same material, thickness, workmanship, and finish as existing and accurately match-surrounding work to the satisfaction of the District’s Representative.
   3. Prior to penetrating, coring, drilling or cutting existing building elements, concrete and/or masonry, provide imaging equipment examinations of each specific location. The imaging process shall identify existing internal embedded components and locations, including structural elements/anchors, conduit, and piping that are present. Do not penetrate or damage the existing internal embedded elements. Imaging shall employ one (1) of the following, with GPR methodology preferred:
      a. Non-invasive imaging employing high frequency, Ground Penetrating Radar (GPR), single side echo reflection technology.
      b. Non-invasive imaging employing x-ray radiography, through-and-through imaging technology.

B. Excavation Temporary Cover
   1. Excavations for Contract Work occurring in streets, vehicular drive areas, parking lots, sidewalks; any paved surface; or any area accessible to the public; provide temporary steel plating and shoring support for the plates, to completely cover the excavations under one or more of the following conditions:
      a. Excavation shall not remain "open" for more than 4-calendar days; provide temporary plating.
      b. Excavation shall not be "open" over weekends (Saturday, Sunday) or Holidays; provide temporary plating.
   2. The temporary plating shall be a minimum of 0.75-inch thickness steel, but in no case shall the thickness be less than required to support AASHO-H20 traffic loading.
   3. Provide a minimum of two (2) 100% open lane(s) (12-foot lane width) for vehicular traffic at all times during construction, for vehicle access to all areas.
1.10 IDENTIFICATION

A. Equipment Nameplates

1. Panelboards, terminal cabinets, circuit breakers, disconnect switches, starters, relays, time switches, contactors, push-button control stations, and other apparatus used for the operation or control of feeders, circuits, appliances, or equipment shall be properly identified by means of descriptive nameplates or tags permanently attached to the apparatus and wiring.

2. Provide nameplate label on electrical service entrance equipment describing available short circuit information calculated by the CONTRACTOR, including:
   a. Calculation date, month-day-year.
   b. Calculate maximum available short circuit fault current.
   c. Description of parameters and changes affecting the requirements for recalculation of the fault current information.

3. Electrical equipment including switchgear, switchboards, electric panels and control panels, motor control centers, combination motor starters, transformers, disconnects, etc., shall each be labeled by the Manufacturer with “Electric-ARC-FLASH” warning signs. The signs shall explain a hazard to personnel may exist if the equipment is worked on while energized or operated by personnel while energized. The sign shall instruct personnel to wear the correct Protective Equipment/clothing (PPE) when working “Live”, or operating “Live” electrical equipment and circuits.

4. Nameplates shall be engraved laminated phenolic. Shop Drawings with dimensions and format shall be submitted before installation. Attachment to equipment shall be with escutcheon pins, rivets, self-tapping screws or machine screws. Self-adhering or adhesive backed nameplates shall not be used.

5. Provide black-on-white laminated plastic nameplates engraved in minimum ¼-inch high letters to correspond with the designations on the Drawings. Provide other or additional information on nameplates where indicated.

B. Plates: All cover and device plates shall be furnished with engraved or etched designations under any one of the following conditions (minimum character size not less than 0.188 inch. Engraving shall indicate circuits and equipment controlled or connected):

1. More than two (2) devices under a common coverplate.
2. Lock switches.
3. Pilot switches.
4. Switches in locations from which the equipment or circuits controlled cannot be readily seen.
7. As required on all control circuit switches, such as heater controls, motor controls, etc.
8. Receptacles other than standard 15 ampere 120 volt duplex receptacles; shall indicate circuit voltage, ampere, phase and source circuit number.
9. Where outlets or switches are connected to emergency power circuit; provide panelboard and circuit number engraved on plate.
10. Low voltage and signal system outlets.

C. For equipment and access doors or gates to equipment containing or operating on circuits of more than 100 volts AC or DC nominal. Provide red-on-white laminated warning signs engraved in ½-inch high letters to read: "DANGER - 480 (or applicable voltage) VOLTS KEEP OUT AUTHORIZED PERSONNEL ONLY".
D. Wire and Cable Identification
   1. Provide identification on individual wire and cable including signal systems, fire
      alarm, electrical power systems (each individual phase, neutral and ground),
      empty conduit pull ropes, and controls circuit.
   2. Permanent identification shall be provided at each termination location, splice
      location, pullbox, junction box and equipment enclosure.
      a. Individual wire and cable larger than #6AWG or 0.25-inch diameter, shall
         be provided with polypropylene identification tag holders, with yellow
         polypropylene tags interchangeable black alphanumeric characters,
         character height 0.25 inch. Attach identification tags with plastic “tie”
         wraps, minimum of two (2) for each tag. As manufactured by Almetek
         Industries—“EZTAG” Series; or TECH Products - “EVERLAST” Series.
      b. Individual wire and cable #6AWG and smaller or smaller than 0.25 inch
         diameter, shall be provided with water and oil resistant, flexible, self-
         laminating pressure sensitive machine embossed plastic tags that wrap a
         minimum of 360 degrees around the wire/cable diameter. The entire tag
         shall then be covered with a clear flexible waterproof plastic cover wrapped
         a minimum of 540 degrees around the wire/cable diameter and completely
         covering the identification. As manufactured by Brady Identification; or 3M;
         or Panduit.
      c. Each identification tag location shall indicate the following information:
         circuit number, circuit phase, source termination and destination
         termination equipment name (or outlet number as applicable).
   3. Install permanent identification after installation/pulling of wire/cable is complete,
      to prevent loss or damage to the identification.

E. Cardholders and cards shall be provided for circuit identification in panelboards.
   Cardholders shall consist of a metal frame retaining a clear plastic cover permanently
   attached to the inside of panel door. List of circuits shall be typewritten on card.
   Circuit description shall include name or number of circuit, area, and connected load.

F. Junction and pull boxes shall have covers stenciled with box number when shown on
   the Drawings, or circuit numbers according to panel schedule. Data shall be lettered in
   a conspicuous manner with a color contrasting to finish.

1.11 TESTING

A. The CONTRACTOR shall obtain an independent Testing Laboratory, provide all
   instrumentation and perform tests on the electrical system and equipment as
   hereinafter described and further directed by the District’s Representative. The test
   shall be performed after the completion of all electrical systems included in the
   Contract Scope of Work. All tests shall be recorded and documented and submitted to
   the District’s Representative for review.
   1. All equipment and Personnel required for set-up and testing shall be provided by
      the CONTRACTOR.

B. Test for Phase to Ground and Neutral Condition:
   1. Open main service disconnects.
   2. Isolate the system neutral from ground by removing the neutral disconnects link
      located in the service switchboard.
   3. Close all submain disconnects.
   4. Close all branch feeder circuit breakers.
   5. Turn all switches to “on” position, unplug all portable equipment from outlet
      receptacles.
6. Measure the resistance of each phase to ground and phase to neutral. A properly calibrated "Megger" type test instrument shall be used. The test voltage shall be a nominal 500 volts.

7. Record all readings after 1-minute duration and document into a complete report.

8. Isolating Grounds: In the event that low resistance ground neutral connections are found in the system, they shall be isolated and located by testing each circuit individually as outlined above. Make proper corrections to restore the resistance values to an acceptable value.

C. Method of obtaining ground resistance shall be in accordance with the latest edition of the James G. Biddle (Plymouth Meeting, Pennsylvania) manual published on this subject.

1. Perform "fall-of-potential" 3-point tests on the main grounding electrode of system per IEEE Standard No. 81, Section 8.2.1.5. when suitable locations for test rods are not available, a low resistance dead earth or reference ground shall be utilized.

2. Perform the 2-point method test per IEEE Standard No. 81, Section 8.2.1.1, to determine the ground resistance between the main grounding system and all major electrical equipment frames, system neutral, and/or derived neutral points.

D. The Testing, Calibrating and Setting of all ground and ground fault equipment, circuit breakers, circuit device protection relays, and meters adjustable settings shall be by an independent Testing Laboratory. Set as recommended by the respective Manufacturer and Coordination Study so as to be coordinated with other protection devices within the electrical design. Bound and tabulated copies of the test and settings shall be sent to the District's Representative.

E. Ampere and Voltage Measurements

1. Measure and record ampere and line voltage measurements under full load on all panel feeders, switchboard, and switchgear feeders, motor control centers and motor circuits provided in the Contract. Record measurements at the equipment tested and submit to the District's Representative for review.

2. Ampere voltage readings shall be:
   a. Phase A-B, A-C and B-C.
   b. Phase A-Neutral, B-Neutral and C-Neutral.

3. The ampere and voltage readings shall be not less than 20-minutes duration for each test. Record and submit the measured minimum, maximum and 20-minute average for each ampere and voltage value and test location. Voltage and ampere measurements shall occur at the connected load end of each respective feeder, not at the source of supply end of each feeder.

4. Test equipment shall be accurate within plus or minus 1%.

5. Branch circuit devices 40 ampere or less and motor loads 10-horsepower or smaller are excluded from ampere and voltage testing requirement.

6. If, in the opinion of the District's Representative, the voltages and regulations are not met within acceptable limits, make arrangements with the serving utility for proper electrical service. Retest feeder line voltages, and submit to District's Representative for review, after the Utility Company has completed corrective actions. Reset "voltage taps" on transformers provided or modified as part of the Contract Work, to adjust line voltages to within acceptable values, as directed by the District's Representative.
F. The Contractor shall complete the following work before any electrical equipment is energized.

1. All equipment shall be permanently anchored.
2. All bus connections and conductor/wire connections shall be tightened per Manufacturer's instructions and witnessed by the District’s Representative.
3. All ground connections shall be completed and identified. Perform and successfully complete all required megger and ground resistance tests.
4. Feeders shall be connected and identified.
5. The interiors of all electrical enclosures including busbars and wiring terminals shall be cleaned of all loose material and debris, paint, plaster, cleaners or other abrasive's over spray removed and equipment vacuumed clean. The District’s Representative shall observe all interiors before covers are installed.
6. All wall, ceiling, and floor work and painting shall be completed within areas containing electrical equipment prior to installation of equipment. The equipment indoor rooms and spaces shall be weather-tight and weather protected from environmental incursions.
7. All doors to electrical equipment rooms shall be provided with locks in order to restrict access to energized equipment.
8. Electrical spaces and rooms shall not be used as storage rooms after power is energized.
9. Outdoor electrical equipment enclosures and housings shall be weather protected.
10. The electrical system timecurrent Coordination and ARC-Fault Study shall be complete for circuit breakers, ground relays sets, and circuit relay sets, fuses; set-up, tested and calibrated accordingly.

1.12 POWER OUTAGES

A. All electrical services in all occupied facilities of the Contract Work are to remain operational during the entire Contract Period. Any interruption of the electrical services for the performance of this work shall be at the convenience of the District and performed only after consultation with the District’s Representative. Work involving circuit outages shall be only at such a time and of such a duration as approved in writing. Work involving circuit outages for the work required to connect new equipment and disconnect existing equipment shall be performed at the convenience of the DISTRICT.

B. Contract Work involving outages or disruption of normal function in electrical power systems, telephone/communication systems, fire alarms, shall be performed during the following time periods. The Contract Work shall be phased to limit outages in the respective systems to the stated periods:
1. 11:30 p.m. Friday to 11:30 p.m. Sunday of the same weekend. Work shall occur on multiple weekend periods if a single weekend is not sufficient time to complete the work.
2. The Contract work involving outages shall be phased in multiple work time units, to comply with the permitted outage limitations.

C. Work involving system outages to the building fire alarm system shall be performed only after consultation with the DISTRICT and shall be only at such a time and of such duration as approved in writing. Contractor shall provide continuous “Fire-Watch” during fire alarm system outages and comply with AHJ “Fire-Watch” requirements.

D. Provide overtime work; double shift work; night time work; Saturday, Sunday, and holiday work to meet outages schedule.
E. Provide temporary electrical power to meet the requirements of this Article.

F. Any added costs to CONTRACTOR due to necessity of complying with this Article shall be included in the Contract Scope of Work.

G. When electrical work involving power disruptions to existing areas is initiated, the work shall proceed on a continuous basis without stopping until electric power is restored to the affected areas.

H. The CONTRACTOR shall request in writing to the DISTRICT’S Representative a minimum of 3-weeks in advance, for any proposed electrical outage.

1.13 TEMPORARY ELECTRICAL POWER

A. Provide temporary electrical power if work requiring power outages cannot be completed in time permitted and approved by the DISTRICT’S Representative.

B. Temporary electrical power shall be a standby diesel engine generators. Voltage, frequency, regulation, etc. shall be equal to that of normal utility source. Exhaust system shall have a critical silencing muffler. Generator voltage shall match the existing secondary voltage required at the site. The CONTRACTOR shall furnish all necessary cables, switches, etc., to make all required connections to existing panels, feeders, etc. Generator shall be sized to adequately carry the demand load. If record of demand load is not available, size generator to match corresponding transformer, maximum capacity circuit as directed by the District’s Representative.

C. After completion of required usage of the temporary generators, prior to completion of the Project, the CONTRACTOR shall remove the generators. All temporary cables, switches, etc. shall be removed and all permanent equipment left in satisfactory condition.

D. Each generator shall be housed in security type sound attenuated housing to prevent access by unauthorized personnel. Temporary power cables, connections, etc. shall be protected from unauthorized personnel.

E. The CONTRACTOR shall be responsible for complete operation of the generator including personnel, fuel supplies, proper safety precautions, etc. generator shall not be left unattended while in operation.

F. The CONTRACTOR shall provide temporary construction lighting and power as required in areas where work is being performed. Temporary power arrangements, outages, installation, work schedules, etc., shall be submitted in writing 3-weeks prior to requested outage date, and approved by the DISTRICT’S Representative prior to start of work.

1.14 ASBESTOS, POLYCHLORINATED BIPHENYL (PCB) OR HAZARDOUS WASTE

A. It is understood and agreed that this Contract does not contemplate the handling of asbestos, PCB or any hazardous waste material. If asbestos, PCB or any hazardous waste material is encountered, notify the District’s Representative immediately. Do not disturb, handle or attempt to remove.
B. Lighting Fixture Demolition Hazardous Materials
   1. The removal of existing lighting fixtures will generate hazardous material waste disposal Contract Documents.
      a. The existing lighting fixture ballast contains PCB material.
      b. The existing lighting fixture lamps contain mercury.
      c. The existing lighting fixture internal wire insulation may contain asbestos.
   2. Remove, handle, store, contain, dispose of and document the hazardous materials resulting from existing lighting fixtures work, as part of the Contract requirements.

1.15 TIME/CURRENT COORDINATION, SHORT CIRCUIT, ARC-FLASH AND SERIES RATED EQUIPMENT

A. Series Rated Equipment.
   1. Circuit Protective Devices Identified as "Series Rated" or "Current Limiting" (i.e., CLCB - Current Limiting Circuit Breaker; CLF - Current Limiting Fuse, etc.) shall be series rated and tested (UL 489 and CSA5) by the Manufacturer with all equipment and circuit protective devices installed downstream of the identified series rated or current limiting device.
   2. Provide nameplates on all equipment located downstream, including the CLCB and CLF devices, to comply with CEC/NEC paragraphs 110-22 and 240-83 "CAUTION SERIES RATED SYSTEM - NEW DEVICE INSTALLATIONS AND REPLACEMENTS SHALL BE THE SAME MANUFACTURER AND MODELS".

B. Short Circuit, Coordination and ARC-Flash
   1. Perform Engineering Analysis and submit engineered settings for each equipment location, fuse and circuit breaker device, showing the correct time and current settings to provide the selective coordination within the limits of the specified equipment. Shall comply with the latest application standards of IEEE and ANSI. Provide electrical system short circuit worst case bolted-fault analysis, both 3-phase line-to-line and 1-phase line-to-ground calculations as part of the Coordination Analysis recommendations. Provide Electric ARC-FLASH calculations as part of the Coordination Analysis recommendations.
   2. The information shall be submitted in both tabular form and on time current log-log graph paper, with an Engineering Narrative. Written narrative describing data, assumptions, analysis of results and prioritized recommendations, six (6) copies.
   3. The goal is to minimize an unexpected but necessary electrical system outage and Personnel exposure to the smallest extent possible within the fault occurrence location, using the specified Contract Equipment. Shall comply with, but not limited to:
      d. CEC/NEC
   4. Provide permanent warning labels on each equipment location. The labels shall describe ARC-FLASH, Short-Circuit and Time/Current Coordination, including safety precautions and protective clothing. Also described actions to be taken if any circuit changes or equipment modifications occur.
   5. Shall be submitted with the Shop Drawing submittals for the respective equipment.
1.16 INDEPENDENT TESTING LABORATORY

A. Testing Laboratories Definition
   2. Membership in the National Electrical Testing Association (NETA) shall also constitute acceptance of meeting said criteria, for testing of electrical systems.

1.17 EQUIPMENT SEISMIC AND WIND LOAD REQUIREMENTS (ADDITIONAL REQUIREMENTS)

A. Refer to Structural, Architectural, and Soils Report Contract Documents for additional requirements.

B. General
   1. Equipment supports and anchorage’s provided as part of the Contract shall be designed, constructed and installed in accordance with the earthquake regulations of the California Building Code (CBC), International Building Code (IBC).
   2. Provide equipment anchorage details, coordinated with the equipment mounting provision, prepared, signed and "stamped" with PE registration in good standing, by a Civil or Structural Engineer licensed as a Professional Engineer (PE) in the State of California.
   3. Mounting recommendations shall be provided by the Manufacturer based upon approved shake-table tests used to verify the seismic design of that type of equipment.
   4. The Equipment Manufacturer shall document the details necessary for proper wind-load and seismic mounting, anchorage, and bracing of the equipment for floor, ceiling, and wall/back installation location.
   5. Seismic performance shall be based on actual install location of the respective equipment in the building and height above or below grade.
   6. The seismic requirements are typical for each equipment item exceeding 19-pounds, including but not limited to the following:
      a. Switchgear, switchboards, and motor control equipment
      b. Transformers
      c. Equipment racks and terminal cabinets
      d. Panels
      e. Conduits with floor, ceiling or wall attachment support and conduits with suspension attachments.
      f. Busway, wire way and cable tray
      g. Uninterruptable Power Supplies (UPS)
      h. Inverters
      i. Generators and related equipment
      j. Lighting equipment
      k. Fire alarm equipment

C. Certification
   1. Electrical Equipment Manufacturers and Contractor shall provide Special Seismic Certification (SCC) for each specific equipment configuration with shake-table verification, all furnished as part of the Contract Documents requirements. The SCC shall include the specific installation location characteristics of the respective equipment including as follows:
      a. Ground or floor attachment
b. Wall attachment

c. Ceiling attachment

d. Roof attachment

2. Wind Loading

Electrical equipment and anchorages shall withstand the wind-load imposed at the install location. Wind Loading Withstand requirements shall apply to all electrical equipment installed in outdoor locations and to all electrical equipment exposed to the weather. The equipment shall be Tested and Certified by the Manufacturer and Contractor. The Wind-Load Withstand Qualification of the equipment and anchorages shall be verified by the following methods:

a. Aero-dynamic wind tunnel test method.

b. Analytical calculation method, for oversized equipment too large for wind tunnel test method.

3. The Wind-Load Withstand Rating and the SCC shall comply with the requirements of the Authority Having Jurisdiction (AHJ), and include the latest revisions, but not limited to the following:

a. American Society of Civil Engineers; ASCE-7

b. CBC/IBC; including but not limited to Sections 1702, 1708, 1709, 1708A and 1709A.

c. California Office of State Wide Health Planning and Development OSHPD; OPA-Preapproval of Anchorage; Code Application Notice CAN 2-1708A.5 and OSP-Special Seismic Certification Approval.


D. Wall Mounted Electrical Equipment

1. Surface Mounted Equipment

a. Provide multiple horizontal Sections of metal “C” channels for support and attaching wall mounted equipment to walls. Channels shall provide “turned lips” at longitudinal edges to hold “lock-in” fasteners and shall comply with ANSI-1008 and ASTM-A569 latest revision. The channels shall be steel hot dip zinc galvanized. As manufactured by Unistrut or Kindorf.

b. The “C” channels shall be positioned horizontally within 3-inches of the top and bottom of each, equipment Section cabinet and located behind each Equipment Vertical Section. Provide additional intermediate “C” channels at not less than 36-inches on center between the “top” and “bottom” “C” channel positions, located behind each equipment vertical Section.

c. The “C” channels shall be of sufficient length to provide connection to not less than two (2) vertical structural wall framing elements separated by not less than 16-inches; but in no case shall the “C” channel length be less than the width of the respective equipment Section.

d. Attach the “C” channels to the wall structural elements after the wall, finish surface, installation (including painting) is complete.

e. Attach the “C” channels with fasteners to the building wall framing structural elements as follows: welded to steel framing; bolted to wood framing; cast in place concrete inserts for masonry and concrete construction; drilled “afterset” expansion anchors for existing masonry and concrete construction.

f. Attach the equipment to the “C” channels with threaded and bolted fasteners to “pre-locate” and lock into the channel “turned lips” and channel walls.
2. Flush mount equipment  
   a. Provide anchor attachment of equipment into adjacent wall structural elements.

E. Housekeeping Pad  
1. Provide cast-in-place, steel re-enforced concrete raised “housekeeping” pads under all floor standing electrical equipment (except data network equipment racks).
2. Pad sizes  
   a. The raised housekeeping pad height shall extend 4-inches above the surrounding finished floor elevation for interior building locations.
   b. The pad shall extend 8-inches below finish grade plus 4-inches above finish grade for outdoor equipment location on grade.
   c. The pads shall extend 7-inches past the “footprint” edge of the respective floor standing equipment.
3. Anchor equipment to pads. Anchor pads to the building structural floor. Equipment pad, equipment re-enforcing and equipment anchoring shall comply with seismic earthquake requirements and wind load requirements.
4. Unless shown otherwise on Drawings. The equipment housekeeping pad steel re-enforcing shall consist of two (2) layers of number 4-size steel-rebar laid horizontally and uniformly spaced 6-inches on center. Position rebar in two (2) directions (90-degrees opposed) and centered inside the concrete housekeeping pad. Horizontal rebar shall extend to within 3-inches of the edge of the concrete pad in all directions. Metal wire “tie-wrap” shall be provided at each rebar crossing.
5. Equipment anchor attachments shall extend through the housekeeping pad and into the structural concrete below the pad a minimum of not less than 2-inches.

1.18 ELECTRICAL WORK CLOSEOUT  
A. Prepare the following items and submit to the District’s Representative before final acceptance.
1. Two (2) copies of all test results as required under this Section.
2. Two (2) copies of Local and/or State Code Enforcing Authority’s Final Inspection Certificates.
3. Copies of Record Drawings as required under the General Conditions, pertinent Division One Sections and Electrical General Provisions.
4. Two (2) copies of all receipts transferring portable or detachable parts to the District’s Representative when requested.
5. Notify the District’s Representative in writing when installation is complete and that a final inspection of this work can be performed. In the event any defect or deficiencies are found during this Final Inspection they shall be corrected to the satisfaction of the District’s Representative before final acceptance can be issued.
6. List of spare fuses and locations identified by equipment name and building designation.
7. Prior to energizing, retighten to the proper torque, each circuit conductor lug landing, each bus bar (phases, neutral and ground) and circuit protection device threaded connections in all switchboards, switchgear, motor control centers, transformers, busways, disconnect switches, motor starters, motor terminals and panelboards, after the equipment is installed/connected and prior to energizing the equipment. The torque values shall comply with Manufacturer's recommendations.
B. Electrical Power Single Line Diagrams – SLD
   1. Provide Single Line Diagrams showing the Contract Document Work complete electrical power system (normal and emergency). SLD shall show interconnection circuits, electrical equipment, panels, and circuit protection devices, nominal 50% (½-size) approximately 18-inches by 24-inches. Show installed voltages and electrical capacity sizes.
   2. SLD shall be mounted in metal (picture frame) rigid enclosure frame with rigid-backing (backer-board) and clear/transparent front, for hanging on wall. Provide clear transparent cover over SLD inside the frame.
   3. Provide a wall-hung (± 48-inches) SLD in each “Main” and “Sub” Electrical Equipment Room. If wall space is limited, alternatively securely attach SLD frame to room door facing into the respective Electrical Room.

END OF SECTION 26 0500
031616/223029
SECTION 26 0505
BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.01 SCOPE

A. 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 Section, complete as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Sections for work related to those other Sections and required to be included as work under this Section.
   2. General provisions and requirements for electrical work.

1.02 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. Submit Product Data Sheets for all Outlet Boxes, Wiring Devices, Device Plates, Relays, Contactors, and timeswitches.

B. Submit Detailed Shop Drawings including Dimensioned Plans, Elevations, Details, Schematic and Point-To-Point Wiring Diagrams and descriptive literature for all component parts for relays, time clocks, and photocells.

C. Submit Material List for Outlet boxes.

PART 2 - PRODUCTS

2.01 OUTLET AND JUNCTION BOXES

A. General:
   1. Flush or concealed outlet boxes and junction boxes.
      a. Non-masonry and/or non-concrete locations provide pressed steel boxes. Steel thickness not less than 0.062-inch, hot-dip galvanized. Knockout (KO) type with conduit entrances and quantity size to match conduits shown connecting to respective junction box and outlet box.
      b. UL-514 listed and labeled.
      c. Minimum required box depth is exclusive of extension-ring depth.
      d. Provide all boxes with matching cover plates. Cover plates shall be gasketed water-tight in wet and outdoor locations.
      e. Boxes installed in masonry or concrete shall be UL "concrete-tight" approved for installation in concrete, and shall allow the placing of conduit without displacing reinforcing bars.
   2. Provide boxes of proper Code Size for the number of wires or conduits passing through or terminating therein. In no case shall box be less than 4.0-inches square by 2.125-inches deep, unless specified elsewhere or noted otherwise on the Drawings. 2.5-inches minimum depth for box width’s exceeding 2-gang.
   3. Increase the minimum outlet box size to 4.69-inches square by not less than 2.125-inches deep, where one or more of the following conditions occurs:
      a. More than two (2) conduits connect to the outlet box.
      b. Circuit or Conduit “homerun” connects to outlet box.
4. Signal, Communication and Low Voltage:
   a. Individual audio/visual, telephone, computer or data outlets: 4.69-inches square by 2.125-inch deep minimum with 2-gang extension ring on flush boxes.
   b. Combination signal/telephone/data or computer outlets: 4.69-inches square by 2.125-inch deep minimum with 2-gang wide extension ring on flush boxes.

5. Junction boxes shall be sized to comply with the following:
   a. Code requirements size based on the conduit quantities, conduit sizes and wire-fill connected to the junction box.
   b. Junction box minimum size shall not be less than 4.69-inches by 4.69-inches by 2.5-inches deep, but not less than size indicated on the Drawings or required by Code.

6. Provide extension rings on flush outlets to finish face of extension ring flush with finished building surfaces. Extension ring shall match outlet box construction and contain "attachment mounting-tabs" for wiring devices. Extension rings shall be "screw-attached" to respective outlet box and maintain "ground" bonding continuity.

7. Outlet boxes installed in outdoor locations, or in wet locations, or in concrete/masonry, shall be cast-iron or cast-bronze, with threaded conduit hubs. UL rated for wet locations.
   a. Aluminum boxes shall NOT be in contact with concrete or masonry. Die-cast aluminum or cast aluminum water-tight electrical outlet boxes with threaded hubs may be provided as an alternate to cast-iron or cast-bronze outlet boxes, only where one or more of the following conditions occur:
      1) Outdoor locations above finish grade.
      2) Indoor wet locations surface or flush in walls or ceilings.

8. Provide fixture-supporting device in outlet boxes for surface mounted fixtures as required.

9. Provide solid gang boxes for three (3) or more devices, typical for line and low voltage switches, receptacles, low voltage/signal outlets, etc. for mounting devices behind a common device plate.

10. Provide isolation barriers in outlet boxes:
    a. Between line voltage and low voltage devices.
    b. Where more than one (1) device is installed in an outlet box.
    c. Between 277-volt and 120-volt devices.
    d. Between devices connected to emergency and non-emergency circuits of all voltages.

11. Outlet boxes installed penetrating into fire rated walls, fire rated floors, fire rated ceilings and all fire rated construction. The outlet boxes shall be UL listed, classified and labeled, for fire rated and temperature rated penetration of the respective fire rated surface and fire rated construction. The outlet box fire rating and temperature rating shall equal or exceed the fire/temperature rating of the surface/construction being penetrated. Provide UL listed and labeled supplemental fire and temperature protection to maintain ratings:
    a. Wall and ceiling penetrations, tumescent fire wrap (external or internal of outlet box).
    b. Floors provide subfloor supplemental fireproofing below floor box.

12. Outlet boxes installed in floors. The floor outlet boxes shall be UL listed and labeled for scrub water exclusion requirements, including but not limited to tiles, carpeting and exposed wood and concrete floor fishes.
13. Outdoor flush in wall device outlet boxes:
   a. flush in wall, gasketed water tight, with hinged, key locking cast metal, self-closing cover. Tamper resistant and vandal-resistant. UL listed and labeled for installation in masonry, cast-in-place concrete and hollow-framed walls.
   b. flush cast-iron or cast-bronze device back-box, 4.68-inch square by 2.25-inch deep.
   c. Internal metal adapter plate and wiring device types, in the box as indicated on the Drawings.
   d. as manufactured by Legrand/Pass and Seymour #4600 Series; or C.W. Cole #310 Series.
14. Refer to Architectural and Structural Contract Documents and details for additional box and install requirements.

B. Surface Outlet Boxes
   1. Surface mounted outlet boxes, cast iron Type FS or FD, with threaded hubs as required. Box interior dimensions and interior volume capacity not less than required for “press steel boxes”, and “sheet steel boxes”. Provide plugs in all unused openings. Provide weatherproof gaskets for all exterior boxes.

2.02 PULL BOXES

   A. General
      1. Sizes as indicated on the Drawings and in no case of less size or material thickness than required by the Governing Code and AHJ.
      2. Exercise care in locating pull boxes to avoid installation in drain water flow areas and to clear existing condition interferences.
      3. UL listed and labeled for electrical circuits.

   B. General Purpose Sheet Metal Pullbox
      1. General purpose sheet steel pull boxes: Install only in dry protected locations with removable screw covers. Manufacturer's standard rust proofing and baked enamel finishes.

   C. Concrete Pull Boxes and Hand-holes
      1. H-20 traffic rated box and cover, pre-cast concrete, steel reinforced pull boxes and hand-holes. Provide complete with pulling irons, hot-dip galvanized metal traffic cover with hot-dip galvanized metal cover frame, pull-box concrete base with sump. Four (4) cable full height wall racks with porcelain blocks.
      2. Boxes shall be “Intercept” type with multiple sections and extension cable-intercepts at both ends of box. Refer to Drawings for box size.
      3. Covers shall be flush bolt down. Covers weighing more than 40-pounds shall be split cover type “Torsion-Sping” assist, hinged open-close.
      4. Box covers shall comply with Federal ADA, UL, State and Local AHJ for slip resistance. Provide bead weld on cover to pull box to indicate services within pull box (i.e., "480/277-VOLT, 3-PHASE, 4-WIRE ELECTRICAL" OR "SIGNAL/TEL/P.A./CLOCK/FIRE ALARM" etc.).
      5. Shall be set on a machine-compacted pea gravel base 12-inches thick and extend 6-inches beyond box base on all sides. Provide a 3/16-inch by 10-feet copper clad ground rod through the box bottom with 9-inch projection into box, for grounding all metal parts with #10awg copper bond wire.
6. After cables have been pulled, connected, tested and inspected, seal all box joints and seal box between cover and frame with a mastic compound similar to Parmagum or Dukseal.

7. As manufactured by Jensen Precast; or Oldcastle Precast.

2.03 SWITCHES

A. General

1. Provide wiring device circuit switches totally enclosed, electrical insulating Bakelite or electrical insulating composition base, manual operator type with 277 volt 60Hz AC rating for full capacity contacts rated for incandescent lamp loads, fluorescent lamp loads and motor loads. Switch mounting-ears for screw attachment to outlet box. Switches shall be UL listed and labeled; conform to NEMA-WD1 and WD6.

2. Switch controlling (on-off) rated for all lighting loads and all non-lighting loads; switch ratings shall be 20 ampere; unless indicated otherwise on Drawings.

3. Color as selected by DISTRICT’S Representative. Switches controlling circuits connected to emergency power shall be red.

4. All switches shall be of the same Manufacturer.

5. Where switches are mounted in multiple gang assembly and are operating at 277 volts and/or 277 volts and 120 volts or emergency/non-emergency and mounted in same outlet box, there shall be an insulating barrier installed between each switch.

6. Devices shall additionally be listed and labeled as UL, all Weather-Resistant for the following install locations:
   a. Devices indicated on Drawings as Weather-Proof (W.P.).
   b. Devices installed in outdoor locations
   c. Installed in classified wet or damp area locations both indoor and outdoor.

7. Wiring devices shall be listed and labeled for connection of both “solid” and “stranded” copper circuit conductors.

8. Switches with ampere and voltage ratings different than described herein. The different rated switches shall have the same characteristics and performance as the respective described switches, except for differing ampere and voltage characteristics.

B. Switches Heavy Duty (Toggle – Type)

1. Single Pole Switches – 20 Amp at 277V

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Toggle Type</th>
<th>Lock Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hubbell</td>
<td>#HBL1221</td>
<td>#HBL1221-L</td>
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<td>Legrand/P&amp;S</td>
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<td>Leviton</td>
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<tr>
<td>Cooper-Arrow/Hart</td>
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2. Double Pole Switch – 20 Amp at 277V

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<td>Legrand/P&amp;S</td>
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<td>Leviton</td>
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3. Three-Way Switches – 20 Amp at 277V

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<tr>
<th>Manufacturer</th>
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<tr>
<td>Cooper-Arrow/Hart</td>
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4. Four-Way Switches – 20 Amp at 277V

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<td>Leviton</td>
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<td>Cooper-Arrow/Hart</td>
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5. Momentary Contact Switches – 20 Amp at 277V

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<tr>
<th>Manufacturer</th>
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<th>3-Position Lock</th>
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<tr>
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6. Maintained Contact Switches (Double Throw, Center Off) – 20 Amp at 277V

<table>
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<th>Manufacturer</th>
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<th>2-Pole</th>
<th>1-Pole</th>
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<tr>
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<td>#AH (extra)</td>
<td>#AH (extra)</td>
<td>#AH (extra)</td>
</tr>
</tbody>
</table>

7. Pilot lights used in conjunction with circuit switches shall be LED type with red jewel.

C. Weather-Proof (W.P.) Switches

1. Outdoor switches provide heavy-duty, tamper-resistant gasketed weather proof metal, hinged door cover for each switch.
2. Cover door shall be key locking-type or padlock-type.

D. Other Switches, Receptacles, Devices, and Outlets

1. Special devices outlets and outlet locations shall be as indicated on the Drawings. Modify device and outlet characteristics to accommodate the actual install location conditions for each outlet.

2.04 RECEPTACLES

A. General

1. All receptacle wiring devices in flush type outlet boxes shall be installed with a bonding jumper to connect the box to the receptacle ground terminal. Grounding through the receptacle mounting straps is not acceptable. The bonding jumper shall be sized in accordance with the branch circuit protective device as tabulated herein under "Grounding". Bonding jumper shall be attached at each outlet to the back of the box using drilled and tapped holes and washer head screws 6-32 or larger (except isolated ground receptacles). For receptacles in surface mounted outlet boxes direct metal-to-metal contact between receptacle mounting strap (if it is connected to the grounding contacts) and outlet box may be used. Receptacle mounting-ears for screw attachment to outlet box. Receptacle shall be UL listed and labeled; conform to NEMA-WD1 and WD6.

2. All receptacles shall be same Manufacturer.

3. Receptacle color as selected by DISTRICT’S Representative. Receptacles connected to emergency power circuits shall be red.
4. Tamper Resistant Receptacle
   a. Devices shall additionally be listed and labeled as tamper resistant.
   b. The electrical receptacles shall be rated “Tamper-Resistant-Receptacle” (TR), UL-TR (RTRT). Spring loaded shutters shall automatically open-close (unblock-block) the receptacle slots, when the plug-in (cap) insertion and removal occurs.
   c. Typical for 15-ampere and 20-ampere receptacles. Modify Manufacturer’s catalog number description to include tamper resistant receptacle function.

5. Wiring devices shall be listed and labeled for connection of both “solid” and “stranded” copper circuit conductors.

6. Duplex convenience receptacles and 120-volt single phase branch circuits.
   a. Duplex (convenience) receptacle, wiring device with two (2) single receptacles with the same electrical rating, integrated into a single assembly by the Manufacturer.
   b. 20-ampere branch circuits with a single duplex convenience receptacle connection on each circuit, receptacles shall be rated for 20-ampere.
   c. 15-ampere and 20-ampere branch circuits with two (2) or more duplex convenience receptacle connections each circuit, receptacle shall be rated 15-ampere or 20-ampere.

7. Devices shall additionally be listed and labeled as UL-All Weather-Resistant, provide weather resistant receptacles for the following install locations:
   a. Devices indicated on Drawings as Weather-Proof (W.P.).
   b. Devices installed in outdoor locations.
   c. Devices installed in classified as damp or wet locations both indoor and outdoor.
   d. All GFCI (ground-fault) receptacles all locations.

8. Receptacles with ampere and voltage ratings different than described for duplex convenience receptacles. The different rated receptacles shall have the same characteristics and performance as the respective duplex convenience receptacles, except for differing ampere and voltage characteristics.

9. Receptacles shall be GFCI type for the following locations:
   a. located within 84-inches of a sink or hosebib shall be GFCI receptacles.
   b. Devices installed in outdoor locations.
   c. Devices installed in classified as damp or wet locations both indoor and outdoor.
   d. Devices indicated on Drawings as GFCI or Weather-Proof (W.P.).

B. Duplex convenience receptacles.
1. Shall be grounding type, 120 volt and shall have two (2) current carrying contacts and one (1) grounding contact which are internally connected to the frame. Outlet shall accommodate standard parallel blade cap and shall be side wired. Receptacles shall be Tamper Resistant (TR), UL-TR.
2. GFCI receptacles shall be all Weather-Resistant and wet location rated. Rated 120 volt 60Hz AC, 20 ampere, unless indicated otherwise on Drawings.
3. Heavy Duty Industrial Grade

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>NEMA 5-15R</th>
<th>NEMA 5-20R</th>
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C. Weather Proof (W.P.) Receptacle
   1. Outdoor receptacles shall be duplex convenience GFCI type rated 20-ampere 120 Volt 60Hz AC weatherproof, GFCI, unless indicated otherwise on Drawings. Test-reset buttons and visual pilot.
   2. GFCI receptacles shall be wet location and Weather-Resistant rated weatherproof, gasketed, key locking tamper resistant, wet location.
   3. Outdoor, flush mount outlet with hinged, key-locking, weather-proof cover (CEC/NEC – 406.8 compliant). As manufactured by Pass and Seymour/Legrand #4600 Series; or C.W. Cole #310 Series.
   4. On exposed conduit runs, provide weatherproof ground fault circuit interrupter type GFCI receptacles installed in "FS" condulet water tight cast metal body, with weather-proof spring door type covers, gasket water tight. Door shall be key locking-type or padlock-type.

D. Other Switches, Receptacles, Devices, and Outlets.
   1. Special devices, outlets and outlet locations shall be as indicated on the Drawings. Modify device and outlet characteristics to accommodate the actual install location conditions for each outlet.

2.05 PLATES

A. Metal cover plates for devices
   1. Provide cover plates for every switch, receptacle, telephone, computer, television and other device outlets. All plates shall be 0.040-inch stainless steel, Type 302 alloy composed of 18% chromium and 8% nickel. Plates shall be manufactured by P&S, Hubbell, Leviton or General Electric.

2.06 VANDAL-PROOF FASTENINGS

Provide approved vandal-proof type screws, bolts, nuts where exposed to sight throughout the Project. Screws for such items as switch plates, receptacle plates, fixtures, communications equipment, fire alarm, blank covers, wall and ceiling plates to be spanner head stainless steel, tamperproof type. Provide DISTRICT with six (6) screwdrivers for this type.

2.07 STRUCTURAL AND MISCELLANEOUS STEEL

Structural and miscellaneous steel used in connection with electrical work and located out-of-doors or in damp locations, shall be hot-dip galvanized unless otherwise specified. Included are underground pull box covers and similar electrical items. Galvanizing averages 2.0 ounce per square foot and conforms to ASTM A123.

2.08 FLASHING ASSEMBLIES

A. General
   1. Flashing shall be compatible with the material being penetrated and with the pipe passing through the flashing. Coordinate with and comply with Manufacturer's recommendations, for both the flashing and the material being penetrated.
   2. Provide lead metal flashing assemblies at all roof penetrations, unless recommended otherwise by Manufacturer.
   3. Seal the joint between the flashing and pipe passing through the flashing with waterproofing compound.
   4. Lead flashing for roof penetrations, as manufactured by: Santa Rosa Lead Products; or Semco; or Flashco.
B. Storm Collars

1. In addition to penetration flashing, provide a storm-collar counter-flashing for each roof penetration flashing. Shall attach to the structure of the penetration and form a water-tight "umbrella" counter flashing over the roof penetration flashing.

2. As manufactured by: STD-Storm collars; or ASI-Storm collars.

2.09 RELAYS, CONTACTORS, AND TIME-SWITCHES

A. Individual Control Relays (HV/AC Plumbing of the Control Functions)

1. Individual control relays shall have convertible contacts rated a minimum of 10 amperes, 600 volts regardless of usage voltage. Coil voltage, number and type of contacts shall be verified and supplied to suit the specific usage as shown in the wiring diagrams and/or schedules on the Electrical and Mechanical Drawings. Coil control circuit shall be independently fused, sized to protect coil. Relays shall be installed on prefabricated mounting strips. Each relay shall have a surge suppressor to limit coil transient voltages. Furnished in the NEMA Type I enclosure unless indicated otherwise.

2. The following relays are approved:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Type</th>
</tr>
</thead>
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<tr>
<td>Cooper-Arrow/Hart</td>
<td>IMP</td>
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<tr>
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<td>Class CR 2811</td>
</tr>
<tr>
<td>Square D Co.</td>
<td>Class 8501, Type A</td>
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<tr>
<td>Westinghouse</td>
<td>Bul. 16-321, Type NH</td>
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<tr>
<td>Allen Bradley</td>
<td>Approved Equal</td>
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</table>

B. Contactors and/or Relays

1. Contactors and/or relays for control of lighting shall be 600 volt AC, electrically operated, and mechanically held units, open type for panel mounting with number of poles and of size as indicated on the Drawings. Provide auxiliary control relay for operation of each contactor and/or relay with a 2-wire control circuit.

2. Contactors and/or relays shall be mounted in panelboards in barriered section under separate hinged lockable doors or in contactor and/or relay cabinets as called for on the Drawings. Contactors and/or relays shall be installed on Lord sound absorbing rubber mounts.

3. Contactors and/or relays shall be Automatic Switch Co. Bulletin #920 Series for 2-pole and 3-pole, Automatic Switch Co. Bulletin 917 Series with poles as indicated on Drawings. Coil control circuit shall be independently fused, sized to protect coil.

4. Contactors and/or relays shall be equipped with a switch, in the proper configuration, to disconnect the control circuit controlling the coil of the respective device. Control circuit disconnect switch shall be labeled showing function of device.

C. Time-Switches

1. All time-switches shall have synchronous motor drive for operation on 120 or 277 volts, 60Hz, AC and shall be furnished with a 10-hour, spring-driven, reserve-power motor. Contacts shall be rated 40A per pole.

   a. Exterior lighting time-switches for control of individual circuits or electrically operated relays shall have astronomic dial and shall be Tork 7000ZL Series or approved equal by Paragon or Intermatic.
b. Interior lighting time-switches for control of individual circuits or electrically operated relays shall be Tork 7000 Series or approved equal by Paragon or Intermatic.

c. Time-switches for control of air conditioning or plumbing equipment shall have seven day dial and shall be Tork WL Series or approved equal by Paragon or Intermatic.

2. All time-switches shall be mounted in separate section in top of panelboards under separate lockable door unless otherwise indicated on Drawings. Clear opening for time-switch shall be a minimum of 12-inches by 12-inches.

D. Contactors and/or Relays/Time-Switch Cabinet

1. Contactors, relays, and/or time-switches not indicated to be mounted in electrical panels shall be mounted in a cabinet, size as required, with hinged lockable door keyed same as panelboards. Construction of cabinet shall be similar to terminal cabinets.

2. Each contactor, relay or time-switch mounted in the contactor cabinet shall be barriered in its own compartment, and shall be installed on Lord sound absorbing mounts.

3. Contactor cabinets shall be of the same Manufacturer as the panelboards.

4. Where relays and/or contactors occupy the same enclosure as time-switches they shall have a clear acrylic shield installed over each relay or contactor to guard line exposed parts from accidental contact by Non-Authorized Personnel.

2.10 CONCRETE WORK (ADDITIONAL REQUIREMENTS)

A. Portland Cement

1. ASTM C33-(latest revision), Type II, Low Alkali Cement. Composed of Portland cement, coarse aggregate, fine aggregate, and water.

   a. Concrete for use as electrical equipment footings, lighting pole bases and equipment slabs on grade, concrete shall attain minimum 28-day compressive strength of 4000psi, using not less than 5.75 sacks of cement per cubic yard of wet concrete.

   b. Concrete for underground duct/conduit encasement, the minimum 28-day compressive strength shall be 2000 psi. Provide a minimum of 10-pounds of red oxide concrete coloring per yard of concrete.

   c. Mix shall obtain a 6-inches slump, measured with standard slump cone per ASTM C143/C143M (latest revision).

2. Coarse Aggregate: Uniformly graded between maximum size not over 1½-inch and not less than ¾-inch and minimum Size #4, crushed rock or washed gravel. For concrete encased conduit only, maximum aggregate size shall be ½-inch.

3. Fine Aggregate: Clean, natural washed sand of hard and durable particles varying from fine to particles passing ⅜-inch screen, of which at least 12% shall pass fifty (50) mesh screens.

B. Water: Clean and free from deleterious quantities of acids, alkalis, salts, or organic materials.

C. Reinforcement

1. Bars: Intermediate Grade Steel conforming to ASTM A615/A615M grade 60, with pattern deformations.

2. Welded Wire Fabric: ASTM A185/A185M.

3. Bending: Conform to requirements of ACI 318.
D. Form Material: For exposed work, use PS 1-66 "B-B Concrete Form" plywood forms, or equal. Elsewhere, forms may be plywood, metal, or 1-inch by 6-inch boards. Forms for round lighting pole bases shall be sono-tube.

PART 3 - EXECUTION

3.01 GROUNDING (ADDITIONAL REQUIREMENTS)

A. Grounding shall be executed in accordance with all applicable Codes and Regulations, both of the State of California and Local Authorities Having Jurisdiction.

B. Each pull box or any other enclosure in which several ground wires are terminated shall be equipped with a ground bus secured to the interior of the enclosure. The bus shall have a separate lug for each ground conductor. No more than one conductor shall be installed per lug.

C. The Maximum Resistance to Ground shall Not Exceed 5 ohms.

3.02 OUTLET AND JUNCTION BOXES

A. General:
   1. Accurately place boxes and securely fastens to structural members. Where outlets are shown at same location but at different mounting heights, install outlets in one vertical line. Where outlets are shown at same location and mounting height, mount outlets as close together in a horizontal row as possible. Where the outlet boxes for switches and receptacles are shown at the same location and mounting height, mount in common outlet box with barriers between devices. Provide single piece multi-gang cover plate for close mounted outlet boxes. Where switches are shown on wall adjacent to hinge side of doors, box shall be installed to clear door when door is fully opened.
   2. Flush mounted boxes shall be attached to not less than two (2) parallel studs or structure members by means of metal supports. The supports shall span between and attach to the structure members.
   3. Boxes above accessible ceilings shall be attached to structural members. Where boxes are suspended, they shall be supported independently of conduit system by means of hanger rods and/or preformed steel channels. Boxes shall be supported independently of all piping, ductwork, equipment, ceiling hanger wires and suspended ceiling grid system.
   4. Surface mounted outlets shall be attached to concrete or masonry walls by means of expansion shields.
   5. Floor boxes shall be installed level with finish floor and within adjustable limits of floor ring. Where outlets are shown at same or adjacent location, use multi-gang boxes.
      a. Provide cut-outs in the sub-floor assembly, to accept the recess depth of each electrical floor box. Provide added “fire-proof” applications on the bottom of each floor box location extending through the sub-floor. The “fire-proof” application shall be equal to the floor fire-assembly withstand rating.
   6. Outlet Box Horizontal and Vertical Separation: Outlet boxes and device outlet rings installed flush in walls shall be horizontally and vertically separated by not less than 24-inches (edge of box to edge of box) from device outlet boxes and rings in common wall surfaces located on the opposite (back) side of the same wall.
      a. Where the separation cannot be maintained, provide a solid backing behind and completely enclosing each outlet box.
b. The backing shall extend the width of the wall cavity (i.e., between "studs" or masonry cells) behind the box and 12-inches above and below the outlet box centerline, completely enclosing the outlet box.

c. The backing shall consist of the following:
   1) ¾-inch thick gypsum board anchored in place for "stud" wall construction.
   2) Solid "mortar" to completely fill the outlet box "cell" behind the box in masonry construction.

7. Provide metal outlet box for each device. Install devices in metal outlet boxes. Typical for all wiring devices including, switches, receptacles, line voltage devices, and low voltage/signal system devices.

B. Fire Wrap:
   1. In fire rated walls and ceilings provide fire rated "box-wrap" around the outside of each outlet box placed in fire rated wall or ceiling. Install the fire wrap on exterior of box inside the wall or ceiling, to maintain the fire rating of wall or ceiling with the installed outlet boxes.

3.03 SWITCHES AND RECEPTACLES-DEVICES

A. General
   1. Provide outlet boxes for all devices, switches, receptacles, both line-voltage and low-voltage.
   2. Devices installed in wireways shall be installed flush in wireway assembly.
   3. Install and screw attach devices into outlet boxes and wireways.
   4. Provide ground circuit connections to all devices.
   5. Provide branch circuit connections to all devices.
   6. Provide testing and commissioning for proper operation and phase/ground connectors.
      a. Test each GFCI devices after installation and circuit connection is complete.
      b. Test all devices for correct polarity and proper electrical energization.
   7. Install and adjust all coverplates to be flush and level, with correct device identification.
   8. Were one or more device occurs at the proximity with other similar devices, all of the devices shall be “granged” under one common coverplate as follows:
      a. Duplex convenience receptacles with other proximity (within 18-inches) duplex convenience receptacles.
      b. Lighting control switches not exceeding 20-ampere switch rating with other proximity (within 18-inches) similar switches.

B. Line-Voltage Plug-In Type Receptacle Installation Orientation:
   1. The “ground-pin” shall face “up” at the receptacle top location (double duplex) 4-plex, individual and vertically mounted individual duplex receptacles.
   2. The “neutral-blade” shall face “up” at the receptacle top location on horizontally mounted duplex receptacles.

3.04 CONCRETE WORK

A. Form:
   1. Space forms properly with spreaders and securely tie together. Do not use twisted wire form ties. Keep forms wet to prevent joints from opening up before concrete is placed. Replace improper construction as directed. Do not use wood inside forms.
2. Build in and set all anchors, dowels, bolts, sleeves, iron frames, expansion joints and other materials required for the Electrical Work. Place all items carefully, true, straight, plumb and even.

3. Carefully remove all exposed forms. Cut nails and tie wires below face of concrete and fill all holes. Rubbish will not be allowed to remain in, under, or around concrete.

B. Mixing: Use batch machine mixer of approved type. After ingredients are in mixer, mix for at least 1½-minutes.

C. Transit Mixing: In lieu of mixing at site, transit mixing may be used if rate of delivery, haul time, mixing time, and hopper capacity is such that concrete delivered will be placed in forms within 90-minutes from time of introduction of cement and water to mixer.

D. Placing of Concrete
   1. Before placing concrete, remove wood, rubbish, vegetable matter and loose material from inside forms. Thoroughly wet down wood forms to close joints.
   2. Clean reinforcement; remove paint, loose rust, scale and foreign material. Bars with bends not called for will be rejected. Hold securely in place to prevent displacement. Lap bar splices 24-diameters, min; lap fabric one mesh min. Tie intersections, corners, splices with 16-gallon annealed wire, or as otherwise called for.
   3. Place concrete immediately after mixing. Do not use concrete that has begun to set; no tempering will be allowed. If chuting is used, avoid segregation. In placing new concrete against existing concrete, use bonding agent per Manufacturer's directions.
   4. Give careful and thorough attention to curing of concrete. Keep concrete and forms wet for a minimum of 10-days, after placing concrete.

E. Concrete Finish
   1. Finish of Exposed Concrete: Horizontal surfaces, steel troweled monolithic finish; vertical surfaces, smooth and free of fins, holes, projection, etc.
   2. Exposed lighting pole bases shall be filled and sack finished to a smooth finish.

END OF SECTION 26 0505
031616/223029
SECTION 26 0530
CONDUIT AND WIRE

PART 1 - GENERAL

1.01 SCOPE

A. 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 Section, complete as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Sections for work related to those other Sections and required to be included as work under this Section.
   2. General provisions and requirements for electrical work.

1.02 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. Submit Product Data Sheets for all Wire, Supports, Conduit, Fittings and Splicing Materials.

B. Submit Material List for all Conduit and Conduit Fittings.

PART 2 - PRODUCTS

2.01 CONDUIT

A. General
   1. The interior surfaces of conduits and fittings shall be continuous and smooth, with a constant interior diameter. Conduits and conduit fittings shall provide conductor raceways of fully enclosed Circular Cross Section. The interior surfaces of conduits and fittings shall be without ridges, burrs irregularities or obstructions. Conduits and fittings of the same type shall be of the same uniform weight and thickness.
   2. Type of conduit, type of conduit fittings and conduit supports shall be suitable for the conditions of use and the conditions of location of installation, based on the Manufacturer’s recommendations and based on applicable Codes.
   3. All fittings for metal conduit shall be suitable for use as a grounding means, pursuant to the applicable Code Requirements. All metal conduit and metal conduit fittings shall provide 3 second duration ground fault current carrying ratings, when installed and connected to the respective conduit, as follows:
      a. RMC and EMT conduit fittings
         1) 0.5 inch through 1.5 inch conduit/fitting size - 10,000 ampere RMS.
         2) 2.0 inch and larger conduit/fitting size - 20,000 ampere RMS.
      b. FMC and LTFMC Conduit Fittings
         1) 0.5 inch through 1.25-inch conduit/fitting size-1,000 ampere RMS (without external bonding jumper).
         2) 1.5 inch through 4.0-inch fitting size-10,000 ampere RMS with bonding jumper.
4. Protective corrosion resistant finish for metal conduit fabricated from steel and metal conduit fittings fabricated from steel, shall be as follows:
   a. Clean all metal surfaces (including metal threads) with acid bath “pickle” prior to coating, to remove dirt, oil and prepare surfaces for galvanizing.
   b. Hot-dip galvanized zinc coating on all interior and exterior steel surfaces. Minimum finish zinc coating thickness shall not be less than 0.002 inches.
   c. Threads shall be hot-dip zinc coated after machine fabrication.
   d. Exterior metal surfaces shall be finished with clear organic polymer topcoat layer, after galvanizing.
   e. The inner metal surfaces of conduit fittings shall be finished with a lubricating topcoat after galvanizing, to facilitate conductor pulling through the conduit/fitting.

5. Threads for metal conduit and metal conduit fittings shall be taper-pipe-thread, National Pipe Standards (NPS) and shall comply with ANSI-B1.20.1.

6. Metal conduit termination connector fittings shall be provided with a Manufacturer installed, insulating throat bushing inside the fitting. The bushing shall protect the wire conductor insulation from cutting, nicks and abrasion during conductor installation and electrical load “cycling” after installation is complete. The bushing shall comply with UL 94V-0 flammability.

7. Provide conduit bonding/grounding jumper from metal enclosures with “concentric ring” knockouts, to positively ground/bond each respective conduit(s) to the metal enclosure.

8. Metal conduit fittings connecting to PVC coated metal conduit shall be PVC coated to match the conduit.

9. The conduit and fittings shall be watertight and airtight without cracks and pinholes.

B. Rigid Metal Conduit (RMC)

1. Rigid metal, round tubing, machine threaded at both ends.
   a. The conduit and conduit fittings shall comply with the requirements for an equipment grounding conductor, pursuant to applicable Codes.

2. RMC raceway types shall be as follows:
   a. Rigid Galvanized Steel conduit (RGS), minimum yield strength shall be 35,000 PSI. Shall comply with NEMA Standard 5-19 (latest revision); ANSI C80.1 and ANSI-C80.4 (latest revision); UL 514-B and UL 6 (latest revisions); National Pipe Standard Specification (latest revision).
   b. Intermediate Steel Conduit (IMC). Shall comply with NEMA Standard 5-19 (latest revision) ANSI-C80.6 (latest revision); UL 2142 (latest revision).

3. RMC fittings:
   a. Fittings shall be compatible with RGS and IMC.
   b. Fittings shall be rated “liquid tight”.
   c. Fittings imbedded in concrete shall be rated “liquid tight” and “concrete tight”.
   d. Connectors and couplings for terminating, connecting and coupling to RMC conduit shall be threaded metal.
   e. Fittings shall comply with ANSI C80.4 and ANSI C33-84 (latest revision); NEMA FB1 (latest revision); UL 514 (latest revision).
   f. Conduit seal fittings:
      1) Conduit seals shall prevent the passage of gasses, liquids and vapors past the location of the seal installation in the conduit.
      2) Conduit seals shall be suitable for installation in both vertical and horizontal conduit locations.
      3) Conduit seals shall be visible and accessible for inspection after installation is complete.
4) Conduit seals shall be rated for the following locations:
   a) Wet locations
   b) Classified hazardous location materials NEC Class 1 Division 1.
   c) Temperature ranges from 0 minus 20 degrees centigrade through 90 degrees centigrade.
5) Conduit seals, sealing compound and sealing compound dam shall be the products of the same Manufacturer.

4. RMC fittings as manufactured by:
   a. For threaded enclosure, termination connection.
      1) Thomas & Betts - 106 Series bonding locknut, 5302 Series sealing ring with stainless steel retainer.
   b. For non-threaded enclosure, termination connector.
      1) Thomas & Betts - 370 Series watertight threaded sealing hub, 106 Series threaded bonding lock nut, Sta-Con Series enclosure bonding jumper and 3870 Series threaded ground bushing.
      2) Emerson-OZ/Gedney-CHMT/CHT watertight threaded hub with bonding locknut and GH50G Series enclosure bonding jumper.
   c. For RMC to RMC conduit-to-conduit coupling
      1) Thomas & Betts/Erickson - 674 (threaded) Series
      2) Emerson-OZ/Gedney Type TPC (threaded) Series
   d. For RMC Conduit Seals
      1) Emerson-OZ/Gedney-EYA and EYAM (threaded) Series
      2) Appleton-EYF and EYM (threaded) Series

C. Electrical Metallic Tubing (EMT)
   1. Rigid metal round tubing, “thin wall” steel construction, with non-threaded ends.
      a. The conduit and conduit fittings shall comply with the requirements for an equipment grounding conductor pursuant to applicable codes.
      b. The conduit shall be watertight and airtight without cracks and pinholes.
   2. EMT shall be allowed for conduit size ranges from 0.5-inch through 4.0-inches.
   3. Comply with ANSI C80.3, C80.4, and ANSI C33.98 (latest revisions); UL 594 and UL 797 (latest revisions); CEC Section 12500 (latest revision).
   4. EMT fittings:
      a. Connectors and couplings for terminating, connecting and coupling to EMT conduit shall be non-threaded steel fabrication.
      b. EMT termination connector fittings shall be as follows:
         1) Set screw type “concrete tight” when installed in dry interior locations.
         2) Compression types “raintight” and “concrete tight” when installed in wet or damp locations, outdoors and in concrete or masonry construction.
      c. Fittings shall comply with ANSI C33.84 (latest revision); UL 514 (latest revision); NEMA FB-1.
   5. EMT fittings as manufactured by:
      a. For threaded and non-threaded enclosure, termination connector
         1) Thomas & Betts-TC721A (set screw type) Series (with locknuts).
         2) Emerson-OZ/Gedney-TC500I (set screw type) Series (with locknuts).
         3) Thomas & Betts-5123 (compression type) Series (with 2 locknuts).
         5) Thomas & Betts-4240 (compression type) Series (90 degree angle with locknut).
6) Emerson-OZ/Gedney-TWL (compression type) Series (90 degree angle with locknut).

b. For EMT to EMT conduit-to-conduit coupling:
   1) Thomas & Betts-TK121A (set screw type) Series (with locknut).
   2) Emerson-OZ/Gedney-5000 (set screw type) Series (with locknut).
   3) Thomas & Betts-5120 (compression type) Series.
   4) Emerson-OZ/Gedney-TC600 (compression type) Series.

c. For EMT to RMC conduit to conduit combination coupling:
   1) Thomas & Betts-HT221 (set screw type) Series.
   2) Emerson-OZ/Gedney-ESR (set screw type) Series.
   3) Thomas & Betts-530 (compression type) Series.

D. Flexible Metal Conduit (FMC)
1. Round flexible conduit, fabricated from a single continuous steel strip. The steel shall be factory formed into continuous interlocking convolutions to form a complete lock between steel strips and provide raceway flexibility.
2. Metal to metal grounding contact shall be maintained throughout the length of the FMC conduit.
3. FMC shall be allowed for conduit size ranges from 0.5 inch through 4.0-inches.
4. FMC shall comply with ANSI-C.33.84 and ANSI C33.92; NEMA FB-1; CEC 12-1100.
5. FMC Fittings
   a. FMC fittings shall be malleable iron construction or steel construction.
   b. Fitting shall automatically cause the FMC raceway throat opening to be centered with respect to the fitting throat opening.
   c. Straight and angled connector termination fittings shall be threaded on one end and shall include a threaded locknut, suitable for connection to threaded and unthreaded enclosures.
   d. The attachment of the fittings to FMC shall be angled saddle type, to engage and interlock with the FMC spiral groove, and shall be unaffected by vibration. Direct bearing screw type fittings shall not be used.
   e. Direct FMC conduit-to-FMC conduit coupling of FMC shall not be permitted.
   f. Shall comply with ANSI C33.9, and ANSI C33.92 (latest revision); NEMA FB1 (latest revision); UL 514.
6. FMC fittings as manufactured by:
   a. Straight Termination Connectors Thomas & Betts-3110 Series Thomas & Betts-3130 Series (with locknut) (with locknut)
   b. FMC to EMT conduit combination coupling: Thomas & Betts 503TB Series.

E. Liquid Tight Flexible Metal Conduit (LTFMC)
1. The metal conduit core of LTFMC shall comply with the same requirements as FMC conduit, with the addition of a thermoplastic exterior flexible jacket over the metal core.
2. The exterior jacket shall be positively locked to the metal core to prevent jacket “sleeving”.
3. The LTFMC shall be rated for installation and operating service temperatures of between minus 20 degrees centigrade through plus 90 degrees centigrade.
4. The LTFMC jacket shall be suitable for continuous exposure to sunlight, rainwater, water vapor, mineral oils and liquid solvents, without penetrating into the conduit and without deteriorating the jacket.
5. LTFMC sizes from 0.5-inch through 1.25-inch shall include an additional internal ground conductor, fabricated by the Manufacturer, as an integral part of the conduit core.

6. Direct LTFMC conduit-to-LTFMC conduit coupling of LTFMC shall not be permitted.

7. LTFMC shall be allowed for conduit size ranges from 0.5-inch through 4.0-inches.

8. In addition to the requirements for FMC conduit, LTFMC shall also comply with ANSI C-33.84 (latest revision); NEMA-FB1 (latest revision); CEC 12-1400 (latest revision).

9. LTFMC fittings
   a. Fittings shall include an external mechanical ground/bond wire connector.
   b. The attachment of the fitting to LTFMC shall be threaded compression type onto the conduit core with locknut and liquid tight jacket compression seal. The fitting shall automatically prevent “sleeving” of the jacket.
   c. Straight and angled termination connector fittings shall be threaded on one end and shall include locknut suitable for connection to threaded and unthreaded enclosures.

10. LTFMC fittings as manufactured by:
    a. Termination connector fittings:
       1) Thomas & Betts-5331 GR & Series 5351GR Series.
       2) Appleton-STB & STN-L Series for use with preformed “knockouts”. Appleton-STB-L Series; STN-L Series for use with performed “knockouts”.
       3) Emerson- OZ/Gedney-4Q Series Emerson-OZ/Gedney-4Q Series.
    b. LTFMC to RMC conduit to conduit combination coupling fittings:
       1) Thomas & Betts-5271 GR Series.
       2) Emerson-OZ/Gedney-4Q Series.

F. Rigid Non Metallic Conduit (RNMC)
   1. General
      a. Conduit and fittings shall be 90 degree centigrade conductor rated. Fabricated from homogeneous material, free from visible cracks, holes or foreign inclusions, with integral “end-bell”. The conduit and conduit fittings shall be watertight and airtight.
      b. Conduit, conduit fittings and conduit fitting assembly “solvent cement” shall all be the product of the same Manufacturer. Conduit fittings shall be solvent cement welded watertight.
      c. Conduit and fittings shall be identified with legible markings showing ratings, size and Manufacturers name.
      d. RNMC and fitting shall be corrosion resistant, watertight.
      e. Conduit shall be suitable for conductor operating temperatures from minus 20 degrees centigrade to 90 degrees centigrade.
      f. RNMC shall comply with NEMA TC-2 (PVC 40 conduit, latest revision) NEMA TC-6 (EB conduit latest revision) and NEMA TC-3 (fittings, latest revision); UL 514 and UL 651 (latest revision).
   2. Polyvinyl Chloride (PVC)-RNMC
      a. PVC-Schedule 40 heavy wall construction.
      b. PVC-Schedule 80 extra heavy wall construction.
      c. PVC-Type EB.
3. RNMC fittings connecting to metallic raceways shall be provided with a ground/bond jumper connection.

G. Combi-Duct
1. Rigid nonmetallic conduit combining a continuous linear outer raceway (duct) with factory installed (inside the outer duct) multiple, segregated inner raceway (ducts). Rigid, Schedule 40 PVC construction. Shall be modular lengths of 20-feet for each duct segment.
2. The conduit shall be suitable for use with signal/telecommunications, fiber optic, telephone and computer/data circuits, operating at 100 volts or less, UL listed and labeled.
3. Outer Duct, outer enclosing Schedule-40 PVC duct size. The outer enclosing duct shall be 4.2-inches inside nominal duct diameter and 4.5-inches outer duct nominal diameter.
4. Inner-ducts (contained inside the enclosing outer duct), non-metallic SDR-19 or Type-C/CAO-8546:
   a. Quantity of three (3) continuous round rigid inner linear ducts, nominal size inside diameter 1.5-inch for each inner duct.
   b. Quantity of four (4) continuous round rigid inner linear ducts, nominal size inside diameter 1.19-inch for each inner duct.
5. Manufacturer’s standard bends and offsets, minimum 72-inches radius.
6. Combi-duct and combi-duct fittings shall be airtight and watertight. Approved for direct burial in earth and approved for encasement in concrete.
7. As manufactured by Carlon # Multi-Guard/Multi-Cell Series; American Pipe and Plastic (AMTEL) #Multi-Bore Series; or equal.

H. Expansion Joint, Deflection Joint and Seismic Joint Conduit Fittings
1. Expansion Conduit Fitting - Fitting shall provide for a minimum of 2-inches straight line movement between two (2) connecting conduits in each direction (total 4-inches conduit expansion and Contraction) parallel to the respective conduit lengths. Fitting shall be watertight.
2. Deflection Conduit Fitting - Fitting shall provide for a minimum of 30 degrees angular deflection movement (“Shear” deflection) between two (2) connecting conduits, in any direction perpendicular to the length of the respective conduits. Fitting shall be watertight.
3. Combination Expansion/Deflection Conduit Fitting - Fitting shall provide the combined “expansion” and “deflection” movement capacity between two (2) connecting conduits as described for separate “expansion” and “Deflection” conduit fittings. Fitting shall be approved for installation concealed in both masonry/concrete construction and exposed non-masonry/concrete construction. Fitting shall be watertight.
4. Fittings shall comply with UL.
5. Fittings as manufactured by:
   a. Conduit expansion fittings exposed or concealed locations as manufactured by:
      1) Emerson-OZ/Gedney – AXB-8 Series for RMC conduit.
      2) Emerson-OZ/Gedney - TX Series for EMT conduit.
      3) Appleton – AXB or XJ8 Series for RMC conduit and EMT conduits. Provide RMC to EMT combination conduit coupling fittings for each end of the expansion fitting.
b. Combination expansion/deflection conduit fittings exposed or concealed conduit locations as manufactured by:
   1) Emerson-OZ/Gedney - AXDX Series for RMC conduit.
   2) Emerson-OZ/Gedney - AXDX Series for EMT conduit.
   3) Appleton-DX Series for RMC conduit.
   4) Provide RMC to EMT combination conduit coupling fittings for each end of the expansion/deflection fitting.

c. Conduit expansion/deflection fittings for FMC and LTFMC conduit.
   1) Provide a minimum of 12-inches of “slack” LTFMC in each FMC or LTFMC conduit at building and structure seismic or expansion joint conduit crossings.
   2) Note: Each FMC “slack” expansion/deflection location, shall be considered as not less than a 90 degree conduit bend location, for compliance with the maximum quantity of conduit bends allowed in a raceway.

6. Conduit fitting bonding jumper:
   a. The grounding/bonding path of metal conduit shall be maintained by the fitting.
   b. Provide a bonding jumper at each expansion, deflection and combination expansion deflection conduit fitting.
   c. The jumper shall be a bare flexible copper “braid”. The copper braid electrical current carrying capacity shall be equal to the metal conduit.
   d. Provide a factory terminated ground clamp on each end of the braid with adjusting steel conduit grounding clamps and connect to each respective conduit end.
   e. The jumper braid length shall be 8-inches longer than the respective conduit fitting.
   f. Bonding jumper for FMC and EMT fittings as manufactured by:
      1) Emerson-OZ/Gedney – BJ and BJE Series
      2) Appleton – BJ/XJ Series

I. Conduit Bodies Conduit Fitting
   1. Conduit bodies shall provide conductor access with a removable conduit body cover and wiring area enclosed in metal housing. The conduit body shall facilitate pulling conductors.
   2. In-line form “C” conduit bodies shall be prohibited.
   3. The interior space “length” of 90 degree “elbow” conduit bodies shall not be less than six (6) times the diameter size of the largest conduit connecting to the conduit body.
   4. Conduit body covers shall be removable, gasketed; watertight “domed” metal covers “Mogul-Type” with threaded screw attachment to the conduit body.
   5. Lubricated, reusable, wire roller guards inside the conduit body shall protect wire from insulation damage during wire “pulling”.
   6. Conduit body fittings shall comply with UL 514.
   7. Conduit bodies as manufactured by:
      a. For RMC Conduit
         2) Emerson-OZ/Gedney - LB 6X/Mogul (90 degree elbow) Series - threaded body.
         3) Appleton – NEC6X-LB/Mogul (90 degree elbow) Series - threaded body.
      b. For EMT Conduit
         1) Same as for RMC conduit. Provide EMT to RMC conduit combination coupling fitting for each outlet body connection.
2.02 CONDUIT SUPPORTS

A. General
1. Conduit Supports, hangers and fasteners for metal conduit shall be steel, hot dip zinc galvanized.
2. Conduit supports, hangers and fasteners for PVC coated conduit shall be PVC coated to match the conduit PVC coating.
3. Threaded hardware shall be continuous, free running threads.
4. Conduit support systems, including support channels, pipe clamps, braces, anchors, hardware, fasteners, shall be sized to support the full capacity circuit conductors weight, plus the installed conduit weight, plus the conduit fitting weight and support hardware weight, plus a 300% additional weight capacity safety factor.
5. Provide lock washer at each “bolted”/threaded connection.
6. Conduit supports, fasteners, channels, braces, hardware, anchors, pipe clamps, and hangers as manufactured by Unistrut or Kindorf.
7. Supports shall be free of “BURRS” and sharp edges.
8. Metal supports cut in the field shall be zinc galvanized after cutting to prevent rust.

B. Conduit Hangers
1. Threaded steel hanger rods.
   a. Hanger rods smaller than 0.375-inches in diameter shall not be used for support of individual conduits.
   b. Hanger rods smaller than 0.5-inches in diameter shall not be used for support of multiple conduits.
2. Conduit hanger wires shall be not less than 12-gauge steel.
3. Conduit hangers shall attach to structure fasteners with steel “Clevis” or “Swing” hangers and shall provide a minimum of 45 degrees of angular movement in any direction at the point of the conduit hanger attachment to the structure fasteners.
4. Conduits individually suspended by conduit hangers shall fasten to the respective hangers with “Clevis” type pipe hangers. The pipe hangers shall be steel, adjustable to fit conduit size and shall completely enclose the conduit circumference.

C. Conduit Support Channels
1. “C” channels shall be factory preformed with a minimum 12 gauge thickness metal. The channel shall be factory “punched” with regularly spaced slotted holes for fastener attachments along the length of the channel.
2. The “C” channel shall not deflect more than 0.1 inch between channel supports at maximum installed design load, including required safety factor.
3. Channels shall comply with ANSI-1008 (latest revision) and ASTM-A569 latest revision).
4. Channels shall provide “turned lips” at longitudinal edges to hold (lock-in) fasteners.
5. Conduit support channels suspended from conduit hangers shall attach to conduit hangers with threaded connections. Provide a minimum of two (2) hangers (trapeze style) connected to each channel.
6. Non-suspended conduit support channels shall connect to structure fasteners with threaded connectors.
D. Fasteners, Seismic Earthquake Rated
   1. Channel fasteners:
      a. Channel fasteners shall “prelocate” and lock into the channel “turned lips”
         and channel “walls”.
      b. A separate metal strap shall “tie” each conduit to each channel with conduit
         channel fasteners.
   2. Structure fasteners:
      a. Structure fasteners for wall and floor mounted conduit attachments shall
         attach to existing masonry and concrete structures with structure fasteners
         using drilled, mechanical, expansion shield anchors.
      b. Structure fasteners for wall and floor mounted conduit attachments shall
         attach to new masonry and concrete structures with structure fasteners
         using steel threaded inserts precast into the structures.
      c. Structure fasteners shall center the support load above or below the beam
         flanges and reduce torsion-rotation forces exerted on the structural beam.
         Attach to steel structural members with “swing-beam clamps”, with set-
         locking screw structure fasteners.
         1) Beam clamps shall include integral safety rod, strap or “J”-hook to
            secure the attachment clamp to the beam flanges on both sides of the
            beam, with integral hanger rod attachment.
         2) Or double-ended beam clamp to secure the attachment clamp to the
            beam flanges on both sides of the beam, with integral hanger rod
            attachment.
      d. Structure fasteners for wall and floor mounted conduit attachments shall
         attach to wood structural members with flush “through-bolted” wood beam/
         wood framing stud structure fasteners.
      e. Structure fasteners for wall mounted conduit attachments shall attach to
         steel framing studs and steel structural elements with spot welded steel
         structure fasteners or drilled and bolted structure fasteners.

E. Brace Connectors
   1. Provide lateral brace connectors to resist horizontal, lateral and vertical
      movement of suspended conduits during seismic earthquakes.
   2. The braces shall connect from each conduit support, attach as close to the
      conduit as possible, and attach to fixed rigid, nonsuspended building “main”
      structural elements with fixed anchoring.
   3. Brace attachment connectors and fasteners shall be rigid preformed steel
      channels or flexible #10 gauge steel hanger wire.
   4. Connect and attach the brace connectors to fixed structural elements in the same
      manner as conduit support hangers. The connection of braces to structural
      elements shall be independent of the conduit support hanger structure fasteners.

2.03 ELECTRICAL POWER WIRE AND CABLE

A. General
   1. All wire and cable shall be single-conductor, annealed copper, insulated 600 volt,
      #12AWG minimum unless specifically noted otherwise on the Drawings.
   2. Conductors #10AWG and smaller shall be solid. Conductors #8AWG and larger
      shall be stranded.
   3. Insulation of conductor connected to circuit protection devices required to be
      "100%" rated, shall be 90 degree centigrade rated insulation.
   4. Insulation of conductors installed outdoors, on grade or underground, insulation
      shall be rated for wet locations.
5. Insulation of conductors installed outdoors, installed exposed to the sun, installed in exposed conduits, insulation shall be rated for high-temperature 90 degrees centigrade.
6. Insulation of branch circuit conducts installed in light fixtures, insulation shall be rated for 90 degrees centigrade.
7. Conductor exposed to oil, insulation and jacket shall be oil resistant, complying with “Oil Resistant-1” and “Oil Resistant-2” UL 83.

B. Conductor Insulation
1. 600 Volt AC and/or DC insulated conductors installed entirely inside conduits, or enclosed inside wireways, or enclosed inside raceways, insulation shall be rated as follows.
2. Indoor above Grade locations either concealed or exposed.
   a. Dual rated THHN and THWN
   b. Individually rated THHN-2
   c. Individually rated THWN-2
   d. XHHW-2
3. Outdoor above Grade either concealed or exposed.
   a. XHHW-2
   b. THWN-2
   c. THW-2
4. Outdoor below Grade or outdoor on Grade.
   a. XHHW-2
   b. THWN-2
   c. THW-2
5. All other enclosed raceway locations not described above.
   a. XHHW-2
   b. THWN-2
   c. THW-2

C. Insulation Color Coding and Identification
1. The following color code for branch circuits:
   a. Neutral . . . White (Tape feeder neutrals with white tape near connections)
   b. Normal Power:
      
      | 120/208 Volt | 480/277 Volt |
      |--------------|-------------|
      | Ground Green | Ground Green|
      | Phase A Black | Phase A Brown |
      | Phase B Red | Phase B Orange |
      | Phase C Blue | Phase C Yellow |
   c. Isolated ground insulation shall be green with a longitudinal yellow stripe.
2. When individual neutral conductors are shown for each branch circuit, the color code for the neutral conductors shall be as follows:
   a. 120/208 volt; Phase A - White with Black stripe; Phase B - White with Red stripe; Phase C - White with Blue stripe.
3. Feeders identified as to phase or leg in each, switchboard, switchgear, panelboard and junction location with printed identifying tape.

D. Panel Feeders, Copper:
1. Wire size shown on the Drawings is for copper conductors, unless specifically indicated otherwise.
PART 3 - EXECUTION

3.01 TRENCHING, FOOTINGS, SLEEVES

A. Provide trenching, concrete encasement of conduits, backfilling, and compaction for the underground electrical work, in accordance with applicable Sections of this Specification.

B. Provide footings for all post and/or pole-mounted lighting fixtures: concrete shall conform to the applicable Sections of this Specification.

C. Sleeves
   1. Provide sleeves for raceways, conduit and wire/cables passing through the following construction elements:
      a. Concrete and masonry foundations, floors, walls and slabs.
      b. Gypsum, Lath, and plaster walls and ceilings.
      c. Building structures (i.e., foundations, walls, floors, ceilings, beams, and roofs) with a fire rating exceeding 20-minutes.
   2. Sleeves shall extend 1.5-inch above and below floors, except under floor standing electrical equipment. Sleeves shall be flush with wall ceiling foundations and partitions exposed to public view and extend approximately 0.5-inch past penetration in fire rated construction. Sleeves shall be installed at exact penetration locations and angles to accommodate wire/cable, raceway and conduit routings.
   3. Joists, girders, beams, columns or reinforcing steel shall not be cut or weakened. Where construction necessitates the routing of conduit or raceways through structural members, framing or footings, written permission to make such installation shall first be obtained from the DISTRICT’S Representative. Such permission will not be granted, however, if any other method of installation is possible.
   4. The layout and design of raceways and conduits located in or routed through masonry or reinforced beams or the DISTRICT’S Representative shall review walls before any work is performed. All sleeving shall be accomplished according to the instructions of the DISTRICT’S Representative and shall be accepted before any concrete is poured.
   5. Sleeves, raceways and conduit shall be located to clear steel reinforcing bars in beams. Reinforcing bars in walls shall be offset to clear piping and sleeves.
   6. Provide a continuous clearance between the inside of a sleeve and exterior of wire/cables, conduits and raceways passing through the sleeve not less than the following:
      a. 0.5-inch clearance except as required otherwise.
      b. 1.0-inch clearance through outside walls below grade.
      c. 3.0-inch clearance through seismic joints.
   7. Sleeves set in fire rated construction shall be caulked between sleeve and building structure, additionally sleeves shall be caulked between the sleeve and the wire/cables, conduits/raceways passing through the sleeve. The caulking shall be a fireproof sealant, equal to the fire rating and temperature being penetrated. Clearance between components inside of sleeve and exterior of components passing through sleeve and between components inside the sleeve shall comply with Fireproof Sealant Manufacturer’s recommendations.
8. Sleeve material:
   a. In floor construction: Schedule 40 black steel pipe, with upper surface to be sealed watertight.
   b. In concrete or masonry walls roofs or ceilings: Schedule 40 black steel pipe. When installed in roofs or outside walls, seal outer surface watertight.
   c. In fire rated construction; 24 gauge galvanized iron or steel.
   d. Sleeves through waterproof membranes: Cast iron or Schedule 40 steel with flashing clamp device and corrosion resistant clamping bolts. Caulk space between pipe and sleeve and surfaces between sleeve and conduits sealed watertight.

3.02 GROUNDING

A. Grounding shall be executed in accordance with all applicable Codes and Regulations, both of the State and Local Authorities Having Jurisdiction.

B. Where nonmetallic conduit is used in the distribution system, the CONTRACTOR shall install the proper sized copper ground wire in the conduit with the feeder for use as an equipment ground. The electrical metallic raceway system shall be grounded to this ground wire.

C. The maximum ground/bond resistance to the grounding electrode shall not exceed 1 ohms from any location in the electrical system. The maximum ground resistance of the grounding electrode to earth shall not exceed 5 ohms.

D. Ground/Bond Conductors
   1. Provide an additional, dedicated, green insulation equipment ground/bond wire inside each conduit type and raceway as follows. Size the ground/bond conductors to comply with CEC/NEC Requirements. The metal conduit or raceway shall not be permitted to serve (function) as the only (exclusive) electrical ground return path:
      a. All types of nonmetallic conduit and all types of non-metallic raceways including but not limited to: RNMC - Rigid Nonmetallic Conduit.
      b. FMC - Flexible Metal Conduit.
      c. LTFMC - Liquid Tight Flexible Metal Conduit.
      d. Metal and non-metal raceways.
      e. RMC - Rigid Metal Conduit.
      f. EMT - Electrical Metal Tubing.
   2. The equipment ground/bond wire shall be continuous from the electrical circuit source point of origin to the electrical circuit end termination utilization point as follows:
      a. Every conduit and raceway path containing any length of the above identified conduits or raceway.
      b. Every conduit path and raceway path connected to any length of the above-identified conduits and raceways.
3. The equipment ground/bond wire shall be sized as follows, but in no case smaller than indicated on the Drawings. Install equipment ground/bond wire in each conduit/raceway, with the respective phase conductors:
   a. Feeder, Subfeeders and Branch Circuit Protection

<table>
<thead>
<tr>
<th>Min. Equipment Ground</th>
<th>Wire Size</th>
</tr>
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<tbody>
<tr>
<td>15 Amp</td>
<td>#12</td>
</tr>
<tr>
<td>20 Amp</td>
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</tr>
<tr>
<td>30 to 60Amp</td>
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<td>#8</td>
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<tr>
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<td>#2</td>
</tr>
<tr>
<td>401 to 600Amp</td>
<td>#1</td>
</tr>
<tr>
<td>801 to 1000Amp</td>
<td>2/0</td>
</tr>
<tr>
<td>1001 to 1200Amp</td>
<td>3/0</td>
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<tr>
<td>2001 to 2500Amp</td>
<td>350 MCM</td>
</tr>
<tr>
<td>2501 to 4000Amp</td>
<td>500 MCM</td>
</tr>
</tbody>
</table>

4. Isolated grounds - Raceways containing branch circuit or feeder phase conductors connected to panelboards equipment, or receptacles with isolated grounds or isolated ground bus shall contain a dedicated insulated ground conductor connected to the isolated ground system only. The isolated ground conductor shall be continuous the length of the raceways and connected only to the isolated ground terminals in addition to and independent of the equipment bonding/ground conductor. The isolated ground conductor shall be sized as indicated above, for equipment ground/bond wire.

5. Splices in ground/bond wires shall be permitted only at the following locations:
   a. Ground buses with listed and approved ground lugs.
   b. Where exothermic welded ground/bond wire splices are provided.

6. Provide ground/bond wire jumpers for conduit fittings with ground lugs, expansion and deflection conduit fittings at conduit fittings connecting between metallic and non-metallic raceways and to bond metal enclosures to conduit fittings with ground lugs.

E. Where conductors are run in parallel in multiple raceways, the grounding conductor shall be run in parallel. Each parallel equipment-grounding conductor shall be sized on the basis of the ampere rating of the overcurrent device protecting the circuit conductors in the raceway. When conductors are adjusted in size to compensate for voltage drop, grounding conductors, where required, shall be adjusted proportionately in size.

F. Ground conductors for branch circuit wiring shall be attached at each outlet to the back of the box using drilled and tapped holes and washer head screws, 6-32 or larger.

G. Each panelboard, switchboard, pull box or any other enclosure in which several ground wires are terminated shall be equipped with a ground bus secured to the interior of the enclosure. The bus shall have a separate lug for each ground conductor. No more than one conductor shall be installed per lug.

H. UFER Ground
   1. In addition to all cold water and structural steel grounds provided to meet this specification, there shall be a main ground system of the UFER ground style.
2. The UFER ground electrodes shall be a minimum of two (2) 20-feet lengths of #4/0 AWG bare stranded copper cable embedded horizontally in the cast in place concrete footing, extending in opposite directions in the footings. All portions of the ground electrodes shall be placed inside the concrete, between 2-inches and 4-inches from the earth surrounding the concrete.

3. The lengths of cable shall extend in opposite directions in the footings, with the center end of each cable terminated onto the main electrical service ground bus for the main electrical service equipment.

4. All wire cable connection terminations onto the ground bus shall be exothermic weld type.

5. The “UFER” grounding electrode, embedded in concrete, shall be exothermically welded to each steel reinforcing bar (rebar) and each steel anchor bolt located within 18-inches of the grounding electrode inside the concrete. Note: Reinforcing steel (rebar), in concrete foundations, attached with metal “tie-wraps” and in direct physical contact to other adjacent rebar that is in turn exothermic welded to the UFER grounding electrode, may be classified as attached to the UFER grounding electrode, and does not require additional exothermic weld connections to the UFER grounding electrode.

I. Provide a separate ground/bond insulated grounding electrode conductor, copper wire from the main electrical service ground bus to each of the following locations. The ground/bond conductor shall be sized to comply with applicable Codes and as indicated on the Drawings, but in no case smaller than the following:

1. Main service entrance equipment ground bus:
   a. Services smaller than 1200 ampere 1.5-inch conduit with 1#4/0.
   b. Services 1200 ampere and larger 2.5-inches conduit with 1#500MCM.
   c. Where a separate ground bus is not required, connect ground to electrical equipment metal housing

2. Each telephone backboard and signal system backboard location, 1.25-inch conduit with 1#1.

3. Metal cold water pipe located inside the building, 1.5-inch conduit with 1#4/0.

4. Outdoor underground metal cold water pipe, make connection 5-feet from the building, 1.5-inch conduit with 1#4/0.

5. Each service entrance ground bus and each separately derived ground rod system:
   a. Services smaller than 1200 ampere 1.5-inch conduit with 1#4/0.
   b. Services 1200 ampere and larger 2.5-inches conduit with 1#500MCM.

6. Separate 1.25 inch conduit with 1#2 (AWG) bonding conductor to each interior metal pipe system located in the same building, including but not limited to, the following:
   a. Fire sprinkler system each stand pipe location (water based and non-water based).
   b. HVAC chilled water supply and return, at each pump location.
   c. Roof drains.
   d. Waste liquid disposal systems.
   e. Metal gas pipe service entrance and service meters.
   f. Hydraulic elevator hydraulic pipes.

3.03 CONDUIT

A. General

1. The sizes of the conduits for the various circuits shall be as indicated on the Drawings, but not less than the conduit size required by Code for the size and quantity of conductors to be installed in the conduit.
2. Conduits shall be installed concealed from view. Install conduits concealed in walls, concealed below floors and concealed above ceilings, except as specifically noted otherwise.
   a. Conduits shall not be installed in concrete floors.
3. The following systems shall be considered as circuits 100 volts and less, all other circuits shall be considered to be over 100-volts (power circuits) unless specifically noted otherwise: Fire alarm, energy management control, telephone, public address, data, computer, television, intercom, intrusion alarm and nurse call.
4. Conduits shall be provided complete with conduit bends, conduit fittings, outlet boxes, pullboxes, junction boxes, conduit anchors/supports, grounding/bonding for a complete and operating conductor/wire raceway system.
5. Metal and nonmetal conduits shall be provided mechanically continuous between termination connection points. Metal conduit shall be provided electrically continuous between termination connection points.
6. Individual conduit paths and home runs shown on the Drawings shall be maintained as separate individual conduits for each homerun and path.
7. Conduits, conduit fittings and installation work occurring in classified hazardous materials locations shall comply with applicable Code Class 1 Division 1 requirements, unless specifically noted otherwise.
8. Transitions between conduits constructed of different materials and occurring in above grade locations shall be allowed only at outlet boxes, junction boxes, pull boxes and equipment enclosures unless specifically indicated otherwise. Provide outlet boxes and junction boxes.
9. Metal conduit terminating to nonmetal enclosures; terminating into metal enclosures with "concentric ring" knockouts; terminating into metal enclosures with knockout reducing washers, including but not limited to equipment housings, outlet boxes, junction boxes, pull boxes, cable trenches, manholes, shall be provided with a ground/bonding lug integrated with the conduit termination conductor fitting construction, by the Fitting Manufacturer. The lug shall provide for connection of a grounding/bonding conductor (insulated or uninsulated). The grounding lug shall be located on the fitting, inside the termination enclosure.
10. The type of conduit, type of conduit fittings, and type of conduit supports and method of conduit installation shall be suitable for the conditions of use and conditions of location of installation based on the Manufacturer's recommendations; based on the applicable Codes and based on the requirements of the Contract Documents.

B. RMC Installation Locations

RGS, IMC conduits and RGS, IMC fittings shall be installed in the following locations:
1. Embedded in floors, walls, ceilings, roofs, foundations, and footings constructed with concrete.
2. Embedded in walls and foundations constructed with brick and masonry.
3. Interior of buildings, within 9-feet of finish floor lines for exposed conduit locations.
4. Exterior of building for exposed conduit locations.
5. Damp or wet locations, exposed or concealed locations.
7. In hazardous materials areas and locations; below hazardous materials areas and locations; above hazardous materials areas and locations.
8. Exposed on utility service poles, for pole risers less than 9-feet above finish grade.
9. RMC conduit and RMC fittings may be installed in any location where EMT and FMC conduit is permitted to be installed.

C. PVC Coated RMC Installation Locations

PVC coated RMC conduit and PVC coated RMC fittings shall be installed in the following locations:
1. Underground conduit locations for elbows and bends with a radius of less than 36-times the conduit diameter.
2. Underground vertical risers extending above grade.
3. Entire length of underground conduits for the following circuits:
   a. Audio microphones
   b. Lighting dimming controls
4. Installed in contact with earth or corrosive materials.
5. Exposed in “cold” rooms and “refrigerated” rooms, rooms with a maintained temperature below 65 degrees Fahrenheit.

D. EMT Installation Locations

EMT conduit and EMT fittings may be installed in the following locations, for circuit conductors operating below 600 volts to ground; locations containing only “non-hazardous materials”; only dry locations:
1. Concealed in hollow non masonry/non-concrete, metal stud frame and wood stud frame walls and floors.
2. Concealed above ceilings.
3. Exposed inside interior enclosed crawl spaces.
4. Exposed interior locations placed 9-feet or higher above finished floors (except as described in paragraph below at lower heights).
5. Exposed on walls and ceilings (any height) in the following dedicated function areas, interior enclosed room locations:
   a. Indoor enclosed electrical equipment rooms and closets.
   b. Indoor enclosed data and telecommunication terminal rooms and closets.
   c. Indoor enclosed HVAC equipment rooms and closets.
6. Any location where FMC is described to be installed, except as the final connection to rotating or vibrating equipment.

E. FMC Installation Locations

FMC conduit and FMC fittings may be installed in the following locations for circuit conductors operating below 600 volts to ground; locations containing only “non-hazardous materials”; only dry, interior locations:
1. Concealed in hollow non-masonry metal stud frame and wood stud frame fully enclosed walls.
2. Concealed above fully enclosed ceiling spaces.
3. FMC conduit shall be installed in continuous lengths between termination points. FMC shall not be “spliced” or coupled directly to FMC or any other conduit type under any circumstance.
4. The maximum continuous length of FMC that shall be installed between termination end points is 15-feet. Circuits requiring continuous conduit lengths exceeding 15 feet between termination end points shall be installed using either RMC or EMT conduits. FMC lengths shorter than 16-inches are prohibited.
5. The minimum size FMC conduit shall be as shown on the Drawings but not be less than the following:
   a. FMC lengths of 6-feet or less, minimum FMC conduit size shall be 0.50-inch.
b. FMC lengths exceeding 6-feet, minimum FMC conduit size shall be 1.0-inch.

F. LTFMC Installation Locations

LTFMC conduit and LTFMC fittings shall be installed in the following locations for circuit conductors operating below 600 volts to ground; locations containing only “non-hazardous materials”:
1. Final electrical connection to vibrating or rotating equipment; control and monitoring devices mounted on vibrating and rotating equipment including the following. Minimum conduit length shall not be less than 24-inches:
   a. Motor, engines, boilers, solenoids, and valves.
   b. Fixed mounted “shop” (manufacturing) production equipment.
   c. Fixed mounted food preparation equipment and “kitchen” equipment.
2. All locations where exposed flexible conduit connections are required, both indoor and outdoor.
3. Final connection to indoors electrical transformers. Minimum conduit length shall not be less than 24-inches; maximum conduit length shall not exceed 72-inches.
4. Do not install LTFMC located in environmental air plenums.

G. RNMC Installation Locations

RNMC conduit and RNMC fittings shall be installed in the following locations containing only “non-hazardous material”:
1. Underground, concealed below earth grade, unless specifically noted or specified otherwise.
2. Exposed on utility service poles, for pole risers at 9-feet or higher above finish grade, schedule 80 PVC only.
3. RNMC type “EB” conduit(s) shall be concrete encased along the entire length of the conduits for all installation locations.
4. Non-metal type raceways and RNMC type conduit shall not be installed inside buildings.

H. Combi-Duct Installation Locations

Combi-duct conduits shall be installed where shown on the Drawings. Combi-duct shall be installed underground (below grade) as follows:
1. Do not install exposed or inside buildings above grade.
2. Provide a 0.25-inch pull rope in each inner duct.
3. Radius and elbows shall be rigid non-metallic, PVC, Manufacturer factory fabricated, in lieu of PVC coated RMC conduit.
4. Inner ducts shall be supported by internal spacers inside the enclosing outer duct.
5. Provide end bell and three (3) hole “snug-plugs” at each entrance end of Combi-duct into pullboxes, manholes, equipment cabinets stubups and Combi-duct terminations. Compression type “snug-plugs” shall provide watertight and airtight seal between inner and outer ducts and around future cables installed in inner duct.

I. Conduit Installation

1. Conduit Supports
   a. Securely and rigidly support all raceways/conduits from the building structure. Raceways/Conduits shall be supported independent of all piping, air ducts, equipment ceiling hanger wires, and suspended ceiling grid systems. Secure conduit to structural element by means of UL listed and approved hangers, fasteners, “C” channels and pipe clamps.
b. Provide conduit supports spaced along the length of the conduit as follows:
   1) RMC and EMT conduit, maximum not to exceed 96-inches on center; within 24-inches of each conduit bend and conduit termination location.
   2) FMC and LTFMC conduit, maximum not to exceed 24-inches on center; within 6-inches of each conduit bend and conduit termination location.

c. Suspended conduit methods:
   1) Individual, suspended raceways/conduits separated by more than 12-inches from any other conduit and suspended from ceilings and roofs shall be supported as follows:
      a) Conduits smaller than 1.5-inches by means of hanger rods or hanger wires.
      b) Conduits 1.5-inches and larger by means of hanger rods.
      c) The conduit shall attach to the hangers with pipe clamps.
   2) Suspended raceways/conduits positioned within 24 inches of any other conduit shall be grouped and supported by hanger rods using trapeze type conduit support channels ("C" channels). Conduits shall individually attach to common channels side-by-side, with pipe clamps.

d. Non-suspended conduit methods:
   1) Individual raceway/conduits placed against wall/ceiling/floors, placed inside hollow wall/ceiling construction or structure framing (i.e., "dry-wall" or plaster hollow wall construction), shall be secured by means of individual pipe clamps and fasteners attached to the framing studs or other structural members and the conduit/raceway.
   2) Provide common "C" channel supports for all multiple raceway/conduits placed against vertical or horizontal surfaces and positioned within 24-inches of other raceways/conduits. Attach channels to the framing studs or other structural members. Attach the conduits/raceway individually to common channels, side-by-side, with pipe clamps.
   3) The use of toggle bolts is prohibited.

e. Conduit rising from floor for motor connection shall be independently supported if extending over 18-inches above floor. Support shall not be to a motor or ductwork, which may transmit vibrations.

f. Provide conduit anchoring, conduit support and conduit bracing systems conforming to Earthquake Seismic Zone 4 Requirements. The conduit support/anchoring system capacity shall include the weight of the conduits, conduit fittings, conduit supports and conductors/wires/cables installed in the conduits plus a 300% safety factor. Submit Shop Drawing details showing each typical conduit anchor, conduit support and conduit brace location. Submit Structural Calculations performed by and signed by a Professional Structural Engineer (P.E.) with a P.E. License, Registered in the State of California, U.S.A.

2. Conduit separation:
   a. Conduit installed underground or below building slab without full concrete encasement: Shall be separated from adjacent conduits of identical systems (i.e. signal to signal, data to data, power to power, control to control etc.) by a minimum of 3-inches. Conduits of non-identical systems (i.e. signal to power; data to power; power to control; signal to control, etc.) shall be separated by a minimum of 12-inches.
b. Conduit installed underground with full concrete encasement; shall be separated from adjacent conduits of similar systems (100 volt and less) by a minimum of 2-inches; conduits for non-power systems (100 volts and less to ground) shall be separated by a minimum of 6-inches from power circuits (over 100 volts to ground); conduits for power circuits shall be separated from adjacent conduits of similar power systems (over 100 volts to ground) by a minimum of 3-inches.

c. Separation of conduits entering termination points or crossing other conduits may be reduced as required within 60-inches of the termination or crossing points.

d. Conduits containing Utility Company service circuits (i.e. electrical power, telephone, or cable television) shall be separated a minimum of 12-inches from all other utilities and conduits, with or without concrete encasement; metallic or non-metallic conduit, above grade or underground conduit locations.

e. Conduits shall be separated from hot water piping, exhaust flues/chimneys, steam piping, boilers, furnaces, ovens by a minimum of 12-inches.

3. Conduit stubs:
   a. Branch circuit and telephone conduits turned up from floor at the following locations shall terminate each conduit in a flush conduit coupling at the floor and then extend into partition or to equipment. Refer to DISTRICT’S Representative’s Drawings for location of walls and partitions.
      1) Interior demountable partitions.
      2) Below, into or adjacent to equipment not installed directly adjoining to a wall.
      3) Up from below the floor into hollow stud frame walls.
   b. From each panel, and signal cabinet which is wall mounted, stub up from top of the panel/cabinet a minimum of three (3) 1-inch conduits to the nearest accessible ceiling spaces or other accessible location. Where the floor below the panel is accessible or is a ceiling space, stub an additional three (3) 1-inch conduits from the bottom of the panel into the accessible space below the panel. Cap conduits for future use.
   c. Conduits stubbed underground outside of building line for future use shall be terminated a minimum of 5-feet clear (whichever distance is greater) of building or adjacent concrete walks and AC paving. The stubout conduit shall be capped. Provide concrete monuments, 6-inches by 6-inches by 15-inches deep, buried flush with grade over the capped ends. The face of monument shall be furnished with 3-inch square brass plates securely mounted and engraved with the number and size of conduits and type of service (i.e., "POWER", "TEL.", etc.).
   d. Conduits stubbed into ceiling or floor spaces from outlets for telephone, video, computer/data or television shall be provided with an insulated throat bushing, on the end of each conduit stubout.
   e. Conduit stubouts from outlet boxes and equipment located in hollow stud walls, into ceiling and floor spaces, shall be EMT or RMC conduit. The stubouts shall terminate into the ceiling and floor spaces with a conduit termination connector fitting.
   f. Empty conduit stubs into building spaces and equipment shall be individually identified with an “ID-tag” located at each end of the conduit. The ID-tag shall state the origination point and termination point of the respective conduit (i.e., “from PNL-A/to Room #121”; “from outlet #24/to outlet #17 in Room #120”; etc.).
   g. Provide a conduit termination fitting with insulated throat bushing and mechanical ground lugs at each conduit “stub-up” location.
4. Conduit concrete encasement:
   a. Conduits which are run underground exterior to building slab shall be continuously concrete encased except, 15 and 20-ampere power branch circuit conduits underground do not require concrete encasement.
   b. PVC rigid-non-metalllic-type EB conduit, of any size and any location shall be continuously concrete encased the full length of the conduit installation, including under building slab.
   c. Concrete for encasement of underground conduits shall be 2000-PSI 28-days cure strength with a mix of cement, sand, water and maximum of ¾-inch gravel. Concrete encasement of conduits shall be continuous without voids. The encasement shall extend 3-inches past the edges of all conduits on all sides of the circuit. Provide ten pounds of red oxide cement coloring uniformly mixed with each cubic yard of concrete for conduit encasement.
   d. Conduits located below or adjacent to structural foundations shall be separated from the foundation by a minimum of 12-inches. Conduits located below structural foundations shall be fully and continuously concrete backfilled and encased between the bottom of the foundation to the bottom of the conduits. The concrete shall be 4000 PSI 28 day cure strength instead of 2000-PSI concrete.
   e. Conduits of any size and type (including 15 ampere and 20 ampere power branch circuits) located under roads, paved areas and “transit-system” right of way shall be concrete encased.

5. Underground conduits:
   a. Three or more underground conduits larger than 1-inch in size and occupying the same trench shall be separated and supported on factory fabricated, non-metallic, duct/conduit support spacers. The spacers shall be modular, keyed interlocking type, "built-up" to accommodate quantity, size orientation and spacing of installed conduits. The spacers shall maintain a constant distance between adjacent conduit supports and hold conduits in place during trench backfill operations. Minimum support spacer installation interval along with length of the conduits shall be as follows:
      1) Concrete encased conduits, not less than 8-feet on center.
      2) Non-concrete encased conduits, not less than 5-feet on center.
   b. Provide trenching, excavation, shoring and Backfilling required for the proper installation of underground conduits. Tops of backfill shall match finish grade.
   c. Bottoms of trenches shall be cut parallel to “finish grade” elevation. Make trenches 12-inches wider than the greatest diameter of the conduit.
   d. Back-filling Trenches for Conduits without Concrete Encasement Requirements
      1) Conduits which are not required by the Contract Documents to be concrete encased and are located exterior to building slab, shall be set on a 3-inch bed of damp clean sand. Conduit trenches shall be backfilled to within 12-inches of finished grade with damp sand after installation of conduit is completed. Remainder of backfill shall be native soil.
      2) Conduits located under a building which are not required by the Contract Documents to be concrete encased, shall be completely backfilled and compacted with clean damp sand to the same level as the building foundation pad.
3) Provide a continuous yellow 12-inches wide flat plastic tracer tape, located 12-inches above the conduits in the trench. The tracer tape shall be imprinted with “Warning-Electric Circuits” a minimum of 24-inches on center.

e. Backfilling trenches for conduits under paved areas:
   1) In addition to the requirements of conduit concrete encasement, conduits under walkways, roads, parking lots, driveways, and buildings shall be cast in place concrete “slurry mix” backfill. The slurry mix shall cover each side and top of conduits and conduit concrete encasement. The slurry mix shall be continuous to the underside of the finish subgrade surface.

f. Backfilling trenches for conduits with concrete encasement requirements by the Contract Documents:
   1) Trenches with all conduits concrete encased shall be backfilled with clean damp sand when located under building pads.
   2) Trenches with all conduits concrete encased and not located under a building pad and not located under paved areas shall be backfilled with clean damp sand or native soil.

g. Backfill material:
   1) Sand and native soil backfill of trenches shall be machine vibrated in 6-inch lifts to provide not less than 90% compaction of backfill.
   2) Soil backfill shall have no stones, organic matter of aggregate greater than 3-inches.
   3) Concrete and slurry mix (2000-PSI) shall be machine vibrated during installation to remove “air-voids”.
   4) The slurry mix shall consist of concrete, clean rock, clean sand and clean water mixture. Maximum shrinking of slurry mix shall not exceed 5% wet to dry.

h. Do not backfill until District’s Representative has approved installation and As-Built Drawings are up to date. Promptly install conduits after excavation has been done, so as to keep the excavations open as short a time as possible. Excess soil from trenching shall be removed from the site.

i. Install underground conduit, except under buildings, not less than 24-inches below finished grade in non-traffic areas and 30-inches below finished grade in traffic areas, including roads and parking areas. Not less than 48-inches below finished grade under public/private transit system right of way and railroad right of way. Dimensions shall be measured to the top of the conduit.

j. Conduit crossing existing underground utilities shall cross below the bottom depth of the existing utilities. If the top portion of the existing utility depth below finish grade exceeds 72-inches and the specified separation and depths are maintained when crossing over the top of the existing underground utility, the conduit may cross above the existing underground utility.

k. Provide long radius horizontal bends (minimum radius of 36-times the conduit diameter) in underground conduits where the conduit is in excess of 100-feet long.

l. Conduits installed below grade and on grade below buildings, shall not be smaller than 0.75-inches. Conduits for circuits exceeding 600-volts shall not be smaller than 5.0-inches.
m. Underground conduits entering a building shall be sloped. The conduit direction of slope shall be away from the building, and shall prevent water in the conduit from “gravity draining” towards the building. The conduit slope “high point” shall originate from the building, out to the first exterior pullbox, manhole etc. exterior conduit termination “low point”. The minimum slope angle shall be a constant 8-inches (or greater) of fall for each 100-feet of conduit length.

n. Dewatering:
   1) Provide pumping to remove, maintain and dispose of all water entering the excavation during the time the excavation is being prepared, for the conduit laying, during the laying of the conduit, and until the backfill at the conduit zone has been completed. These provisions shall apply on a continuous basis. Water shall be disposed of in a manner to prevent damage to adjacent property. Trench water shall not be drained through the construction. Groundwater shall not be allowed to rise around the pipe until joining compound has firmly set.
   2) The DISTRICT’S Representative shall be notified 48 hours prior to commencement of dewatering.

6. Raceway/Conduits, which are installed at this time and left empty for future use, shall have 0.25-inch diameter polyvinyl rope left in place for future use. The pull rope shall be 500-pound minimum tensile strength. Provide a minimum of 5-feet of slack at each end of pull ropes.

7. Unless otherwise restricted by Structural Drawings and Specifications, the maximum size conduit permitted in concrete slab on-grade, walls, ceilings and roofs constructed of masonry or concrete shall not be greater than 20% of the concrete/masonry thickness. Conduits installed in these locations shall not cross.
   a. Conduits shall not be installed in cast-in-place concrete floors.

8. Provide openings in building structures for conduit penetrations:
   a. New construction shall be provided with conduit sleeves, to provide conduit penetrations.
   b. Existing construction shall be drilled (core drill masonry and concrete) and provide conduit sleeves installed after drilling, to provide conduit penetrations.
   c. Where the structure penetrations for underground conduits penetrating through foundations will not comply with the (restriction/penetration) shown in the Contract Documents, install the conduits below and clear of the foundation lowest point.

9. Conduit bends risers and offsets:
   a. The minimum bend radius of “factory or field” fabricated conduit bends shall not be less than the following. The bend radius shall be measured at the surface, inside radius of the conduit wall:
      1) FMC and LTFMC conduit - conduit minimum bend radius 12-times the conduit diameter.
      2) RMC and EMT conduit minimum bend radius - conduit for power circuits over 100 volts and less than 600 volts, 8-times conduit diameter. Conduit for power circuits over 600 volt, 12-times conduit diameter. Conduit for low voltage, signal and fiber optic circuits, 10-times conduit diameter.
      3) RNMC conduit - conduit minimum bend radius 36-times the conduit diameter. Under building reduce minimum bend radius to 10-times the conduit diameter. Conduit bends and offsets in RNMC with less than 36-times conduit diameter bend/offset radius shall be RNMC PVC schedule 80 or PVC coated RGS.
4) Conduits for Utility Company conductors. Conduit minimum bend radius shall comply with the respective Utility Company requirements.

b. Bends and offsets in conduits shall be kept to an absolute minimum. The total summation of all bends and offsets permitted in a conduit segment, occurring between two (2) conduit termination/connection end points, shall not exceed the following, including conduit fittings:
   1) RMC and EMT conduit - 360 angular degrees
   2) FMC and LTFMC conduit - 180 angular degrees
   3) RNMC conduit - 270 angular degrees

c. Each field fabricated conduit offset, bend and elbow which are not the standard product of the Raceway/Conduit Manufacturer shall be mandrel tested. The test shall be conducted after the conduit installation is complete and prior to pulling-in any wire, in the same manner as for underground conduits.

d. Factory manufactured angle connector conduit fittings shall be installed in exposed conduit locations only. Installation in locations normally concealed from view shall not be permitted. Not more than one (1) factory manufactured angle connector shall be permitted in any length of conduit between conduit termination end points.

e. RNMC conduit risers from below grade shall be PVC coated RGS. Conduit risers, bends or offsets entering into a building shall be PVC coated RGS.

f. If three (3) or more conduit-bends of the same conduit size and same conduit material type, installed, as part of the Contract Work, fail to comply with the required minimum conduit bend radius or conduit angular degree limits. The following corrective actions shall occur:
   1) The CONTRACTOR shall remove all the non-complying conduit bends and the respective wire in the conduit from the Project Site. Provide new conduit and wire, complying with the Contract Documents.
   2) Where the conduit bends similar to the non-complying conduit bends are installed concealed in walls, floors, above ceilings or below grade, the Contractor shall expose the conduit bends to allow visual observation.
   3) The CONTRACTOR shall remove the non-complying conduit bends and dispose of the Project Site. The CONTRACTOR shall provide new conduit bends and conductors complying with the Contract Documents.
   4) All the costs to correct the deficient material and work along with costs to repair the direct, indirect, incidental damages and Contract delays shall be the sole responsibility of the CONTRACTOR and shall be included in the bid price.

10. Expansion joint, deflection joint and seismic joint fittings.

a. Provide a conduit expansion fitting for each conduit length and conduit type as follows (Note - The installation of specified combination expansion/deflection fittings at seismic joints shall satisfy this spacing requirement also):

<table>
<thead>
<tr>
<th>Conduit Type</th>
<th>Conduit</th>
<th>Fitting Length Spacing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) RMC and EMT</td>
<td>Exposed exterior locations</td>
<td>200-feet</td>
</tr>
<tr>
<td>2) RMC and EMT</td>
<td>Interior weather protected locations</td>
<td>400 feet</td>
</tr>
</tbody>
</table>

b. Provide a conduit combination expansion/deflection fitting for each conduit, crossing the following elements:
   1) At each building or non-building structure seismic joint.
   2) At each building on non-building structure expansion joint.
   3) At each conduit penetration of a “sound-rated” wall, floor or ceiling.
11. Provide two (2) locknuts and an insulated throat bushing at each metal conduit terminating at enclosures, including but not limited to outlet boxes, junction boxes, terminal cabinets, switchgear, transformers, switchboards, distribution panels and panelboards.

12. Provide metallic or plastic closure caps on all conduit ends during construction, until installation of conductors in the respective conduit.

13. Conduit run exposed, shall be run at right angles or parallel to the walls or structures. All changes in directions, either horizontally or vertically, shall be made with conduit outlet bodies as manufactured by Crouse Hinds, OZ or equal. Conduits run on exposed beams or trelliswork shall be painted to match surrounding surfaces.

14. Conduit exposed on roof:
   a. Conduits installed exposed on roofs shall be installed on conduit sleepers. Place the conduit sleepers a maximum 5-foot on center along the entire length of the conduit; under conduit expansion/deflection fittings; under each junction box and within 24-inches of each conduit bend.
   b. Provide a conduit support “C” channel continuous along the top length of the sleeper and rigidly bolted to the sleeper. Conduits shall be loosely fastened to each sleeper “C” channel with pipe clamps to allow for relative movement between the sleeper and conduit.
   c. Conduits shall not block or interfere with roof hatches, doors, ventilation openings, dampers, equipment access panels/doors, roof water drainage.
   d. Conduit sleepers shall be fabricated from “clear” solid redwood 4-inches by 4-inches (nominal) size. Sleeper length shall extend a minimum of 9-inches past the conduits attached to the sleeper, but in no case shall the length of the sleeper be less than 24-inches.
   e. Provide a pad under each sleeper; sleepers shall not be installed in direct contact with the roofing. Sleeper pads shall extend a minimum of 6 inches past each side of the sleeper. The sleeper pad shall be semi-rigid mineral surfaced composition board, not less than 0.375-inch thickness, bituminous impregnated, manufactured for application on the specific roofing material. Remove roofing “ballast” (gravel) under pad, prior to installation of sleeper pad. Do not puncture roof membrane.
   g. Position the “length” of the conduit sleepers’ perpendicular to the roof slope, to prevent obstruction of roof drainage water flow. Where the conduit routing prevents placing the conduit sleeper parallel to the roof slope, provide two separate sleeper pads for the conduit sleeper, with a continuous 3-inches wide water drainage gap between the sleepers. Align the water drainage gap to allow unimpeded water travel along the roof slope drainage flow line between the pads.
   h. Sleepers and sleeper pads shall be set in nonhardening mastic, a minimum of 0.25-inch thickness. Mastic shall be inorganic, nonhardening, and complying with ASTM-D1227. Mastic shall be applied with continuous uniform coverage, minimum 0.25-inch thickness, on all the surfaces of each conduit sleeper and on the sleeper pad contact surface with the roof.

15. Rigid steel conduit or electrical metallic tubing shall not be strapped or fastened to equipment subject to vibration or mounted on shock absorbing bases.

16. RMC conduit threads:
b. The length of bare metal exposed during thread fabrication shall be completely covered by conduit couplings and fittings. Additionally, the thread length shall insure that conduit joints will reach “torque” tightness and become secure before conduit ends “but” together and before conduit ends “but” into the “shoulders” of other conduit fittings.

c. Running threads or right/left handed threads shall not be used to connect RMC.

17. RNMC conduit:
   a. Joints and fittings shall be solvent welded to RNMC conduit. Joints and fittings shall be watertight and airtight after fabrication.

18. Tighten each conduit fittings and fitting appurtenance, to the “torque” (allowable tolerance ±5%) value recommended by the Fitting Manufacturer and applicable Code. If three (3) or more conduit fittings are found to not be in compliance with the Manufacturer’s “torque” (tightness) recommendations, the following corrective actions shall occur:
   a. The CONTRACTOR shall tighten “re-torque” the defective fittings and all similar conduit fittings installed as part of the Contract Documents in the presence of the District’s Representative.
   b. If the respective conduit fittings similar to the deficient “torque tightness” fittings are installed concealed in walls, floors, above ceilings or below grade, the CONTRACTOR shall expose the fitting, to allow retightening each similar conduit fitting to the Manufacturers recommended “torque” values.
   c. All the cost to repair the direct, indirect, incidental damages and Contract delays resulting from complying with these requirements shall be the sole responsibility of the CONTRACTOR and shall be included in the bid price.

19. Horizontal directional boring for underground conduit:
   a. Provide a directional guided horizontal “bore-hole” underground conduit installation where one or more of the following conduits occur:
      1) Continuous trenching excavation and backfill for conduit installation is not permitted by the Contract.
      2) Where continuous trenching excavation due to the existing surface and below grade conditions and restrictions, is not possible or practical to excavate a trench.
   b. Provide “path-tracing” of the underground bore head, from the surface, along the entire horizontal bore length. Path tracing shall use electronic transmitters and receivers, continuously communicating the underground bore head locations and depth to the bore equipment operator. The directional boring system shall employ active tracking and directional position/steering control of the bore equipment drill head location. The active tracking system shall provide a portable receiver/transmitter unit for tracking the position of the moving drill head; a sensor “Sonde” unit on the drill head for tracking signals to the receiver/transmitter; and a drill head tracking data view display located at the boring equipment operator position to view the drill head position information sent from the portable receiver/transmitter. As manufactured by SPX-Radiodetection Company or similar products.
   c. Provide vertical pilot excavations not more than 50-feet on center along the path of the bore-hole to intercept the horizontal bore-hole routing, provide excavations at the beginning and end terminals staging points of the horizontal bore-hole.
   d. Provide full-depth “shoring” of the vertical pilot excavations. Remove the shoring, backfill, compact and repair the excavations when conduit installation is complete.
e. “Drilling-fluid” shall be used during “back-reaming” and “pullback”, pumped through the drill pipe to the bore drill head.

f. Directional guided horizontal drilling shall employ equipment specifically designed and manufactured for the process. The Equipment Manufacturer shall train Bore Equipment Operating Personnel in the proper operation of said equipment.

g. Locate the position, size, depth and identify all underground “cross-bore” existing underground utilities, pipes, structures and conflicts along the entire bore path of each underground bore, prior to initiating directional boring work. Notify respective Agency for each “cross bore” potential crossing. Comply with the recommendations of the Cross Bore Safety Association (CBSA).

h. Horizontal, directionally guided boring equipment, as manufactured by Ditch Witch; Vermeer Manufacturing; or Case Corporation.

J. Conduit Seals

1. Provide conduit seal fittings at each location where a conduit transitions or passes through the following areas and where indicated on the Drawings:
   a. Refrigerated areas.
   b. Temperature control rooms including warming rooms, steam rooms, saunas etc.
   c. Classified hazardous material areas.
   d. Water intrusion areas.

2. Provide conduit seals on each conduit entering a building from a below grade area located outside the building (i.e., basement, vault etc.) and connecting to the following types of equipment
   a. Transformers
   b. Panelboards
   c. Motor control centers
   d. Switchboards
   e. Switchgear
   f. Motors
   g. Terminal cabinets
   h. Terminal backboards
   i. Cable trenches

3. Conduit seals shall be installed in locations where the fitting is visible and accessible.

K. Nailing Shields

1. Provide “nail” shields where FMC conduit and conductors not installed in a conduit are installed through wood stud and wood frame construction. The nail shield shall provide a barrier resistant to “nailing” fasteners through the stud, and penetrating into the FMC and conductors.

2. The nail shields shall be flat nominal 1.5-inch by 3-inches, 14-gauge steel, and hot dip zinc galvanized with “nailing spurs”.

3. Provide nailing shields on the front face and rear face of each FMC penetration. The shield shall be centered on each penetration through the respective framing, stud framing blocking, and stud framing plates.

L. Conduit Bodies

1. Conduit bodies shall be installed in exposed conduit locations only or above accessible ceilings.

2. Conduit bodies shall be accessible for removing body cover and pulling wire through the conduit body.
3. Conduit bodies shall not be installed inside enclosed walls.

M. Preparation of Reuse of Existing Conduits
1. Prepare existing conduits shown to be reused as part of Contract Work as follows: Complete the required work prior to installing any conductors or cables in respective existing conduits.
   a. “Rod” out existing raceways to be used under this contact, with approved test and flexible mandrels to remove all obstructions to clear debris from inside conduits.
   b. Use test mandrels at least 12-inches long, 0.25-inch less than diameter of duct at center, tapering to 0.5-inch less than duct size at ends.
2. If test mandrels cannot be pulled through raceways, CONTRACTOR shall perform the following to clear the existing raceways:
   a. Force rigid or semi-rigid rods through the raceways to clear the obstructions from one to both ends of the raceway.
   b. Force a power driven rotating router device through the conduit from one or both ends of raceways. Device shall incorporate small diameter cutting blades. Repeat the “router” process in incremental stages to a cutting blade diameter approximately ⅛-inch smaller than the raceway inside diameter.
3. After clearing the raceway of obstructions, pull a test mandrel or brush through the raceway to clear the remaining debris from the raceway.

3.04 WIRE AND CABLE

A. Branch circuit and fixture joints for #10AWG and smaller wire shall be made with UL-approved connectors listed for 600 volts, approved for use with copper and/or aluminum wire. Connector to consist of a cone-shaped, expandable coil spring insert, insulated with a nylon shell and two (2) wings placed opposite each other to serve as a built-in wrench or shall be molded one-piece as manufactured by 3M-“Scotchlok”.

B. Branch circuit joints of #8AWG and larger shall be made with screw pressure connectors made of high strength structural aluminum alloy and UL-approved for use with both copper and/or aluminum wire as manufactured by Thomas & Betts. Joints shall be insulated with plastic splicing tape, tapered half-lapped and at least the thickness equivalent to 1.5-times the conductor insulation. Tapes shall be fresh and of quality equal to Scotch.

C. Use UL listed pulling compound for installation of conductors in conduits.

D. Correspond each circuit to the branch number indicated on the panel schedule shown on the Drawings except where departures are approved by the DISTRICT’S Representative.

E. All wiring, including low voltage, shall be installed in conduit.

F. Control wiring to conform to the wiring diagrams shown on the Mechanical Drawings and the Manufacturer’s Wiring Diagrams.

G. All splices in exterior pull boxes and light poles shall be cast resins encapsulated.
   1. Power conductor splices - 3M Scotchcast Series 82/85/90; Plymouth or equal.
   2. Control and signal circuits 3M Scotchcast Series 8981 through 8986, Plymouth or equal.
H. Neatly group and lace all wiring in panelboards, motor control centers and terminal cabinets with plastic ties at 3-inch on centers. Tag all spare conductors.

3.05 CHEMICAL GROUND ROD

A. General
   1. Install ground rod system in compliance with Manufacturer’s instructions.
   2. Install rods vertically. Where subterranean hard rock conditions prevent vertical installation horizontal "L" shape ground rod shall be installed.
   3. Where ground rod is installed in an indoors dry location set ground box flush with finish floor. Where ground rod is installed outdoors set the top of the ground box four inches above finish grade.
   4. Do not remove sealing tape from ground rod holes until time of installation in ground.
   5. Separate ground rods from all other grounding electrodes and from each other by not less than 12-feet horizontal distance.

B. Excavation
   1. Vertical installation bore a 12-inches diameter vertical hole in the ground 6-inches deeper than ground rod length.
   2. Horizontal installations excavate a 12-inches wide trench, slope rod and trench to insure end cap of rod is 2-inches lower than the elbow.

C. Backfill
   1. Surround the entire rod with a minimum of 10 inches of bentonite clay mixed with water at six (6) times volume to form a paste. Approximately 14-gallons for each 50-pounds of clay. Remove any excavation liners from the rod excavation area.
   2. Install ground box and complete backfill.

D. Connect grounding electrode conductor(s) to ground rod.

3.06 CABLE RACKS

A. General
   1. Provide cable racks in precast and cast-in place concrete pullboxes, manholes and cable trenches.

3.07 TESTING

A. Testing Conduit and Conduit Bends
   The CONTRACTOR shall demonstrate the usability of all underground raceways, and field fabricated conduit bends installed as part of this Contract.
   1. A round tapered segmented semi-rigid mandrel with a diameter approximately ¼-inch smaller than the diameter of the raceway shall be pulled through each new raceway.
   2. The mandrel shall be pulled through after the raceway installation is completed. Conduits which stubout only, may have the mandrel pulled after the concrete encasement is completed, but prior to completing the backfill.
   3. DISTRICT’S Representative shall witness the raceway testing for usability. A Representative of the respective Utility Company shall witness the raceway testing where applicable.
   4. CONTRACTOR shall repair/replace any conduit and conduit bend provided under this Contract which will not readily pass the mandrel during this test.

END OF SECTION 26 0530
SECTION 26 0548
SOUND CONTROL

PART 1 - GENERAL

1.01 SCOPE

A. 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 Section, complete as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Sections for work related to those other Sections and required to be included as work under this Section.
   2. General provisions and requirements for electrical work.

1.02 SUBMITTALS (ADDITIONAL REQUIREMENTS)


B. Submit Product Data Sheets for Vibration Isolation Devices.

C. Submit Detailed Shop Drawings including Dimensioned Plans, showing equipment vibration isolation anchoring.

PART 2 - PRODUCTS AND EXECUTION

2.01 QUIETNESS OF OPERATION

Before the work will be accepted as complete, quietness of operation, to a degree satisfactory to the ARCHITECT, shall be attained for apparatus, equipment, fixtures, etc., included under the electrical work. Provide isolation and vibration protection required.

2.02 VIBRATION ISOLATION FOR ELECTRICAL EQUIPMENT

A. Objective: It is the objective of this Specification to provide the necessary design for the avoidance of excessive noise or vibration in the building due to the operation of machinery or transformers, and/or due to interconnected conduit.

B. CONTRACTOR Responsibility
   1. Provide a submittal to the ARCHITECT for review prior to any installation of his equipment, containing the following information:
      a. Catalog cuts and data sheets on specific vibration isolators to be utilized showing compliance with the Specification.
      b. An itemized list showing the items of equipment to be isolated, the isolator loading and deflection and isolator placement.
      c. Drawings showing methods for attachment of conduit to motors.
   2. Furnish and install the vibration isolation devices as specified herein.
   3. Do not install any equipment or conduit as specified in the schedule, which makes rigid contact with the “Building” unless it is approved in this Specification, or by the ARCHITECT. “Building” includes slabs, beams, studs, walls, lath, etc.
4. Coordinate work with other trades to avoid rigid contact between equipment or conduit as specified in the schedule and the building. Inform other trades following his work, such as plastering, to avoid any contact that would reduce the vibration isolation.

5. Bring to the ARCHITECT'S attention, prior to installation, any conflicts with other trades which will result in unavoidable contact to the equipment or conduit as specified in the schedule, described herein due to adequate space, etc. Corrective work necessitated by conflicts after installation shall be at the responsible CONTRACTOR'S expense.

6. Bring to the ARCHITECT'S attention any discrepancies between the Specifications and field conditions, changes required due to installation. Corrective work necessitated by discrepancies after installation shall be at the CONTRACTOR'S expense.

7. Obtain approval from the ARCHITECT of any installation to be covered on enclosed, prior to such closure.

8. Obtain written and/or oral instructions from the Vibration Isolation Manufacturer as to the proper installation and adjustment of vibration isolation devices.

9. Notify the ARCHITECT, prior to the general installation of vibration isolation devices, so that the ARCHITECT can instruct and demonstrate the technique of proper installation with the CONTRACTOR'S Foreman.

10. Correct, at no additional cost, all installations, which are deemed to be defective workmanship or materials by the ARCHITECT.

2.03 VIBRATION ISOLATION TYPES

A. Isolator Description

1. Isolate all transformers with Type MN molded neoprene units equipped with leveling bolts and design status deflection under load of 0.3-inch.

2. Isolate all switchgear connected directly to transformer with Type PN isolators. Limit loading to a static deflection of 0.06 inch. Choose the area of pad to match the load with the Manufacturer's recommended unit loading. An auxiliary steel plate may be required to distribute the load uniformly over the pad area.

B. Equivalent Vibration Isolators

1. Type Description A B C D E F G

<table>
<thead>
<tr>
<th>Neoprene Mount</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) 0.2-inch max. deflection</td>
<td>N</td>
<td>F</td>
<td>D</td>
<td>R</td>
<td>RV</td>
<td>CS</td>
<td>F</td>
</tr>
<tr>
<td>b) 0.4-inch max. deflection</td>
<td>ND</td>
<td>FDD</td>
<td>RD</td>
<td>RFD</td>
<td>FU</td>
<td>RD</td>
<td>T-44</td>
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<tr>
<td>PN Neoprene Pad</td>
<td>W (1)</td>
<td>(2)</td>
<td>NR</td>
<td>R</td>
<td>(3)</td>
<td>100W</td>
<td></td>
</tr>
</tbody>
</table>

2. Notes Manufacturer's Code

(1) Elastrogrip A. Mason Industries
(2) Shearflex B. Korfund
(3) Kinetic C. Vibration Mounting
D. Amber/Booth
E. Sausse
F. Consolidated Kinetics
G. Vibration Eliminator

2.04 CONDUIT INSTALLATION

A. Provide flexible conduit or an approved vibration isolation device between any transformer and the building structure.
B. Secure all electrical panels connected to transformers by flexible conduit to the floor. Do not contact stud or masonry partitions. Isolated panels from the floor as specified herein.

C. Provide flexible conduit connections to all connections to air conditioning, plumbing, etc., or any rotating or oscillating equipment requiring electrical motors. Base the length of flexible conduit required for each motor upon the requirements for a 360 degrees loop in the conduit between the electrical motor and electrical box.

D. As an alternative to the 360 degrees loop, a Neoprene or rubber bushing between the conduit and the electric motor to break the metal-to-metal contact may be used. Provide a flexible ground strap to complete the electrical ground.

2.05 DEVICE OUTLET BOXES (INSTALLED IN COMMON PARTY SEPARATION WALLS, IN CORRIDOR WALLS AND SERVICE WALLS)

Device outlet boxes installed in walls shall be sealed on the exterior back and sides of the boxes, including wall openings around the box, with a 1/8-inch minimum thickness resilient sound absorbing, sealant. The sealant shall be free of asbestos, temperature rated from -30°F to 200°F, self-adhesive to metal and plastics, as manufactured by Lowry and Associates Inc. Sun Valley, California or equal.

END OF SECTION
031616/223029
SECTION 26 0943

LIGHTING CONTROL SYSTEM

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. NA

1.02 SUMMARY

A. The Lighting Control System specified in this Section shall provide time-based, sensor-based (both occupancy and daylight), and manual lighting control.

B. The system shall be capable of turning lighting loads on/off as well as dimming lights (if lighting load is capable of being dimmed).

C. All system devices shall be networked together enabling digital communication and shall be individually addressable.

D. The System Architecture shall be capable of enabling stand-alone groups (rooms) of devices to function in some default capacity even if network connectivity to the greater system is lost.

E. The System Architecture shall facilitate remote operation via a computer connection.

F. The system shall not require any centrally hardwired switching equipment.

G. The System shall be capable of Wireless, Wired, or Hybrid Wireless/Wired Architectures.

1.03 DEFINITIONS

A. NA

1.04 SUBMITTALS

A. Product Datasheets (General Device Descriptions, Dimensions, Wiring Details, Nomenclature).

B. Riser Diagrams – typical per room type (Detailed Drawings showing device interconnectivity of devices).

C. Other Diagrams – as needed for special operation or interaction with other system(s)

D. Example Contractor Startup/Commissioning Worksheet – must be completed prior to factory start-up.

E. Hardware and Software Operation Manuals

F. Other operational descriptions as needed
1.05 QUALITY ASSURANCE

A. All steps in sensor manufacturing process shall occur in the USA; including population of all electronic components on circuit boards, soldering, programming, wiring, and housing.

B. All components and the manufacturing facility where product was manufactured must be ROHS compliant.

C. In high humidity or cold environments, the sensors shall be conformably coated and rated for condensing humidity and -40 degree Fahrenheit (and Celsius) operation.

D. All applicable products must be UL / CUL Listed or other acceptable National Testing Organization.

1.06 COORDINATION

A. Coordinate Lighting Control Components to form an integrated interconnection of compatible components.

B. Coordinate Lighting Controls with BAS (if necessary) either through IP based intercommunication of system or hardwired auxiliary relay outputs.

C. The Installing Contractor shall be responsible for a complete and functional system in accordance with all applicable Local and National Codes.

1.07 WARRANTY

A. All devices in Lighting Control System shall have a 5 year warranty.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

A. This Specification is based on the nLight® Network Control System from Sensor Switch, an Acuity Brands Company (800-727-7483, www.sensorswitch.com).

2.02 SYSTEM REQUIREMENTS

A. System shall have an Architecture that is based upon three (3) main concepts; 1) Intelligent lighting control devices; 2) Standalone lighting control zones; 3) Network backbone for remote or time based operation.

B. Intelligent lighting control devices shall consist of one or more basic lighting control components; occupancy sensors, photocell sensors, relays, dimming outputs, manual switch stations, and manual dimming stations. Combining one or more of these components into a single device enclosure should be permissible so as to minimize overall device count of system.

C. System must interface directly with intelligent LED luminaires such that only CAT-5 cabling is required to interconnect luminaires with control components such as sensors and switches (see Networked LED Luminaire section).

D. Intelligent lighting control devices shall communicate digitally, require <4 mA of current to function (Graphic wall stations excluded), and possess RJ-45 style connectors.
E. Lighting Control Zones shall consist of one (1) or more intelligent lighting control components, be capable of stand-alone operation, and be capable of being connected to a higher level network backbone.

F. Devices within a lighting control zone shall be connected with CAT-5e low voltage cabling in any order.

G. Lighting Control Zone shall be capable of automatically configuring itself for default operation without any start-up labor required.

H. Individual Lighting Zones must continue to provide a user defined default level of lighting control in the event of a system communication failure with the backbone network or the management software becoming unavailable.

I. Power for devices within a lighting control zone shall come from either resident devices already present for switching (relay device) or dimming purposes, or from the network backbone. Standalone “bus power supplies” shall not be required in all cases.

J. All switching and dimming for a specific lighting zone shall take place within the devices located in the zone itself (i.e. not in a remotely located devices such as panels) to facilitate system robustness and minimize wiring requirements. Specific applications that require centralized or remote switching shall be capable of being accommodated.

K. System shall have one (1) or more primary wall mounted network control “gateway” devices that are capable of accessing and controlling connected system devices and linking into an Ethernet LAN.

L. System shall use “bridge” devices that route communication and distribute power for up to eight (8) directly connected lighting zones together for purposes of decreasing system wiring requirements.

M. System shall be capable of wirelessly connecting a lighting zone to a WiFi (802.11n) wireless data network for purposes of eliminating the “bridge” devices and all cabling that connects zones to bridge devices.

N. WiFi enabled devices shall be able to detect when WiFi Network is down and revert to a user directed default state.

O. WiFi enabled devices shall be capable of current monitoring

P. WiFi enabled devices shall utilize WPA2 AES encryption

Q. WiFi enabled devices shall be able to connect to 802.11b/g/n WiFi Networks

R. WiFi enabled devices shall have at least one local RJ-45 port for communicating with non-WiFi enabled system devices

S. System shall have a web-based software management program that enables remote system control, status monitoring, and creation of lighting control profiles.

T. Individual lighting zones shall be capable of being segmented into several “local” channels of occupancy, photocell, and switch functionality for more advanced configurations and sequences of operation.
U. Devices located in different lighting zones shall be able to communicate occupancy, photocell, and switch information via either the wired or WiFi backbone.

V. System shall be capable of operating a lighting control zone according to several sequences of operation. System shall be able to change a spaces sequence of operation according to a time schedule so as to enable customized time-of-day, day-of-week utilization of a space. Note operating modes should be utilized only in manners consistent with Local Energy Codes.

1. Auto-On / Auto-Off (via occupancy sensors)
   • Zones with occupancy sensors automatically turn lights on when occupant is detected.
   • Zones with occupancy and/or photocell sensors turn lights off when vacancy or sufficient daylight is detected.
   • Pressing a switch will turn lights off. The lights will remain off regardless of occupancy until switch is pressed again, restoring the sensor to Automatic On functionality.

2. Manual-On / Auto-Off (also called Semi-Automatic)
   • Pushing a switch will turn lights on.
   • Zones with occupancy and/or photocell sensors turn lights off when vacancy or sufficient daylight is detected.

   • Pushing a switch will turn lights on.
   • After initial lights on, zones with occupancy and/or photocell sensors turn lights on/off according to occupancy/vacancy and/or daylight conditions.
   • Sequence can be reset via scheduled (ex. daily each morning) events

5. Auto-to-Override On
   • Zones with occupancy sensors automatically turn lights on when occupant is detected.
   • Zone lighting then goes into an override on state for a set amount of time or until the next time event returns the lighting to an auto-off style of control.
   • Sequence can be reset via scheduled (ex. daily each morning) events

   • Pushing a switch will turn lights on.
   • Zone lighting then goes into an override on state for a set amount of time or until the next time event returns the lighting to an auto-off style of control.
   • Sequence can be reset via scheduled (ex. daily each morning) events

7. Auto On / Predictive Off
   • Zones with occupancy sensors automatically turn lights on when occupant is detected.
   • Zones with occupancy and/or photocell sensors turn lights off when vacancy or sufficient daylight is detected.
   • If switch is pressed, lights turn off and a short “exit timer” begins. After timer expires, sensor scans the room to detect whether occupant is still present. If no occupancy is detected, zone returns to auto-on. If occupancy is detected, lights must be turned on via the switch.

8. Multi-Level Operation (multiple lighting levels per manual button press)
   • Operating mode designed specifically for bi-level applications
   • Enables the user to cycle through the up to four potential on/off lighting states using only a single button.
   • Eliminates user confusion as to which of two buttons controls which load
   • Three (3) different transition sequences are available in order to comply with Energy Codes or user preference)
• Mode available as a setting on all nLight devices that have single manual on/off switch (ex. nWSX, nPODM, nPODM-DX).
• Depending on the sequence selected, every button push steps through relays states according to below table
• In addition to achieving bi-level lighting control by switching loads with relays, the ability to command dimming outputs to “step” in a sequence that achieves bi-level operation is present.

<table>
<thead>
<tr>
<th>Sequence State #</th>
<th>Alternating Sequence</th>
<th>Full On Sequence</th>
<th>3 Step On Sequence</th>
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<tbody>
<tr>
<td></td>
<td>Relay 1</td>
<td>Relay 2</td>
<td>Relay 1</td>
</tr>
<tr>
<td>1</td>
<td>On</td>
<td>Off</td>
<td>On</td>
</tr>
<tr>
<td>2</td>
<td>Off</td>
<td>On</td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>-</td>
<td>-</td>
<td>On</td>
</tr>
<tr>
<td>4*</td>
<td>Off</td>
<td>Off</td>
<td>Off</td>
</tr>
</tbody>
</table>

(*step only present for devices without separate off button)

W. A taskbar style desktop application shall be available for personal lighting control.

X. An application that runs on “smart” handheld devices (such as an Apple® IPhone®) shall be available for personal lighting control.

Y. Control software shall enable logging of system performance data and presenting useful information in a web-based graphical format and downloadable to .CSV files.

Z. Control software shall enable integration with a BMS via BACnet IP.

AA. System shall provide the option of having pre-terminated plenum rated CAT-5 cabling supplied with hardware.

2.03 INDIVIDUAL DEVICE SPECIFICATIONS

A. Control Module (Gateway)
1. Control module shall be a device that facilitates communication and time-based control of downstream network devices and linking into an Ethernet.
2. Devices shall have a user interface that is capable of wall mounting, powered by low voltage, and have a touch screen.
3. Control device shall have three RJ-45 ports for connection to other backbone devices (bridges) or directly to lighting control devices.
4. Device shall automatically detect all devices downstream of it.
5. Device shall have a standard and astronomical internal time clock.
6. Device shall have one RJ-45 10/100 BaseT Ethernet connection.
7. Device shall have a USB port
8. Each control gateway device shall be capable of linking 1500 devices to the management software.
9. Device shall be capable of using a dedicated or DHCP assigned IP address.
10. Network Control Gateway device shall be the following Sensor Switch model Series: nGWY2
B. Networked System Occupancy Sensors

1. Occupancy sensors system shall sense the presence of human activity within the desired space and fully control the on/off function of the lights.

2. Sensors shall utilize Passive Infrared (PIR) technology, which detects occupant motion, to initially turn lights on from an off state; thus preventing false on conditions. Ultrasonic or Microwave based sensing technologies shall not be accepted.

3. For applications where a second method of sensing is necessary to adequately detect maintained occupancy (such as in rooms with obstructions), a sensor with an additional "dual" technology shall be used.

4. Dual technology sensors shall have one (1) of its two (2) technologies not require motion to detect occupancy. Acceptable dual technology includes PIR/Microphonics (also known as Passive Dual Technology or PDT) which both looks for occupant motion and listens for sounds indicating occupants. Sensors where both technologies detect motion (PIR/Ultrasonic) shall not be acceptable.

5. All sensing technologies shall be acoustically passive meaning they do not transmit sounds waves of any frequency (for example in the Ultrasonic range), as these technologies have the potential for interference with other electronic devices within the space (such as electronic white board readers). Acceptable detection technologies include Passive Infrared (PIR), and/or Microphonics technology. Ultrasonic or Microwave based sensing technologies shall not be accepted.

6. Sensors shall be available with zero, one, or two (2) integrated Class 1 switching relays, and up to one (1) 0-10 VDC dimming output. Sensors shall be capable of switching 120 / 277 / 347 VAC. Load ratings shall be 800 W at 120 VAC, 1200 W at 277 VAC, 1500 W at 347 VAC, and ¼ HP motor. Relays shall be dry contacts.

7. Sensors shall be available with one or two (2) occupancy "poles", each of which provides a programmable time delay.

8. Sensors shall be available in multiple lens options which are customized for specific applications.

9. Communication and Class 2 low voltage power shall be delivered to each device via standard CAT-5 low voltage cabling with RJ-45 connectors.

10. All sensors shall have two (2) RJ-45 ports or capable of utilizing a splitter.

11. All sensors shall have the ability to detect when it is not receiving valid communication (via CAT-5 connections) and blink its LED in a pattern to visually indicate of a potential wiring issue.

12. Every sensor parameter shall be available and configurable remotely from the software and locally via the device push-button.

13. Sensors shall be able to function together with other sensors in order to provide expanded coverage areas by simply daisy-chain wiring together the units with CAT-5 cabling.

14. Sensors shall be equipped with an automatic override for 100 hour burn-in of lamps. This feature must be available at any time for lamp replacements.

15. Wall switch sensors shall recess into single-gang switch box and fit a standard GFI opening.

16. Wall switch sensors must meet NEC grounding requirements by providing a dedicated ground connection and grounding to mounting strap. Line and load wire connections shall be interchangeable. Sensor shall not allow current to pass to the load when sensor is in the unoccupied (Off) condition.

17. Wall switch sensors shall have optional features for photocell/daylight override, vandal resistant lens, and low temperature/high humidity operation.

18. Wall switch sensors shall be available in four (4) standard colors (Ivory, White, Light Almond, Gray).
19. Wall switch sensors shall be available with optional raise/lower dimming adjustment controls.

20. Wall switch sensors shall be the following Sensor Switch model numbers, with device color and optional features as specified:
   - nWSD or nWSX (PIR, 1 Relay)
   - nWSD PDT or nWSX PDT (Dual Tech, 1 Relay)
   - nWSD NL (PIR w/ Night Light, 1 Relay)
   - nWSD PDT NL (Dual Tech w/ Night Light, 1 Relay)
   - nWSX NL LV (PIR w/ Night Light, No Relay)
   - nWSD PDT NL LV (Dual Tech w/ Night Light, No Relay)
   - nWSD LV or nWSX LV (PIR, No Relay, Raise/Lower Dim Ctrl)
   - nWSD PDT LV or nWSX PDT LV (Dual Tech w/ Night Light, No Relay, Raise/ Lower Dim Ctrl)

21. Network system shall have sensors that can be embedded into luminaire such that only the lens shows on luminaire face.

22. Embedded sensors shall be capable of both PIR and Dual Technology occupancy detection.

23. Embedded sensors shall have an optional photocell.

24. Embedded sensors shall be the following Sensor Switch model number:
   - nES 7 (PIR, No Relay)
   - nES 7 ADCX (PIR w/ Photocell, No Relay)
   - nES PDT 7 (Dual Technology, No Relay)
   - nES PDT 7 ADCX (Dual Technology w/ Photocell, No Relay)

25. Network system shall also have ceiling, fixture, recessed, and corner mounted sensors available.

26. Fixture mount sensors shall be capable of powering themselves via a line power feed.

27. Sensors shall have optional features for photocell/daylight override, dimming control, and low temperature/high humidity operation.

28. Sensors with dimming can control 0 to 10 VDC dimmable ballasts by sinking up to 20 mA of Class 2 current (typically 40 or more ballasts).

29. Sensors shall be the following Sensor Switch Model Numbers, with device options as specified:

<table>
<thead>
<tr>
<th>Model # Series</th>
<th>Occupancy Poles</th>
<th># of Relays</th>
<th>Lens Type</th>
<th>Detection Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>nCM(B) 9</td>
<td>1</td>
<td>-</td>
<td>Standard</td>
<td>PIR</td>
</tr>
<tr>
<td>nCM(B) 9 2P</td>
<td>2</td>
<td>-</td>
<td>Standard</td>
<td>PIR</td>
</tr>
<tr>
<td>nCMR(B) 9</td>
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<td>1</td>
<td>Standard</td>
<td>PIR</td>
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<td>Standard</td>
<td>Dual</td>
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<tr>
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<td>Dual</td>
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<tr>
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<td>1</td>
<td>Standard</td>
<td>Dual</td>
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<tr>
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<td>2</td>
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<td>Dual</td>
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## Table: Occupancy Sensors

<table>
<thead>
<tr>
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<th>Lens Type</th>
<th>Detection Technology</th>
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<td>PIR</td>
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<td>Dual</td>
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<td>PIR</td>
</tr>
<tr>
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<td>2</td>
<td>2</td>
<td>High Bay</td>
<td>PIR</td>
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<td>2</td>
<td>High Bay</td>
<td>PIR</td>
</tr>
</tbody>
</table>

Note: Recessed mount versions of the above ceiling (fixture) mount versions also shall be available (e.g. nCMR(B) 9 => nRMR 9)

30. System shall have WiFi enabled fixture mountable sensors available.
31. Embedded sensors shall have an optional photocell and 0-10 VDC dimming output.
32. WiFi enable sensors shall be one of the Sensor Switch model numbers:
   - nCMRB 6 WIFI (PIR, w/ Relay)
   - nCMRB 10 WIFI (PIR, w/ Relay)
   - nCMRB 50 WIFI (PIR, w/ Relay)
   - nCMRB 9 WIFI (PIR, w/ Relay)

C. Networked System Daylight (Photocell and or Dimming) Sensors
1. Photocell shall provide for an on/off set-point, and a deadband to prevent the artificial light from cycling. Delay shall be incorporated into the photocell to prevent rapid response to passing clouds.
2. Photocell and dimming sensor’s set-point and deadband shall be automatically calibrated through the sensor’s microprocessor by initiating an “Automatic Set-point Programming” procedure. Min and max dim settings as well as set-point may be manually entered.
3. Deadband setting shall be verified and modified by the sensor automatically every time the lights cycle to accommodate physical changes in the space (i.e., furniture layouts, lamp depreciation, or lamp outages).
4. Dimming sensors shall control 0 to 10 VDC dimmable ballasts by sinking up to 20 mA of Class 2 current (typically 40 or more ballasts).
5. Photocell and dimming sensors shall be equipped with an automatic override for 100 hour burn-in of lamps. This feature must be available at any time for lamp replacements. (Note: This function should be performed prior to any dimming of the lamps including the “auto set-point” setting).

6. Combination units that have all features of on/off photocell and dimming sensors shall also be available.

7. A dual zone option shall be available for On/Off Photocell, Automatic Dimming Control Photocell, or Combination units. The second zone shall be capable of being controlled as an “offset” from the primary zone.

8. Line voltage versions of the above described photocell and combination photocell/dimming sensors shall be capable of switching both 120 VAC, 277 VAC, and 347 VAC. Load ratings shall be 800 W at 120 VAC, 1200 W at 277 VAC, 1500 W at 347 VAC, and ¼ HP motor load. Relays shall be dry contacts.

9. Sensor shall be the following Sensor Switch model numbers, with device options as specified:
   - nCM(B) PC (on/off)
   - nCM(B) ADC (dimming)
   - nCM(B) PC ADC (on/off, 0-10 VDC dimming)
   - nCMR(B) PC (on/off, single relay)
   - nCMR(B) PC ADC (on/off, 0-10 VDC dimming, single relay)
   Note: Recessed mount versions of the above ceiling (fixture) mount versions also shall be available (e.g. nCMR(B) PC => nRMR PC)

10. Network system shall have dimming photocells that can be embedded into luminaire such that only the lens shows on luminaire face.

11. Embedded sensors shall be the following Sensor Switch model number:
   - nES ADCX (Dimming Photocell)

D. Networked System Power (Relay) Packs

1. Power Pack shall incorporate one or more Class 1 relays and contribute low voltage power to the rest of the system. Secondary Packs shall incorporate the relay(s), shall have an optional 2nd relay, 0-10 VDC dimming output, or line voltage dimming output, but shall not be required to contribute system power. Power Supplies shall provide system power only, but are not required to switch line voltage circuit. Auxiliary Relay Packs shall switch low voltage circuits only.

2. Power Packs shall accept 120 or 277 VAC (or optionally 347 VAC), be plenum rated, and provide Class 2 power to the system.

3. All devices shall have two RJ-45 ports.

4. Every Power Pack parameter shall be available and configurable remotely from the software and locally via the device push-button.

5. Power Pack shall securely mount to junction location through a threaded ½ inch chase nipple or be capable of being secured within a luminaire ballast channel. Plastic clips into junction box shall not be accepted. All Class 1 wiring shall pass through chase nipple into adjacent junction box without any exposure of wire leads. Note: UL Listing under Energy Management or Industrial Control Equipment automatically meets this requirement, whereas Appliance Control Listing does not meet this safety requirement.

6. When required by local code, Power Pack must install inside standard electrical enclosure and provide UL recognized support to junction box. All Class 1 wiring is to pass through chase nipple into adjacent junction box without any exposure of wire leads.

7. Power Packs and Power Supplies shall be available that are WiFi enabled.

8. Power (Secondary) Packs shall be available that provide up to 16 Amp switching of all lighting load types.
9. Power (Secondary) Packs shall be available that provide up to 5 Amps switching of all lighting load types as well as 0-10 VDC dimming or fluorescent ballasts/LED drivers.
10. Specific Secondary Packs shall be available that provide up to 5 Amps of switching as well as 0-10 VDC dimming of fluorescent ballasts/LED drivers.
11. Specific Secondary Packs shall be available that provide up to 5 Amps of switching and can dim 120 VAC incandescent lighting loads or 120/277 VAC line voltage dimmable fluorescent ballasts (2-wire and 3-wire versions).
12. Specific Secondary Packs shall be available that provide up to 5 Amps of switching and can dim 120/277 VAC magnetic low voltage transformers.
13. Specific Secondary Packs shall be available that provide up to 4 Amps of switching and can dim 120 VAC electronic low voltage transformers.
14. Specific Secondary Packs shall be available that provide up to 5 Amps of switching and can dim 120/277 VAC dual phase (208/240/480 VAC) lighting loads.
15. Specific Secondary Packs shall be available that require a manual switch signal (via a networked Wall Station) in order to close its relay.
16. Specific Power/Secondary Packs shall be available that are UL924 listed for switching of Emergency Power circuits.
17. Specific Secondary Packs shall be available that control louver/damper motors for skylights.
18. Specific Secondary Packs shall be available that provide a pulse on/pulse off signal for purposes of controlling shade systems via relay inputs.
19. Power (Relay) Packs and Supplies shall be the following Sensor Switch model Series:
   nPP16 (Power Pack w/ 16A relay)
   nPP16 WIFI (Power Pack w/ 16A relay, WIFI enabled)
   nEPP5 D (Power Pack w/ 5A relay and 0-10VDC dimming output)
   nSP16 (Secondary Pack w/ 16A relay)
   nSP5 2P (Secondary Pack w/ two 5A relays)
   nSP5 D (Secondary Pack w/ 5A relay and 0-10VDC dimming output)
   nPP16 ER (UL924 Listed Secondary Pack w/ 16A relay for switching emergency power circuits)
   nSP5 D ER (UL924 Listed Secondary Pack w/ 5A relay and 0-10VDC dimming output for switching emergency power circuits)
   nSP5 PCD 2W (Secondary Pack w/ 5A relay and incandescent dimming or 2-wire line voltage fluorescent dimming output)
   nSP5 PCD 3W (Secondary Pack w/ 5A relay and 3-wire line voltage fluorescent dimming output)
   nSP5 PCD MLV (Secondary Pack w/ 5A relay and magnetic low voltage dimming output)
   nSP5 PCD ELV 120 (Secondary Pack w/ 4A relay and electronic low voltage dimming output)
   nSP5 480 (Secondary Pack w/ 5A relay for switching 208/240/480 VAC loads
   nSP5 2P LVR (Louver/Damper Control Pack
   nSHADE (Pulse On/Off Control Pack
   nPS 80 (Auxiliary Bus Power Supply)
   nPS 80 WIFI (Auxiliary Bus Power Supply, WiFi enabled)
   nAR 40 (Low voltage auxiliary relay pack)

E. Networked System Relay and Dimming Panels.
1. Panel shall incorporate up to four (4) normally closed latching relays capable of switching 120/277 VAC or up to two (2) Dual Phase relays capable of switching 208/240/480 VAC loads.
2. Relays shall be rated to switch up to a 30A ballast load at 277 VAC.
3. Panel shall provide one (1) 0-10VDC dimming output paired with each relay.
4. Panel shall power itself from an integrated 120/277 VAC supply.
5. Panel shall be capable of operating as either two (2) networked devices or as one.
6. Panel shall supply current limited low voltage power to other networked devices connected via CAT-5.
7. Panel shall provide auxiliary low voltage device power connected wired directly to a dedicated terminal connection.
8. Power (Relay) Packs and Supplies shall be the following Sensor Switch model numbers:
   - nPANEL 4 (Panel w/ four (4) 120/277 VAC relays and four (4) 0-10 VDC dimming outputs)
   - nPANEL 2 480 (Panel w/ two (2) dual phase relays (208/240/480 VAC) and two (2) 0-10 VDC dimming outputs)

F. Networked Auxiliary Input / Output (I/O) Devices
1. Devices shall be plenum rated and be inline wired, screw mountable, or have an extended chase nipple for mounting to a ½-inch knockout.
2. Devices shall have two (2) RJ-45 ports.
3. Communication and low voltage power shall be delivered to each device via standard CAT-5 low voltage cabling with RJ-45 connectors.
4. Specific I/O devices shall have a dimming control output that can control 0-10 VDC dimmable ballasts or LED drivers by sinking up to 20 mA of current (typically forty (40) or more ballasts).
5. Specific I/O devices shall have an input that read a 0-10 VDC signal from an external device.
6. Specific I/O devices shall have a switch input that can interface with either a maintained or momentary switch and run a switch event, run a local/remote control profile, or raise/lower a dimming output.
7. Specific I/O devices shall sense state of low voltage outdoor photocells.
8. Specific I/O devices shall enable RS-232 communication between lighting control system and Touch Screen based A/V control systems.
9. Specific I/O devices shall sense.
10. Auxiliary Input/Output Devices shall be the following Sensor Switch model numbers:
    - nIO D (I/O device with 0-10 dimming output)
    - nIO 1S or nIO RLX (I/O device with contact closure or 0-10VDC dimming input)
    - nIO NLI (Input device for detecting state of low voltage outdoor photocell; sold in nIO PC KIT only)
    - nIO X (Interface device for communicating with RS-232 enabled AV Touch Screens)

G. Networked LED Luminaires
1. Networked LED luminaire shall have a mechanically integrated control device.
2. Networked LED luminaire shall have two RJ-45 ports.
3. Networked LED luminaire shall be able to digitally network directly to other network control devices (sensors, photocells, switches, dimmers).
4. Networked LED luminaire shall provide low voltage power to other networked control devices.
5. System shall be able to turn on/off LED luminaire without using a relay.
6. System shall be able to maintain constant lumen output over the specified life of the LED luminaire (also called lumen compensation) by varying the input control power (and thus saving up to 20% power usage).

7. System shall indicate (via a blink warning) when the LED luminaire has reached its expected life (in hours).

8. LED Luminaires shall be the following Lithonia model families:
   - RTLED
   - TLED
   - VLED
   - ACLED
   - AL LED
   - WLED
   - STLED
   - MINO

H. Networked System Wall Switches and Dimmers
   1. Devices shall recess into single-gang switch box and fit a standard GFI opening.
   2. Devices shall be available with zero or one (1) integrated Class 1 switching relay.
   3. Communication and low voltage power shall be delivered to each device via standard CAT-5 low voltage cabling with RJ-45 connectors.
   4. All sensors shall have two (2) RJ-45 ports.
   5. All devices shall provide toggle switch control. Dimming control and low temperature/high humidity operation are available options.
   6. Devices shall be available in four (4) colors (Ivory, White, Light Almond, and Gray).
   7. Devices with dimming control outputs can control 0-10 VDC dimmable ballasts by sinking up to 20 mA of current (typically forty (40) or more ballasts).
   8. Devices with capacitive touch buttons shall provide audible user feedback with different sounds for on/off, raise/lower, start-up, and communication offline.
   9. Devices with mechanical push-buttons shall provide tactile and LED user feedback.
   10. Devices with mechanical push-buttons shall be made available with custom button labeling.
   11. Devices with a single on button shall be capable of selecting all possible lighting combinations for a bi-level lighting zone such that the user confusion as to which of two (2) buttons (as is present in multi-button scenarios) controls which load is eliminated.
   12. Wall switches and dimmers shall be the following Sensor Switch model numbers, with device options as specified:
       - nPOD (single on/off, capacitive touch, audible user feedback)
       - nPOD 2P (dual on/off, capacitive touch, audible user feedback)
       - nPODR (single on/off, one relay, capacitive touch, audible user feedback)
       - nPODM (single on/off, push-buttons, LED user feedback)
       - nPODM 2P (dual on/off, push-buttons, LED user feedback)
       - nPODM DX (single on/off, single dimming raise/lower, push-buttons, LED user feedback)
       - nPODM 2P DX (dual on/off, dual dimming raise/lower, push-buttons, LED user feedback)
       - nPODM 4P (quad on/off, push-buttons, LED user feedback)
       - nPODM 4P DX (quad on/off, quad dimming raise-lower, push-buttons, LED user feedback)
I. Networked System Graphic Wall Station
   1. Device shall have a 3.5-inches full color touch screen for selecting up to eight (8) programmable lighting control presets or acting as up to sixteen (16) on/off/ dim control switches.
   2. Device shall enable configuration of lighting presets, switched, and dimmers via password protected setup screens.
   3. Device shall enable user supplied .jpg screen saver image to be uploaded.
   4. Device shall surface mount to single-gang switch box
   5. Device shall have a micro-USB style connector for local computer connectivity.
   6. Device shall have two RJ-45 ports for communication
   7. Device shall be the following Sensor Switch model number:
      nPOD GFX

J. Networked System Scene Controllers
   1. Device shall have two (2) to four (4) buttons for selecting programmable lighting control profiles or acting as on/off switches.
   2. Device shall recess into single-gang switch box and fit a standard GFI opening.
   3. Devices shall provide LED user feedback.
   4. Communication and Class 2 low voltage power shall be delivered to each device via standard CAT-5 low voltage cabling with RJ-45 connectors.
   5. All sensors shall have two (2) RJ-45 ports.
   6. Device shall be capable of reprogramming other devices in its zone so as to implement user selected lighting scene.
   7. Device shall be capable of selecting a lighting profile be run by the system’s upstream Gateway so as to implement selected lighting profile across multiple zones (and not just its local zone).
   8. Device shall have LEDs indicating current selection.
   9. Scene Selector device shall be the following Sensor Switch model number:
      nPODM 2S (2 Scene, push-button)
      nPODM 4S (4 Scene, push-button)
      nPODM 4S DX (4 Scene, push-button, On/Off/Raise/Lower)
      nPODM 4L DX (4 Adjustable Presets, push-button, On/Off/Raise/Lower)

K. Communication Bridges
   1. Device shall surface mount to a standard 4-inches x 4-inches square junction box.
   2. Device shall have 8 RJ-45 ports.
   3. Device shall be capable of aggregating communication from multiple lighting control zones for purposes of minimizing backbone wiring requirements back to Control Gateway.
   4. Device shall be powered with Class 2 low voltage supplied locally via a directly wired power supply or delivered via a CAT-5 cabled connection.
   5. Device shall be careful of redistributing power from its local supply and connect lighting control zones with excess power to lighting control zones with insufficient local power. This Architecture also enables loss of power to a particular area to be less impactful on network lighting control system.
   6. Communication Bridge devices shall be the following Sensor Switch model numbers:
      nBRG 8 (8 Ports)
2.04 LIGHTING CONTROL PROFILES

A. Changes to the operation of the system shall be capable of being made in real-time or scheduled via lighting control profiles. These profiles are outlines of settings that direct how a collection of devices function for a defined time period.

B. Lighting control profiles shall be capable of being created and applied to a single device, zone of devices, or customized group of zones.

C. All relays and dimming outputs shall be capable of being scheduled to track or ignore information regarding occupancy, daylight, and local user switches via lighting control profiles.

D. Every device parameter (e.g. sensor time delay and photocell set-point) shall be configurable via a lighting control profile.

E. All lighting control profiles shall be stored on the network control gateway device and on the software’s host server.

F. Lighting control profiles shall be capable of being scheduled to run according to the following calendar options: start date/hour/minute, end date/hour/minute, and sunrise/sunset +/- timed offsets.

G. Sunrise/sunset times shall be automatically derived from location information using an astronomical clock.

H. Daylight savings time adjustments shall be capable of being performed automatically, if desired.

I. Lighting control profile schedules shall be capable of being given the following recurrence settings: daily, weekday, weekend, weekly, monthly, and yearly.

J. Software shall provide a graphical tool for easily viewing scheduled lighting control profiles.

2.05 MANAGEMENT SOFTWARE

A. Every device parameter (e.g. sensor time delay and photocell set-point) shall be available and configurable remotely from the software.

B. The following status monitoring information shall be made available from the software for all devices for which it is applicable: current occupancy status, current PIR Status, current Microphonics Status, remaining occupancy time delay(s), current photocell reading, current photocell inhibiting state, photocell transitions time remaining, current dim level, device temperature, and device relay state(s).

C. The following device identification information shall be made available from the software: model number, model description, serial number, Manufacturing Date Code, custom label(s), and parent network device.

D. A Printable Network Inventory Report shall be available via the software.

E. A Printable Report Detailing all system profiles shall be available via the software.
F. Software shall require all users to login with a User Name and Password.

G. Software shall provide at least three (3) permission levels for users.

H. All sensitive stored information and privileged communication by the software shall be encrypted.

I. All device firmware and system software updates must be available for automatic download and installation via the internet.

J. Software shall be capable of managing systems interconnected via a WAN (Wide Area Network).

2.06 BMS COMPATIBILITY

A. System shall provide a BACnet IP gateway as a downloadable software plug-in to its management software. No additional hardware shall be required.

B. BACnet IP gateway software shall communicate information gathered by networked system to other building management systems.

C. BACnet IP gateway software shall translate and forward lighting relay and other select control commands from BMS system to networked control devices.

2.07 SYSTEM ENERGY ANALYSIS AND REPORTING SOFTWARE

A. System shall be capable of reporting lighting system events and performance data back to the management software for display and analysis.

B. Intuitive graphical screens shall be displayed in order to facilitate simple viewing of system energy performance.

C. An “Energy Scorecard” shall be display that shows calculated energy savings in dollars, KWHr, or CO₂.

D. Software shall calculate the allocation of energy savings to different control measures (occupancy sensors, photocells, manual switching, etc.).

E. Energy Savings Data shall be calculated for the system as a whole or for individual zones.

F. A time scaled graph showing all relay transitions shall be presented.

G. A time scaled graph showing a zones occupancy time delay shall be presented.

H. A time scaled graph showing the total light level shall be presented.

I. User shall be able to customize the baseline run-time hours for a space.

J. User shall be able to customize up to four (4) time-of-day billing rates and schedules.

K. Data shall be made available via a .CSV file.
2.08 START-UP AND SUPPORT FEATURES

A. To facilitate start-up, all devices daisy-chained together (using CAT-5) shall automatically be grouped together into a functional lighting control zone.

B. All lighting control zones shall be able to function according to default settings once adequate power is applied and before any system software is installed.

C. Once software is installed, system shall be able to auto-discover all system devices without requiring any commissioning.

D. All system devices shall be capable of being given user defined names.

E. All devices within the network shall be able to have their firmware reprogrammed remotely and without being physically uninstalled for purposes of upgrading functionality at a later date.

F. All sensor devices shall have the ability to detect improper communication wiring and blink it’s LED in a specific cadence as to alert Installation/Startup Personnel.

End of Section 26 0943

031616/223029
SECTION 26 2416
BRANCH CIRCUIT PANELBOARDS AND TERMINAL CABINETS

PART 1 – GENERAL

1.01 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Specification Sections and Drawings for related work required to be included as work under Division 26.
   2. General provisions and requirements for electrical work.

1.02 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. Provide Manufacturers Catalog Data for Panels, Cabinets, and Circuit Breakers.

B. Provide Shop Drawing showing Panel Circuit arrangements, size, voltage, ampacity, overcurrent protective devices, etc.

C. Provide Nameplate Engraving Schedule.

D. Short Circuit, Coordination and ARC-FLASH
   1. Perform and submit engineered settings for each equipment location, fuse and adjustable circuit breaker device, showing the correct time and settings to provide the selective coordination within the limits of the specified equipment, per the latest applicable standards of IEEE and ANSI. Provide electrical system short circuit fault analysis, both 3-phase line-to-line and 1-phase line-to-ground calculations as part of the Coordination Analysis recommendations. Provide Electric ARC-FLASH Calculations as part of the Coordination Analysis recommendations.
   2. The information shall be submitted in both tabular form and on time current log-log graph paper, with an Engineering Narrative. Written narrative describing data, assumptions, analysis of results and prioritized recommendations, six (6) copies.
   3. The goal is to minimize an unexpected but necessary electrical system outage and personnel exposure to the smallest extent possible within the fault occurrence location, using the specified Contract Equipment. Shall comply with, but not limited to:
      b. IEEE-399, Recommended Practice for Industrial and Commercial Power System Analysis.
      d. CEC/NEC
4. Electrical equipment including switchgear, switchboards, electrical panels, and control panels, transformers, disconnects, etc., shall each be labeled by the Manufacturer with “Electrical-ARC-Flash” warning signs. The signs shall explain a hazard to personnel may exist if the equipment is worked on while energized or operated by Personnel, to wear the correct Protective Equipment/clothing (PPE) when working “Live”, or operating “Live” equipment and circuits.

1.03 SEISMIC EARTHQUAKE AND WIND LOADING WITHSTAND, TESTING AND CERTIFICATION (ADDITIONAL REQUIREMENTS)

A. General

1. The complete panels and terminal cabinet assemblies; including circuit protection devices, meter, housings/enclosures, accessories, supports/anchors etc., shall be designed, manufactured and tested.
   a. Wind loading all outdoor equipment locations.
   b. Earthquake Seismic Zone-4 and CBC/IBC Seismic withstand all indoor and all outdoor equipment locations.

2. Shall withstand, survive and maintain continuous non-interrupted energized operation during the seismic event occurrences and wind event occurrences. Continued normal energized operation after the wind event and seismic event occurrences have abated.

3. Shall include demonstrations of successful operation and run test after completion of seismic event shake-table simulation. Acceptance test seismic qualification shall employ triple axis shake-table simulation of the Required Response Spectrum (RRS) seismic event motion, certified and approved by the AHJ.

4. Provide three (3) dimensional finite element analysis demonstrating anchorage and operational withstand of wind loading not less than as follows and as required by AHJ:
   a. 100MPH – West Coast States USA and Hawaii.
   b. 150MPH – East Coast States USA, Gulf Coast States USA and Alaska State.
   c. 90MPH – all other USA locations.

5. Seismic Test shall be performed by a third party independent Test Laboratory. Wind Analysis and Seismic Testing and Reports shall be certified, signed and “stamped” by PE Professional Engineer licensed and in good standing in the State, Civil Engineer or Structural Engineer.

B. Refer to General Commissioning Section 01 9113 for additional requirements.

PART 2 - PRODUCTS

2.01 PANELBOARDS AND DISTRIBUTION PANELS

A. Shall be flush or surface mounting as indicated with group-mount circuit protection devices as shown on panel schedule, hinged lockable doors, index cardholders and proper bussing.

1. Panelboards shall comply with the latest versions:
   a. NEMA – PB1.
   b. UL – 50 and 67.
   c. CEC/NEC.
   d. ASTM-B187.
2. Where indicated on the Drawings shall be furnished with subfeed breakers and/or additional conductor lugs, split bussing, contactors, time switches, relays, etc., as required.
   a. Branch circuit panels up through forty-two (42) circuits shall be single section, to accommodate all of the circuits and components.
   b. Distribution panels shall be single section or multi-section, to accommodate all of the circuits and components.
3. Panels shall be “Service-Entrance” equipment rated when the panel main incoming supply feeder originates from one of the following:
   a. Originates outdoors exterior of the building in which the respective panel is located.
   b. Originates from an electrical supply source not located in the same building as the respective panel.

B. Housing and Painting, Panels and Terminal Cabinets
1. Shall be finished with one (1) coat of rust inhibitor zinc chromate and coat of primer sealer after a thorough cleaning.
2. Finish color paint as selected by DISTRICT'S Representative where exposed to public view (e.g., corridors, covered passages, offices, etc.). Prime coated panelboard shall be painted to match surroundings after installation in public areas.
3. Manufacturer’s standard color in electrical rooms/closets, janitors, HVAC and storage rooms.
4. Shall be fabricated of sheet steel of the following minimum gauges.
   a. Full height hinged, locking door. Trim #12 gauge steel; enclosure - code gauge steel.
   b. Panels installed in indoor dedicated electrical equipment rooms and dedicated electrical equipment closets, omit full height hinged locking panel door. Dead front cover behind omitted panel door shall remain.
5. NEMA-1 Metal Housing, for indoor locations.
6. NEMA-3R Metal Housing, tamper resistant, for outdoor locations.
7. Furnish all panels and terminal cabinets with the Manufacturers flush locks and keys except where indicated otherwise herein. Keys and locks shall be interchangeable for all panels. Provide two (2) latches and two (2) locks for door heights exceeding 36-inches.
8. Fasten the trim to panel and terminal cabinets by means of concealed, bolted or screwed fasteners accessible only when the door is open.

C. Panels 208/120 volt, three phase, 4-wire, S/N or 120/240 volt, single phase, 3-wire, S/N.
   Branch Circuit Panel as manufactured by:
   1. Cutler Hammer "Pow-R-Line 1 or 2" Series
   2. General Electric "A" Series
   3. Square D "NF/NQ" Series
   4. Siemens "P1/P2" Series

D. Distribution Panels as manufactured by:
   1. Cutler Hammer "Power-R-Line 3 or 4" Series
   2. General Electric "Spectra" Series
   3. Square D "I-Line" Series
   4. Siemens "P4/P5" Series
E. Top and bottom gutter space shall not be less than 6-inches high. Provide 6-inches additional gutter space in all panels where double lugs are required, or where cable ampere size exceeds bus ampere size. Provide 12-inches additional gutter space in all panels for aluminum feeders where used.

F. Panel Dimensions.
1. Panels with buss sizes 50 ampere thru 400 ampere
   a. Shall be 20-inches wide. Surface or flush mounting as indicated.
   b. Recess mounted type shall have a 20-inches wide (maximum) recess metal enclosure with overlapping edge trim plate cover extending 1-inch on all sides of enclosure.
   c. Depth shall be 5.75-inches nominal. Height of panel as required for devices.
2. Panels with buss sizes greater than 400 ampere
   a. Narrow panels 24-inches (maximum) wide by 6.5-inches (maximum) deep units. Wide panels 25-inches to 44-inches (maximum) wide by 8-inches to 15-inches (maximum) deep units. Nominal 90-inch panel height.
   b. The wider units shall be used only at locations where the narrow unit is not available with the quantity or size of large-ampere frame branch/subfeed circuit protective devices shown on the panel schedules, or where the main breaker size exceeds the narrow panel maximum.
   c. Distribution panels shall be floor standing and also supported from behind the panels at walls.

G. Distribution Panels and Branch Circuit Panels maximum load rating
1. Panelboards and Distribution Panels exceeding 800-ampere load rating shall not be permitted.
2. Provide Distribution Switchboards instead of Distribution Panels for bus load and circuit load ratings exceeding 800 ampere.

H. Panel Auxiliary Cabinets
1. Panelboards shown on the Drawings with relays, time clocks or other control devices shall have a separate auxiliary metal barrier compartment mounted above panel.
2. Panelboards with circuits controlled by low voltage remote control relays shall be provided with separate auxiliary cabinets to contain the relays, adjacent to the panelboard.
3. Provide auxiliary cabinets with separate hinged locking door to match panelboard.
4. Provide mounting subbase in cabinet for control devices and wiring terminal strips.

I. Panels shall have a circuit index cardholder removable type, with clear plastic cover. Index card shall have circuit numbers imprinted to match circuit breaker numbers.
1. The panel identification nameplate shall describe the respective panel name and voltage, corresponding to the Contract Documents.
2. The electrical power source, name and location of each panel supply-feeder and supply equipment name shall also be identified and described on the respective panel nameplate.

J. TVSS - Transient Voltage Surge Suppressor
1. Provide each of the following branch circuit panel and distribution panel types with a TVSS and RF filtering:
   a. 208/120 volt - single phase and/or three phase.
b. 120/240 volt - single phase.
c. 480/277 volt - single phase and/or three phase.
d. All distribution panels.

2. The TVSS shall be installed inside the respective panel housing and shall be factory connected to each main phase, ground and neutral bus inside the panel.

3. The TVSS monitor/annunciator indicators shall be visible only when the panel access door is in the open position.

4. Provide a 20-ampere 3-pole (2-pole for single-phase panels) branch circuit protection device in each panel for TVSS connection.

5. The TVSS device and panel shall be UL labeled and listed for combined use. See related Specification Sections for additional TVSS requirements.

K. Seismic Earthquake and Wind Loading Withstand, Testing and Certification (ADDITIONAL REQUIREMENTS)

1. The complete panel/panelboard assembly; including circuit protection devices, housings/enclosures, accessories, supports/anchors etc., shall be designed, manufactured and tested for Wind Loading and Earthquake Seismic Zone-4 withstand.

2. Shall withstand, survive and maintain continuous non-interrupted energized operation (running) during the seismic event occurrences. Continued normal energized operation after the wind event and seismic event occurrences have abated.

3. Shall include demonstrations of successful operation and run test after completion of seismic event shake-table simulation.

4. Provide three (3) dimensional finite element analysis demonstrating anchorage and operational withstand of wind loading as follows:
   a. 100MPH – West Coast States USA and Hawaii.
   b. 150MPH – East Coast States USA, Gulf Coast States USA and Alaska State.
   c. 90MPH – all other USA locations.

5. Acceptance test seismic qualification of proposed panels and panelboards shall employ triple axis shake-table simulation of the Required Response Spectrum (RRS) seismic event motion, certified and approved by the AHJ.

6. Seismic test shall be performed by a third party independent Test Laboratory. Wind Analysis and Seismic Testing and Reports shall be certified, signed and “stamped” by PE Professional Engineer licensed and in good standing in the State, Civil Engineer or Structural Engineer.

2.02 SHORT CIRCUIT RATING

A. Circuit protective devices and bussing as indicated on the Drawings. All devices and bussing shall have a short circuit fault withstand and interrupting capacity not less than the maximum available fault current at the panel and as indicated on the Drawings, plus a 25% additional capacity (safety margin). However, in no case shall the short circuit fault interrupting and withstand capacity be less than the following symmetrical short circuit.

<table>
<thead>
<tr>
<th>C/B and/or Bus Rating</th>
<th>Circuit Voltage</th>
<th>Short Circuit Amp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 400A and less</td>
<td>240V and below</td>
<td>10,000A</td>
</tr>
<tr>
<td>2. 400A and less</td>
<td>over 240V and below 600V</td>
<td>14,000A</td>
</tr>
<tr>
<td>3. Over 400A &amp; 800A &amp; below</td>
<td>240V and below</td>
<td>42,000A</td>
</tr>
<tr>
<td>4. Over 400A &amp; 800A &amp; below</td>
<td>over 240V and below 600V</td>
<td>30,000A</td>
</tr>
</tbody>
</table>
B. Panel short circuit fault rating
   1. General
      a. Provide a “fully rated” for short circuit fault interrupt and full load ampere
         main circuit breaker in each branch circuit panel and/or each distribution
         panel. Provide the main circuit breaker whether or not a main circuit
         breaker is shown otherwise on the Drawings, Schedules or Diagrams. The
         “utility-source” plus the “motor-load” transient contributions shall be used to
         establish the available fault duty values, unless indicated otherwise on the
         Drawings.
      b. The panel main circuit breaker full load ampere capacity rating shall equal
         the respective panel main bus ampere rating.
      c. The panel assembly, buss and circuit protection devices bolted fault short
         circuit withstand and bolted fault short circuit interrupt ratings shall not be
         less than 125% greater (including a 25% safety margin) than the available
         utility-source symmetrical and asymmetrical bolted fault short circuit current
         when “series combined rated” with the panel main circuit breaker.
      d. The main circuit breaker rated “bolted-fault” short circuit fault interrupt and
         withstand short circuit rating shall not be less than 125% (including a 25%
         safety margin) of the upstream main service entrance “bolted-fault”
         available (symmetrical and asymmetrical) short circuit current.
   2. Distribution Panelboards
      a. Distribution panel, main circuit breaker, all feeder circuit breakers, and all
         branch circuit breakers shall be “fully-rated” (plus safety margin) for the
         available bolted fault short circuit current (including safety margin).
      b. Shall provide time/current-tripping coordination with downstream equipment
         and upstream equipment.
   3. Non-emergency branch circuit panelboards 400-ampere buss and smaller; Non-
      emergency branch circuit panelboards 400-ampere trip main circuit breaker and
      smaller.
      a. The branch circuit panel main circuit breaker shall be “fully-rated” (plus
         safety margin) Current Limiting Circuit Breaker type (CLCB). Shall provide
         time/current- tripping coordination with upstream equipment.
      b. The branch circuit panel main circuit breaker shall be “series-rated” with the
         panel downstream branch circuit devices and panel bussing. “The series-
         rating” shall provide short circuit bolted fault current withstand protection
         and short circuit bolted fault interrupt rating protection during a downstream
         3-phase line-to-line and/or single-phase line-to-ground short circuit bolted
         faults.
      c. Typical for branch circuit panelboards connected to normal-power (non-
         emergency) power circuits.
   4. Emergency branch circuit panelboards 400-ampere bus and smaller; Emergency
      branch circuit panelboards 400-ampere trip main circuit breaker and smaller.
      a. The branch circuit panel main circuit breaker shall be short circuit bolted
         fault “fully-rated” (plus safety margin) Non-Current Limiting circuit breaker
         type (non-CLCB).
      b. The panel bussing shall also be short circuit bolted fault “fully-rated”.
      c. All of the branch circuit panel, branch circuit breakers shall be “fully-rated”
         non-fused Current Limiting Circuit Breaker Type (CLCB). Shall provide
         short circuit bolted fault interrupt rating. Coordinated time/current and
         instantaneous tripping with the upstream circuit protection devices.
      d. Typical for branch circuit panelboards connected to emergency power
         circuits.
2.03 PANEL CIRCUIT BREAKERS, CIRCUIT PROTECTION DEVICES

A. Circuit Breakers General, for Distribution Panels and Panelboards
   1. NEMA-AB1 and AB3, comply with latest revision.
   2. UL-1087, UL-489 and IEC-60.947.2 rated devices, comply with latest revision.
   3. 5Hz AC closing and 3Hz AC trip and clear.
   4. Main circuit breakers for distribution panels exceeding 400 ampere and larger;
      a. Shall be Insulated Case Circuit Breaker type ICCB.
   5. Main circuit breakers for branch circuit panelboards 400 ampere bus and smaller;
      a. Shall be Current Limiting Circuit Breaker type-CLCB for non-emergency
         panelboards.
      b. Shall be Molded Case Circuit Breaker type-MCCB for emergency
         panelboards.
   6. Branch circuit breakers and feeder circuit breakers smaller than 100-ampere trip
      shall be Molded Case Circuit Breakers type-MCCB and/or Current Limiting
      Circuit Breakers type-CLCB.
   7. All circuit breakers 100 ampere and larger trip shall employ sensors and solid
      state digital electronic automatic trip system. Short-time and long-time time/
      current curve shaping field adjustable functions and adjustable instantaneous
      trip. Typical for Molded Case Circuit Breaker type-MCCB, Insulated Case Circuit
      Breaker type-ICCB and Current Limiting Circuit Breaker type-CLCB.
   8. Refer to Specification Section 16425 and/or 16312 for additional circuit breaker
      requirements.

B. Manufacturer
   1. Circuit breakers as manufactured by the following companies only are
      acceptable:
      a. Cutler Hammer
      b. General Electric Co.
      c. Square D Co.
      d. Siemens

C. Configuration
   1. Circuit breakers shall be arranged in the panels so that the breakers of the
      proper trip settings and numbers correspond to the numbering in the panel
      schedules on the Drawings.
   2. Circuit numbers of breakers shall be black-on-white micarta tabs or other
      previously approved method. Circuit number tabs, which can readily be changed
      from front of panel, will not be accepted. Circuit number tabs shall not be
      attached to or be a part of the breaker.
   3. Panelboard circuit protection devices shall be bolt on type for connection to panel
      bus. Removable and installable without disturbing adjacent devices.
   4. Provide conductor wire terminations (lugs) on each circuit protection device for
      incoming main feeder, branch circuits and outgoing feeder circuits. Dual rated
      copper/aluminum and compatible with the respective conductor size, type, and
      quantity.
   5. Where 2-pole or 3-pole breakers occur in the panels, they shall be common trip
      units. Single pole breakers with tie-bar between handles will not be accepted.
   6. Branch circuit panels shall be field convertible for bottom entry main incoming
      feeder or top entry main incoming feeder.
7. Each panel section, the feeder and branch circuit protection devices (3-phase and/or 1-phase) shall be “twin-mount”, side-by-side double row construction for the following circuit sizes:
   a. 480/277 volt, 60-ampere circuit size and smaller.
   b. 240 volt – 208/120 volt, 100 ampere circuit size and smaller.

D. Lock-Off and Lock-On
   1. All circuit breakers shall be pad-lockable in the "off" position.
   2. Where branch circuit breakers supply the power to motors and signal systems, the breakers shall also be furnished with lockout clips, mounted in the "on" position. The breakers shall be able to trip automatically with lockout clips in place.
   3. Provide lock-on clips on branch circuit breakers supplying fire alarm equipment and fire alarm panels. Provide identification of the dedicated "fire alarm" circuit function and operation. Color-code the circuit breakers to comply with AHJ requirements.
   4. Locking facilities shall be riveted or mechanically attached to the circuit breaker (submit sample for approval. Other means of attachment shall not be accepted without prior written approval of the District's Representative.

E. ARC Fault Interrupter Circuit Breaker (AFCI-C/B)
   1. AFCI-C/B provides automatic circuit interruption upon detection of any of these conditions: overload, short circuit fault and electric branch circuit arcing protection.
   2. The AFCI-C/B shall detect intermittent “arching” type electrical faults, and provide automatic circuit interruption (tripping).
   3. Provide “test-pushbutton” on each C/B for manual AFCI-C/B Testing.
   4. Single pole, 120-volt, 60Hz AC UL listed and labeled for installation in panelboard, #14 - #8AWG solid/stranded AL/CU load conductor.

F. Switch and Fuse Feeder Protective Devices for Distribution Panels
   1. Locations where the Drawings show distribution panels employing switch-fuse circuit protection devices.
   2. Fusible Switches: Quick-make, quick-break type with rejection clips for use with Class “R” fuses Current Limiting Fuses (CLF). Switches with ratings up to and including 100 ampere at 240 volts shall be twins mounted. Switches rated through 60 ampere and 480 volts shall be twins mounted. Provisions for padlocking in the “on” and/or “off” positions. Switches shall be removable from front of panel without disturbing adjacent units or panel bus structure.
   3. Fuses shall be time delay current limiting types, UL Class RK-1 unless otherwise indicated on the Drawings. Provide one (1) spare set of fuses of each size and type in each Distribution Panel.
   4. Provide auxiliary contact on switch for remote status (on-off) signaling and monitoring. Provide conductor lugs to accept conductor temperature rating, sizes and quantities shown on Drawings.
   5. Switch and fuse devices shall be permitted only in distribution panels and only where specifically indicated on the Drawings for feeders.

2.04 PANEL BUSSING

A. Bus Material
   1. Bussing shall be rectangular cross section tin-plated copper or alternately silver or tin-plated aluminum.
   2. Bussing shall be non-tapped, full length of the enclosure.
B. Ground Bus
   1. Each panel shall be equipped with a ground bus secured to the interior of the enclosure. The bus shall have a separate lug for each ground conductor. No more than one conductor shall be installed per lug.

C. Provisions
   1. Provide space and all hardware and bus mounting attachments for future devices as indicated on the Drawings.

D. Neutral Bus
   1. The ampere rating of the neutral bus of panels and distribution panels shall be a minimum of 100% greater ampere capacity than the ampere rating of the corresponding phase bus, where the panel is indicated to be provided with an "oversize-neutral" or "200%" neutral on the Drawings.

2.05 TERMINAL AND AUXILIARY CABINETS

A. Cabinets
   1. Fabricated of code gauge sheet steel for flush mounting (except where noted as surface) of size indicated on the Drawings, and complete with hinged lockable doors, provide the quantity of 2-way feed through conductor terminals required for termination of all conductors, plus 15% spares of each type.
   2. Cabinet locks to operate from same key used for panelboards. The trim to cabinets shall be fastened by means of concealed bolted or screwed fasteners accessible behind door into cabinets. All cabinets shall have ⅝-inch plywood backing, finished with fireproof intumescent primer and finish coat paint. Provide equipment ground bus in each cabinet.
   3. Cabinets shall be finished with one coat of zinc chromate and one coat of primer sealer after a thorough cleaning. Where exposed to public view (e.g., corridors, covered passages, offices, etc.) finish color paint to match surrounding and Manufacturer’s standard gray color in switchboard, janitors, heater and storage rooms.
   4. Provide grounded metal barriers inside cabinet to isolate and separate line voltage and low voltage from each other inside the cabinet.

B. Cabinet Dimensions.
   1. Unless indicated otherwise on Drawings.
      a. Shall be 20-inches wide. Surface or flush mounting as indicated.
      b. Recess mounted type shall have a 20-inches wide (maximum) recess metal enclosure with overlapping edge trim plate cover extending 1-inch on all sides of enclosure.
   2. Depth shall be 5.75-inches nominal. Height of cabinet as required for devices, plus 25% spare unused interior space for future use, but not less than 36-inches high.

C. Terminals
   1. Non-digital analog circuits; line and low voltage modular signal systems, 15-ampere dual row with isolation barriers, screw-down terminals insulated strips, heavy duty.
      a. As manufactured by Molex, or ITT-Cannon, or General Electric.
   2. Digital circuits; low voltage signal systems, ANSI/ EIA/TIA Category-6, 110-Block or 66-Block gas-tight punch down style, heavy duty.
      a. As manufactured by: Leviton, or Ortronics, or AMP.
D. Identification (Additional Requirements)
   1. Provide engraved nameplate on each cabinet indicating its designation and system (i.e., “Life Safety System - Panel 2LS”, etc.).
   2. Identify each terminal landing with unique circuit number and provide corresponding alphanumeric text-index card inside panel access door

PART 3 - EXECUTION

3.01 MOUNTING

A. Flush Mounted Panelboards and Terminal Cabinets shall be securely fastened to at least two (2) studs or structural members. Trim shall be flush with finished surface.
   1. Panels and cabinets installed flush (recess or semi-recess) into fire rated or smoke rated walls. The wall recess shall be fully wrapped inside the recess with fire/smoke rated materials. The wrap-materials shall provide the same fire and/or smoke protection rating as the respective wall.

B. Surface Mounted Panels and Terminal Cabinets shall be secured to walls by means of preformed galvanized steel channels securely fastened to at least two (2) studs or structural members.

C. Panelboards and Terminal Cabinets shall be installed to insure the top circuit protective device (including top compartment control devices) are not more than 6-feet-6-inches above finish floor in front of the panel and the bottom device is a minimum of 12-inches above the floor. Manufacturer shall specifically indicate on Shop Drawing submittals each panel where these conditions cannot be met.

3.02 IDENTIFICATION (ADDITIONAL REQUIREMENTS)

A. Provide a red and white Bakelite nameplate with ½-inch high letters in each 277/480 volt panel fastened to face of dead-front plate, to read: “DANGER 480 (or as applicable) VOLTS KEEP OUT AUTHORIZED PERSONNEL ONLY”.

B. Manufacturer shall stencil the panel/cabinet number identification on the inside of door to correspond with the designation on the Drawings.

C. Identification plates and numbers shall be attached with screws or twist lock fasteners. Adhesive attachment of any kind shall not be used.

3.03 SPARE CONDUITS (ADDITIONAL REQUIREMENTS)

Provide three (3) 1-inch conduit only stubs from each panel and terminal cabinet into accessible ceiling space. Where floor level below panel or terminal cabinet is accessible, also provide an additional three (3) 1-inch conduit only stubs into accessible floor space.

END OF SECTION 26 2416
031616/223029
SECTION 26 2419
MOTOR CONTROL EQUIPMENT

PART 1 - GENERAL

1.01 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment necessary for, and incidental to, performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
1. Examine all other Specification Sections and Drawings for related work required to be included as work under Division 26.
2. General provisions and requirements for electrical work.

1.02 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. Provide Schematic "Ladder-Type" logic control wiring diagrams and "point-to-point" control wiring diagrams showing the control system for HVAC equipment and other electrical equipment.

B. Provide Nameplate Engraving Schedule.

C. Submit full-scale time/current transparencies on log/log paper for all fuses, circuit breakers, ground fault system devices, and relays.

D. SHORT CIRCUIT, COORDINATION AND ARC-FLASH
1. Perform and submit engineered settings for each equipment location, fuse and adjustable circuit breaker device, showing the correct time and current settings to provide the coordination within the limits of the specified equipment, per the latest applicable standards of IEEE and ANSI. Provide electrical system short circuit fault analysis, both 3-phase line-to-line and 1-phase line-to-ground calculations as part of the Coordination Analysis recommendations. Provide Electric ARC-FLASH calculations as part of the Coordination Analysis recommendations.
2. The information shall be submitted in both tabular form and on time current log-log graph paper, with an engineering narrative. Written narrative describing data, assumptions, analysis of results and prioritized recommendations, six (6) copies.
3. The goal is to minimize an unexpected but necessary electrical system outage and personnel exposure to the smallest extent possible within the fault occurrence location, using the specified Contract Equipment. Shall comply with, but not limited to:
   b. IEEE-399, Recommended Practice for Industrial and Commercial Power System Analysis.
   d. CEC/NEC
4. Electrical equipment including switchgear, switchboards, electric panels and control panels, motor control centers, combination motor starters, transformers, disconnects, etc., shall each be labeled by the Manufacturer with “Electrical-ARC-Flash” warning signs. The signs shall explain a hazard to personnel may exist if the equipment is worked on while energized or operated by personnel while energized. The sign shall instruct personnel to wear the correct Protective Equipment/clothing (PPE) when working “Live”, or operating “Live” electrical equipment and circuits.

PART 2 - PRODUCTS

2.01 GENERAL

A. Division 24 0000 HVAC/Plumbing

Refer to Division 24 0000 Mechanical and Plumbing Contract Documents and Shop Drawings for additional electrical work and material requirements.

1. Provide all control devices including timeswitches, relays, auxiliary contacts, voltage transformers, and interlocks.

2. Provide all raceways, conduit wire, circuits, outlets, and interconnections of starters as required for HVAC and Plumbing systems.

B. Special Considerations

1. Mount all auxiliary relays and timeswitches in an isolated compartment inside motor control equipment unless otherwise indicated.

2. Whether or not shown on Mechanical and Plumbing Contract Documents and/or control schedules, where motors are controlled by external devices (i.e., thermostats, relays, float or pressure switches, etc.) or interlocked with other motors, provide each magnetic motor starter with a "Hand-Off-Auto" selector switch in starter cover. Other magnetic motor starters provide a "Start-Stop" push-button station in starter cover.

3. Motor starters, motor controllers and circuit feeder tap devices for motor circuits shall be rated and labeled for control of all electric motor design types A, B, C, D, and E pursuant to the requirements of the NEC.

C. Seismic Earthquake and Wind Loading Withstand, Testing and Certification (Additional Requirements)

1. The complete motor control equipment assembly; including circuit protection devices, motor controllers, housings/enclosures, accessories, supports/anchors etc., shall be designed, manufactured and tested.

   a. Wind loading for outdoor locations.
   b. Earthquake Seismic Zone-4 withstand and CBC/IBC Seismic withstand all indoor and all outdoor equipment locations.

2. Shall withstand, survive and maintain continuous non-interrupted energized operation (running) during the seismic event occurrences. Continued normal energized operation after the wind event and seismic event occurrences have abated.

3. Shall include demonstrations of successful operation and run test after completion of seismic event shake-table simulation.

4. Provide three-dimensional finite element analysis demonstrating anchorage and operational withstand of wind loading not less than as follows and as required by AHJ:

   a. 100MPH-West Coast States USA and Hawaii.
   b. 150MPH-East Coast States USA, Gulf Coast States USA and Alaska State.
   c. 90MPH-all other USA locations.
5. Acceptance Test Seismic Qualification of proposed motor control equipment shall employ triple axis shake-table simulation of the Required Response Spectrum (RRS) Seismic Event Motion, Certified and Approved by the AHJ.

6. Seismic test shall be performed by a third party independent Test Laboratory. Wind Analysis and Seismic Testing and Reports shall be certified, signed and "stamped" by PE Professional Engineer licensed and in good standing in the State, Civil Engineer or Structural Engineer.

D. Motor Control Equipment as manufactured by:
   1. General Electric; or Square D; or Cutler-Hammer; or Allen-Bradley; or Siemens.

2.02 MANUAL MOTOR STARTERS

A. Provide flush or surface mounting manual motor starters with number of poles and size of thermal overload heaters as required for the motor being controlled (equipped with overload heaters, one (1) for each motor lead). Back boxes shall be supplied with all flush mounting starters, whether they are toggle type requiring only a 4-inch square outlet box or the larger type requiring a special box. Provide cover designed to accept the particular unit.

B. Unless otherwise noted on the Drawings, all manual starters for single phase motors, smaller than 1 h.p. shall be the compact toggle type. Manual starters for all single phase motors, 1 to 5 h.p. and all three phase motors up to 5 h.p. shall be the heavy-duty type.

C. Where manual motor starter is shown with pilot light, the pilot light shall be installed in a separate outlet box adjacent to the starter outlet with engraved nameplate to indicate function of pilot light. Pilot lights shall be push-to-test style.

2.03 MOTOR STARTERS - 50/60HZ AC INDUCTION ELECTRIC MOTORS

A. General
   1. Motor starters shall be horsepower rated for the motor connected to the starter, air insulated, with NEMA rating.
   2. Motor starter coils and controls shall be designed to operate on the control voltage indicated on the control diagrams and specifications. The motor starters shall reliably pick-up and seal-in at 80% through 110% of their coil control voltage.
   3. Under voltage release for motor starter coil circuit shall automatically drop motor starter off the line when the line voltage drops below normal operating voltage. Under voltage release shall be field adjustable 80% to 95% of nominal voltage with field adjustable dropout delay 0.1 to 3 seconds minimum for starters larger than NEMA Size 1. The under voltage release shall reset automatically when line voltage level returns too normal. The reset time delay shall be a 0.1 to 60-second field adjustable time range for starters larger than NEMA Size 1.
   4. Each motor starter control circuit shall be independently fused.
   5. Three phase motor starters controlling three phase motors, 5-horsepower and larger shall provide integral motor single phasing protection. The starter shall automatically "open", turn off electrical power to the connected motor in the event of the loss of one or more circuit phases, lock out and require manual resetting of the single phase protection to restart the magnetic motor starter. Provide single-phase annunciator. Provide adjustable time delay, minimum range 0.1 to 3 seconds for initiating single phase shut down.
6. Starter units shall be equipped with individual control power transformers (grounded type) with secondary and primary control power fuses. One secondary lead shall be grounded in the unit.
   a. The unit disconnect shall be equipped with a normally open contact to isolate the control circuit from the source when the controller disconnect is open.
   b. The control power transformer VA load rating shall include the motor starter, additional internal and external control devices connected to the motor starter, to insure control power voltage drop does not exceed 5% of nominal rating.

7. Starter units shall be equipped with three (3) motor overload elements, one (1) for each phase, with automatic lockout, external overload indicating flag/pilot light and manual reset external push-button. Trip rating characteristics of the overload elements shall be as recommended by Motor Manufacturer.
   a. Motor overload protection relays shall be bi-metal (non-melting) "heater-element" type or solid-state type, for motor starters NEMA Size 1 and smaller.
   b. Motor overload protection relays for motor starters larger than NEMA Size 1 shall be solid-state type.

8. Pilot light indicators shall be provided with "Push-to-Test" feature. Provide a capacitor in parallel with the starters stop-start control relay circuit, to permit the motor starter control circuit to "drop-out" (turn-off) and prevent "capacitive-holding" (capacitive coupling) on control circuits with "long" (excessive distance) control circuit wiring.

9. Each starter shall be equipped with a minimum of one (1) normally open and one (1) normally closed auxiliary spare contact. Provide additional auxiliary control contacts for interlocking with system control circuits as indicated on the Drawings and Specifications. Auxiliary contacts shall be field convertible for normally open or normally closed operation. Contacts shall be rated not less than 10 amps at 120 volt 60Hz, AC, but in no case shall the auxiliary contacts be rated for less ampere or lower voltage than the connected control circuit.

10. Motor starters larger than NEMA Size 1, provide a running time meter 0 to 99999 hours minimum range, and an operations counter 0 to 9999 meter minimum operations start count range. Meters shall be field resettable with maintained memory during power outages of any length.

11. Minimum starter size shall be NEMA 1, but in no case less than indicated on the Drawings or Specifications.

12. Verify the exact motor connection requirements; motor locked rotor/full load current, NEMA Code letter and voltage characteristics with the supplier of each motor. Motor starters shall comply with the identified requirements.

13. Each starter shall be equipped with "Hand-off-Auto" switch or stop-start push-button as required.

14. An auxiliary relay contact for remote alarm annunciation shall provide common trouble annunciation for any of the starter automatic protection systems. The alarm contact shall automatically reset when the starter is reset.

15. Provide each motor starter main "start" control relay or starter coil as applicable, with a magnetic coil auxiliary control "pilot" relay. The contacts of the auxiliary control relay shall directly control the starting, running and stopping control voltage of the motor starter main control coil circuit. The coil of the auxiliary relay shall condition and match the voltage and in rush of each motor starter to the requirements of the incoming control circuit.

16. Provide a transient surge suppressor for each motor starter coil, to limit voltage transients induced by the motor starter coil operation and to protect the motor starting circuit from voltage transients.
17. Motor starters connected to engine generator emergency power supply source (either direct connection or connection through an automatic transfer switch) shall each be provided with a field adjustable (0.1 - 180 seconds) "start" (on delay) time delay, to provide "staggered" sequenced starting of the connected motor load.

B. Full Voltage Non Reversing (FVNR), Unless Noted Otherwise
   1. Across the line full voltage magnetic electromechanical motor starter.
   2. Provide FVNR motor starter for motor sizes through 50-horsepower (241 to 600 volt) and through 30-horsepower (240 volt and under) where the motor is connected to normal power utility source, unless noted otherwise on Drawings.

C. Two Speed Motor Starters
   1. The two-speed motor starters shall be compatible with the connected motor and shall provide automatic two-speed control of separate high speed and low speed motor winding or consequent pole two-speed motors as applicable. The starters shall be constant horsepower, constant torque or variable torque as applicable for the motor connected to the starter.
   2. Low speed compelling control shall compel the motor starter to always start the motor on low speed before switching to high speed. Compelling control shall be manual switch selectable as either "in" or "out" (bypass) of the motor control circuits.

D. Reduced Voltage Non-Reversing (RVNR)
   1. General
      a. The reduced voltage starter shall reduce both motor starting current and motor starting torque.
      b. Reduced voltage starters shall be closed transition types.
      c. Provide RVNR motor starters for motors larger than 30-horsepower (240 volt and below) and larger than 50-horsepower (over 240 volts), reduced voltage type (Where the motor starter circuit is connected to engine generator emergency power source for motors larger than 5-horsepower, provide each respective motor with RVNR reduced voltage motor starters).
      d. Starters shall provide field adjustable time periods for acceleration (reduced voltage) and transition (transfer to full voltage) modes, with failure to transfer lockouts and pilot light annunciators. Adjustable time range shall be 0.1 to 15 seconds.
      e. Duty cycle - NEMA rated medium duty, starters shall provide for not less than one (1) 15-second duration starter operation in each 4-minute interval for a 1-hour period, followed by a cool down rest period of 2-hours before the duty cycle is repeated. Provide automatic temperature lockout to prevent exceeding starter duty cycle.
      f. Reduced voltage non-reversing RVNR Motor starters shall be types described in the following paragraphs.
   2. Autotransformer type reduced voltage starter
      a. Auto transformers on each phase with field adjustable transformer voltage taps for 50%, 65%, and 80% motor terminal starting voltages.
      b. Magnetic electromechanical motor contactor type.

2.04 COMBINATION MOTOR STARTERS

A. General
   1. Combination motor starters shall consist of a feeder tap device, motor starter and enclosure. Voltage and amperage rating as indicated on Drawings.
2. Combination motor starter shall not be less than NEMA Size 1, but in no case less than indicated on the Drawings.

3. Unit shall be self-contained floor standing, wall mounted NEMA 1 enclosures or as indicated on the Drawings. Constructed, Tested and Listed in accordance with NEMA, ANSI and UL standards.

4. Combination motor starters as manufactured by General Electric, Westinghouse, Square D, Cutler Hammer or equal.

5. Provide incoming line and outgoing load terminations, size and capacity to match connections shown.

B. Construction
1. NEMA styles metal enclosed, with full height hinged access door. 12-gauge welded frame members and 14 gauge panel members. All parts shall be removable and accessible from the front for ease of maintenance and rearrangement.

2. Provide removable lifting points and permanent anchor mounting points on the enclosure.

3. Hinged doors shall be mounted with removable pin hinges and secured with quarter turn indicating fasteners. A door interlock with manual defeat override shall prevent access to unit interior when the feeder tap device is in the "on" position.

4. Each metal surface shall be phosphatizing prime rust inhibitor painted and baked Enamel Finish Painted Manufacturer’s standard color.

C. Combination Motor Starter Short Circuit Coordination Protection
1. The combination motor starter shall be constructed and tested to comply with the following requirements.

2. Type 1 Coordination:
   Under short circuit conditions the contactor/motor starter shall cause no danger to persons or installation. Continued re-use shall be permitted after service, repair or replacement of parts.

3. Type 2 Coordination:
   a. Under short circuit conditions the contactor/motor starter shall cause no danger to persons or installation. Continued re-use shall be permitted without requiring any service, repair or replacement of parts.
   b. Motor starters shall also comply with International Electromechanical Committee (IEC) Type-2 short circuit protection, as recommended by the Manufacturer’s published protection tables and as Certified by UL.

D. Energy Efficient Motor Protection
1. Where a combination motor starter is connected to a high efficiency motor, provide one (1) of the following modifications to the starters or circuit disconnects. The modification shall prevent unnecessary tripping from locked rotor high inrush motor starting current:
   a. Circuit breaker or MCP short circuit protection - Provide circuit breaker/MCP with adjustable magnetic current trip for high inrush motor starting current, or adjustable time delay trip for high magnetic current motor inrush damping.
   b. Switch and fuse motor short circuit protection - Provide fuses with sufficient inherent time delay to allow passage of high magnetic current inrush motor starting current.
PART 3 - EXECUTION

3.01 INDIVIDUAL COMBINATION MOTOR STARTERS

A. Install motor control equipment in accordance with Manufacturer’s written instructions and applicable portions of NEMA “Standards of Installations” for switchboards and motor control centers and individual motor starters.

B. Bolt motor control equipment to floor and wall where wall exists. Where units are free standing provide preformed steel channel or angle iron bracing to nearest wall or building structural member. Motor control equipment anchoring shall be designed for a 1.0 gravity lateral acceleration of the equipment. Submit structural calculation and details.

3.02 IDENTIFICATION

A. Provide a red and white bakelite nameplate with ½-inch high letters fastened to face of dead-front plate, to read: “DANGER 480 (actual volts) VOLTS, KEEP OUT, AUTHORIZED PERSONNEL ONLY”.

B. Manufacturer shall stencil the panel number and name of the connected motor circuit on each device and equipment section to correspond to identification on the Drawing.

C. Identification plates and numbers shall be attached with screws or twist lock fasteners. Adhesive attachment of any kind as the only method of attachment shall not be used.

3.03 SETTINGS AND ADJUSTMENTS

A. Program and set control function sequences, time delays, and protective device settings for correct system operation.

B. Test all timing, control sequences and motor rotation direction for proper operation. Correct deficiencies and retest until proper operation is confirmed.

END OF SECTION 26 2419

031616/223029
SECTION 26 5000
LIGHTING FIXTURES

PART 1 - GENERAL

1.01 SCOPE

A. Work Included:
   All labor, materials, appliances, tools, equipment necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Specification Sections and Drawings for related work required to be included as work under Division 26.
   2. General provisions and requirements for electrical work.

1.02 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. General
   1. Submit certification letter from Manufacturers of Lamps and Ballasts and power/driver supplies, (or alternately, Manufacturer's published catalog data) stating/showing the specific lamp, ballast, or power/driver supply combination comply with Manufacturer recommendation and approval for the combined use, shown on the Drawings.
   2. Provide complete Manufacturers catalog data information for each light fixture (luminaire), ballast, power/driver supplies, lamps, materials, auxiliary equipment/devices, finishes and photometrics.

B. Performance Certification
   2. Submit Manufacturer’s letter of certification for each fixture type, confirming the proposed combination of specific lamp, ballast, power/driver supply and auxiliary components for each light fixture (luminaire) type will function together correctly and perform in compliance with the requirements of the Contract Documents as follows:
      "The proposed drivers, (where, applicable), lamp sockets and fixture have been tested as an assembly. The proposed fixture products assemblies are certified by the Manufacturer to function within the required temperature, lumen output, electrical characteristics and operational life described in the Contract Documents".

C. Light Fixture Samples
   1. If requested by the DISTRICT’S Representative, provide a sample of each fixture proposed as a substitution for a specified fixture. Sample fixture shall be complete with specified lamps, 3-wire grounding "SO" cord and plug for 120-volt 60Hz, AC plug-in operation. Sample fixtures shall be delivered to the DISTRICT’S Representative's office for review, the samples shall be picked up within 10-working days after review comments have been received; any samples left beyond this time will be discarded by the DISTRICT’S Representative. Decision of DISTRICT’S Representative regarding acceptability of any lighting fixture is final.
1.03 QUALITY ASSURANCE (ADDITIONAL REQUIREMENTS)

A. Work and Materials shall be in full accordance with the latest Rules and Regulations as follows. The following publications shall be included in the Contract Document requirements. If a conflict occurs between the following publications and any other part of the Contract Documents, the requirements describing the more restrictive provisions shall become the applicable Contract definition:

1. UL – Underwriters' Laboratory:
   a. UL – 8750 and 1598C: Light Emitting Diode – LED Equipment for use in Lighting Products and Replacements

2. NEMA – National Electrical Manufacturers Association:
   a. NEMA – LE4: Recessed Luminaries Ceiling Compatibility
   b. NEMA – SSL #1, #3 and #6: Electronic Drivers for LED; LED and Incandescent Lamp Replacement
   c. NEMA – LSD #44, #45, #49 and #51: SSL - Solid State Lighting

3. United States Federal Government:
   a. FCC – Part 18: EMI and RFI emissions limitations.
   b. EPA: Energy conservation publications and waste disposal regulations.

4. ETL and C.B.M. certified and approved.

5. Electrical installation standards, National Electrical Contractors’ Association:
   a. NEIS/NECA and IESNA – 500: Recommended Practice for Installing Indoor Commercial Lighting Systems.
   b. NEIS/NECA and IESNA – 501: Recommended Practice for Installing Exterior Lighting Systems
   c. NEIS/NECA and IESNA - 502: Recommended Practice for Installing Industrial Lighting Systems.

6. Illuminating Engineering Society – IES (IESNA):
   a. IES – LM41: Photometric and Reporting.
   b. IES – 587: Transient Surge Protection.
   d. IES – LM80: Testing for Lifetime of LED.

7. ANSI-American National Standards Institute:
   a. ANSI – C81
   b. ANSI – C82
   c. ANSI – C62.41: Transient Withstand
   d. ANSI – C78: Lamps


PART 2 - PRODUCTS

2.01 GENERAL

A. Complete Fixture
   1. Provide light fixtures complete including lamps, drivers, housings, ceiling and wall trim "rings" for each ceiling type, mounting and adapter support brackets, diffusers/lenses and outlet boxes.
   2. Include an allowance of $300.00 to provide a light fixture for each lighting fixture outlet shown on Drawings without a fixture type designation.
B. Specific Fixture Requirements and Fixture Schedule Information
   1. The catalog numbers included in the description of the various types of lighting fixtures shall be considered to establish the type or class of the fixture with a particular Manufacturer only. The fixture length, number of lamps and lamp types, component materials, accessories, mounting type, ceiling, wall and install adapters, operation voltage, and all other components required to fulfill the total description of the fixture based on all Drawing information, Branch Circuits, Voltages, Specification information, and shall be included in the Contract Requirements regardless of whether or not the catalog number specifically includes these components.
   2. Lighting fixtures shall be the types as indicated in Fixture Schedule on the Drawings and as described in the Specifications.
   3. All fixtures of the same fixture type shall be the same Manufacturer and of identical finish and appearance, unless indicated otherwise on Drawings.

C. Manufacturer Certification of Operation
   1. Lamps and lamp ballasts and power supplies (drivers) shall be recommended and certified by the respective Manufacturer(s), to be "matched" to operate correctly together, within the published characteristics, for efficacy, lamp starting, operating life hours, lumen output, power factor, power input, operating line ampere, sound intensity, and temperature.

2.02 BALLASTS AND POWER SUPPLIES (DRIVER-POWER SUPPLIES FOR LED-SOLID STATE LAMPS)

A. General
   1. All ballast, power supplies, lighting fixtures assemblies and components shall be ANSI, ETL approved C.B.M. Certified and UL labeled.
   2. Ballasts shall comply with FCC Part 18 Class-A and NEMA limits as to EMI or RFI and not interferes with normal operation of electrical or electronic data processing equipment.
   3. Open circuit voltage, starting voltage, crest voltage and lamp-operating voltage shall comply with requirements of the respective Manufacturer of the installed lamps.
   4. Lamp ballasts, power supplies and transformers shall be for use with the specific lamps provided as part of the Contract.
   5. Shall be suitable for use with automatic occupancy motion sensing type switching "on-off" control systems, with multiple "on-off" cycles per hour, on a 24-hours a day basis. Operation shall be without loss of performance in operating characteristics described in the Contract Documents.
   6. Fusing
      a. Shall be independently fused on the incoming line side within the fixture compartment.
      b. Alternately the Ballast Manufacturer may install the equipment fuse inside the ballast/power supply.
      c. Provide a label next to ballast cover reading: "Ballast (Power Supply) is fused, check fuse prior to relamping". Provide an additional quantity of 10% spare fuses and deliver to DISTRICT'S Representative.
   7. Ballast sound rating Class-A or better. Where sound-rating classification is not published, the ballast sound rating shall be the best of product manufactured. Ballasts, which are judged by the DISTRICT'S Representative to be excessively noisy, shall be removed and replaced at the CONTRACTOR'S expense with low noise ballasts.
8. Electronic solid-state ballasts and power supplies shall be the product of Manufacturer that has been producing electronic ballasts/power supplies for a minimum of 5-consecutive years prior to the date of the Contract.

9. Shall be designed and supplied to operate on the incoming line voltage system circuits to which the respective light fixtures are connected.

10. Shall not contain any PCB (polychlorinated biphenyl).

11. Power factor shall be not less than 0.90, starting and operating. The input starting transient line input ampere should never exceed lamp normal operating ampere by more than 10%.

12. Ballast and power supply disconnect:
   a. Lighting Fixture Manufacturer factory installed and prewired inside each light fixture, for lamp-ballast or lamp-driver power supply.
   b. Shall comply with UL-2459 and CEC/NEC. Shall disconnect (load-break) energized or de-energized ballast/driver from respective line voltage circuit and dimming circuit. UL-94V-0 flame retardant.
   c. Hot pluggable, multi-pole, insulated connectors, with strain relief and finger-safe squeeze-to-release latching function.
   d. Suitable for available voltage and ampere dimming and non-dimming lamp-balls and lamp-power supplies.

13. Ballast and power supplies as manufactured by General Electric, Advance, Philips, Universal, Sylvania/Osram or equal.

2.03 LIGHT FIXTURES (LUMINAIRE)

A. General
   1. Lighting fixtures shall have all parts, ballasts, sockets, support attachments, trim flanges and fittings necessary to complete and properly install the fixture at the indicated installation locations. All fixtures shall be provided with lamps of size and type specified.
   2. Ceiling and/or wall surface mounted lighting fixtures shall not have any exposed chase nipples or conduit knockouts visible to view within fixture housing. Lighting fixtures mounted in continuous rows shall have chase nipples or conduit knockouts between lighting fixture housing, but shall not have visible chase nipples/conduit knockouts on the visible ends of the continuous row of lighting fixtures.
   3. Where fixture color is indicated to be selected by the ARCHITECT and/or DISTRICT’S Representative, provide two (2) color chip samples for each color for review.
   4. Recessed fixtures with attached junction box shall be provided with a junction box permanently attached to the plaster ring so that the junction box is accessible through the fixture opening when the fixture is removed. Connection between fixture and pull box shall be flexible metal conduit with not less than 16 AWG "AF" or "CF" type fixture rated copper wires, high temperature wire insulation for not less than 600 volts AC. The flexible conduit shall be sufficient length, so that when the fixture is removed, the pullbox is readily accessible.
   5. Recessed fixtures shall be Underwriters’ Laboratory approved for recessed installation with plaster frame and attached pull box. Lamp enclosure, reflectors and finish wiring shall not be installed until plastering is completed. Exposed finish trim shall not be installed until finish painting of the adjacent surface is completed.
   6. The fixture shall bear Underwriters’ Laboratory label of approval for the wattage and installation indicated.
7. Light fixtures installed outdoors, in damp or wet locations shall be UL labeled for said location as "damp-location" and "wet-location" for the respective installation location.

8. Fixtures in contact with thermal/building insulation shall be UL listed and rated for direct contact installation in thermal insulation systems.

9. Lamp auxiliary support brackets shall be heat-resistant, non-dielectric. Alternatively, metal auxiliary lamp support brackets shall be electrically isolated from the fixture, to prevent glass decomposition.

10. Lighting fixtures installed in masonry and/or concrete construction. The fixture housing shall be rated for "concrete-pour" installation location.

11. Provide a permanent label inside each light fixture stating the following relamping information. Not less than 0.125-inch high black alphanumeric characters on white background.

"Replacement lamp(s) installed in this light fixture must comply with the following criteria:

*: CRI  *: Lamp Watts
*: CCT-K  *: Lamp Lumens

Only lamp rated * type lamp ballast shall be installed in this fixture."

*Insert the value required for the specific lamp required by the Contract Documents for each light fixture.

B. Lens and Diffusers
1. Acrylic plastic or Plexiglas for the light fixture diffusers or fixture lenses shall be 100% virgin material.

2. Thickness of not less than 0.125-inch, as measured at the "THINIST" portion on the diffuser or lens. However, thickness shall be increased to sufficient construction and camber to prevent the lens and diffusers from having any noticeable sag over the entire normal life of the installation.

3. Diffusers shall be formed from cast sheet by a vacuum and/or pressure technique.

4. Lighting fixtures containing lamps with dichroic reflectors and light fixtures with non-dichroic lens/diffuser shall be rated for high temperature lamp operations resulting from lamp heat redirected (reflected) back into the fixture.

2.04 SOLID STATE LIGHTING (SSL), LIGHT EMITTING DIODES (LED) LAMPS, POWER SUPPLIES, AND LIGHT FIXTURES (ADDITIONAL REQUIREMENTS)

A. General
1. Solid State LED light source (lamps), related control equipment (driver-power supply), and luminaire (light fixture) optics for light output distribution.

2. Shall comply with the US-DOE Energy Star Program for SSL-LED. Submit Documentation with Shop Drawings.


4. SSL chromaticity shall comply with latest revision NEMA and ANSI – C78.377. Submit Documentation with Shop Drawings.

5. Submit with Shop Drawings two (2) samples of each light fixture type employing SSL, with prewired 120 volt, 60Hz AC “SO” cord and plug-in cap.

B. LED Lamps
1. Lamp lumen output and overall efficiency shall be based on the LED lamps installed in specified fixture and ambient operating temperature.
2. Lamp Color Rendition Index (CRI) shall equal or exceed CRI – 80, unless noted otherwise on Drawings.
3. Lamp color output shall be 4000-degree K (± 100K), unless noted otherwise on Drawings.
4. CRI and lamp color temperature shall be same for all light fixtures of the same fixture type.

C. LED Power Supply (driver)
1. Combination of power supply and SSL – lamp shall be tested and certified by respective Manufacturers for performance and proper operation.
2. Provide dimming type driver where indicated on Drawings. Driver and dimming equipment shall be Tested and Certified by respective Manufacturers for performance and proper operation.

D. Self-Contained LED Lamp and Driver, Integral “Screw-Base” and/or “Pin-Connect”, replacement assembly for incandescent lamps.
1. Shall be dimmable. Dimmer and lamp shall be certified by respective Manufacturers for compatible correct operation with each other.
2. Optical system and operating temperature thermal performance shall be compatible with light fixture.

2.05 EMERGENCY BALLAST LIGHTING AND EMERGENCY DRIVER LIGHTING

A. General
1. Self-contained emergency ballast and power supply (driver) containing batteries, battery charger, solid-state electronic control and lamp/ballast/driver operation, contained within a metal case, red finish case color.
2. UL–924, listed Emergency Lighting and Power Equipment, for installation inside and/or attached to lighting fixtures.
3. The emergency battery supply unit(s) shall be provided inside each respective emergency light fixture by the Fixture Manufacturer.
4. Normal operating temperature range from 0-degrees Centigrade up to operating ambient temperature inside respective lighting fixture, but not less than 50-degrees Centigrade.
5. Provide a permanent label inside each emergency light fixture stating as follows, not less than 0.125-inch high black alphanumeric characters on a white background:
   "Warning – this fixture provides more than one electric power source. Disconnect both normal and emergency sources including battery sources prior to opening fixture. Written permanent records documenting regular (every 30 days) emergency lighting function testing results shall be kept on file by the DISTRICT."
6. UL and Manufacturer rated to supply the lamp and ballast/driver (power-supply) combination occurring in the respective light fixture, both dimming-type and non-dimming type light fixtures.
7. As manufactured by Bodine Inc. or IOTA-Engineering Inc.

B. Operation
1. Emergency mode

   When external AC electrical power fails, the emergency unit shall immediately and automatically switch to emergency mode. Maintain emergency lamp(s) illumination, while operating from the internal battery/electronics during the power failure for not less than 90-minutes continuous duration.
2. Normal Mode
When AC electrical power is restored, automatically switch lamp(s) operation to external AC operation and begin battery-charging mode.

3. Battery Recharge Mode
The battery charger shall automatically fully recharge discharged batteries in less than 24-hours, and prevent overcharging of the batteries, while maintaining a "float-charge" on the batteries.

4. The emergency battery unit shall operate not less than two (2) lamps in multi-lamp light fixtures and one (1) lamp in single lamp light fixtures. When operating in emergency mode and battery power, the lamp lumen output of each lamp shall be not less than 40% of the lamp normal full lumen output rating of the lamp operation on normal power. The lamp-lumen output shall be 100% of the lamp normal full lumen output rating when operating in normal mode.

5. The emergency ballast shall provide cold-strike start and hot-restrike operation of the fixture lamp(s).

6. Periodic automatic, internal self-test, simulating normal power loss and actual operation of emergency lamps on internal battery power. Auto self-test shall occur not more than 30-day intervals. Audible and visual trouble alarm display, with manual alarm reset/silence, for problems identified by autotest functions.

C. Electrical Characteristics
1. Emergency equipment shall operate on the same input AC voltage as the normally "hot" branch circuit supplying the respective light fixture. Maximum line input load shall not exceed 15% more than normal fixture electrical load.
2. The emergency equipment shall be compatible for correct operation with the specific lamp/ballast/driver combination contained in the respective light fixture.
3. The emergency equipment shall be compatible with switched (on-off), non-switched (continuously on) and dimmer controlled lighting fixtures/circuits.

D. Components
1. Sealed nickel cadmium batteries, maintenance-free, rated for continuous operation in high ambient temperature, with 7 to 10 year operational life expectancy.
2. When standing on the floor below the fixture the emergency ballast test/monitor control panel shall be visible and readily accessible when the fixture is installed. The control panel shall provide:
   a. Charging indicator visual annunciator to display the charger and battery status.
   b. Momentary test switch/pushbutton to manually simulate power failure test.

PART 3 - EXECUTION

3.01 LIGHT FIXTURE INSTALLATION

A. General
1. The CONTRACTOR shall verify actual ceiling and wall construction types as defined on the Architectural Drawings and furnish all lighting fixtures with the correct mounting devices, trim rings, brackets whether or not such variations are indicated by fixture catalog number. The CONTRACTOR shall verify depth of all recessed lighting fixtures with Architectural Drawings prior to ordering fixtures. Any discrepancies that would cause recessed lighting fixtures not to fit into ceiling shall be reported to the DISTRICT’S Representative prior to release of order to the Supplier of the fixtures.
2. On acoustical tile ceilings, fixture outlets shall be accurately located in the center, at the intersection of the four (4) corners or at the center of the joints of two (2) tiles.

3. The CONTRACTOR shall aim the exterior adjustable lighting fixtures after dark in the presence of, and at a time convenient to the DISTRICT’S Representative.

4. Fixtures shall be ordered and furnished to operate correctly on the branch circuit voltage connected to the respective fixture as shown on the Site Plan and Floor Plan Electrical Drawings. The voltages shown on the fixture schedule are for generic fixture information only.

5. Install and connect lighting fixtures to the circuits and control sequences indicated on the Drawings and to comply with respective Manufacturer’s instructions/recommendations.

6. Lighting fixtures in building interstitial spaces, in mechanical plumbing and electrical spaces/rooms, are shown in their approximate locations. Do not install lighting outlets or light fixtures until the mechanical, plumbing and electrical equipment/pipes/ductwork are installed; then adjust and install lighting in revised clear (non-interfering) locations to provide best even-illumination. Coordinate the locations with all other trades prior to lighting installation.

B. Lighting Fixtures Installed in Ceiling Support Grids - Suspended Lay-in "T-bar" and Concealed Spline Ceilings.

1. Provide two (2) seismic clips at opposite ends of each recessed light fixture, the clip shall connect to the ceiling grid main runners and the light fixture. The light fixture with seismic clips and ceiling grid runner connections shall resist a horizontal seismic force equal to the total weight of the light fixture assembly.

2. Each light fixture weighing 40-pounds or less and where the respective ceiling grid system is "heavy duty" type, shall be suspended directly from the ceiling grid or shall be suspended independent of the ceiling grid support system as approved by the AHJ. Each light fixture weighing more than 40-pounds or where the ceiling grid system is not a "heavy duty" type shall be supported independent of the ceiling grid and independent of ceiling grid support system.

3. Each light fixture supported independent of the ceiling grid system shall be supported with a minimum of four taut independent support wires, one wire at each fixture corner.

4. Each light fixture supported directly from the ceiling grid or ceiling grid support system shall be additionally connected with a minimum of two (2) independent slack safety support wires. One (1) wire at each opposite diagonal fixture corner. Each 3-feet by 3-feet and larger light fixture shall be supported in the same manner, except provide a minimum of four (4) independent slack safety wires, one at each fixture corner.

5. Light fixtures surface mounted to a suspended ceiling shall be installed with a 1½-inch steel – "C" channel which spans across and above a minimum of two (2) parallel main ceiling grid "runners" and concealed above the ceiling. Each channel or angle member shall be provided with a minimum of two (2) threaded studs for attaching to the fixture housing through the lay-in ceiling tile. Two (2) steel "C" channel members shall be installed for each 4-feet (or smaller) fixture. Install the channels within 6-inches of each end of the light fixture to span a minimum of two (2) ceiling grid parallel main runners. Provide two (2) seismic clips connecting the ceiling grid main runners to each steel – "C" channel. Provide a not less than two (2) taut independent support wires connecting to each channel. Bolt the light fixtures to the threaded studs on the channels or angles, to support the light fixture tight to the ceiling surface.
C. Fixture Supports
1. The support wires for light fixture support shall be 12-gauge steel (minimum). The wires including their building and light fixture attachments shall provide support capacity of not less than four (4) times the weight of the light fixture assembly. Provide additional light fixture support wires and building anchors to meet these requirements, as part of the Contract. The support wires shall be anchored to the building structural elements above the ceiling.
2. Pendant mounting fixtures shall be supplied with swivel hangers. Fixtures shall swing in any direction a minimum of 45 degrees of gravity, position. Fixtures shall have special stem lengths to give the mounting height indicated on the Drawings. Stem to be single continuous piece without coupling, and to be finished the same color as the canopy and the fixture, unless otherwise noted. The CONTRACTOR shall check all lock nuts and set screws to rigidly secure the swivel socket to the stem, and the stem to the outlet box. Fixtures shall be plumb and vertical. Where obstructions occur restricting 45-degrees free-swing of fixtures, the fixtures shall be "guy" wired to prevent fixtures from striking obstructions. The DISTRICT’S Representative shall approve method of guying. Swinging fixtures shall have an additional safety hanger cable attached to the structure and the fixture at each support, with the capacity of supporting four (4) times the vertical weight of the light fixture assembly.
3. Suspended fixtures weighing in excess of 40-pounds shall be supported independently of the fixture outlet box. Provide "air craft" (minimum 12 gauge) steel hanger cable for suspended fixtures route cable concealed or in pendant where possible. Each cable attachments shall support four times the weight of the fixture assembly. Securely attach the cable to the building structure.
4. Surface mounted fixtures installed on drywall or plaster ceilings and weighing less than 40-pounds may be supported from outlet box. Provide structural supports above drywall or plaster ceilings for installation of fixtures weighing more than 40-pounds and secure fixture to structural supports. The use of toggle bolts is prohibited.

C. Recessed Lighting Fixtures - Fire Rated Building Surfaces
1. Lighting fixtures recessed in ceiling or wall which has a fire resistive rating of 1-hour or more shall be enclosed in a fully enclosed backbox (except over fixture lens/diffuser). The material used to fabricate the "enclosed backbox" shall have a fire rating equal to that of the respective ceiling or wall.
2. The space from the fixture to the box enclosure shall be a minimum of 3-inches.
3. The backbox shall be concealed behind the fire rated ceiling and wall finish surface. The light fixture shall be provided with lamp ballast rated for (normal light output) operation in a "high" ambient temperature.

3.02 LENS AND DIFFUSERS
Lens, diffusers, internal reflectors shall be completely cleaned of all dust, dirt and fingerprints after the installation of the light fixtures and lamps, and after all trades have completed work and prior to occupancy of the facility by the DISTRICT.

3.03 COMMISSIONING LIGHTING FIXTURES (ADDITIONAL REQUIREMENTS)
A. General
1. Verify correct lighting control configurations and operation in each room.
2. Simulate normal source power failure by "opening" (turn off) building main service disconnect and verify connections and operation of each emergency lighting fixture.
3. Confirm "EXIT" sign directional arrows are visible in each "EXIT" sign.
4. Verify light fixture support-hangers, ceiling grid clips and seismic restraints comply with the Contract Documents.
5. Remove protective shipping/installation shields on fixtures. Verify fixtures and lamps are clean and free of construction debris. Clean light fixtures found to be contaminated or dirty.
6. Setup, program, and function test lighting control systems to perform each of the indicated control functions, area/room zones and sequences.
7. Provide “aiming”, directional adjustment of light fixtures, both indoor and outdoor. Aiming shall comply with Manufacturer's aiming diagrams, and as directed by District’s Representative.

B. Sample Spot-Check in each room the following lighting fixture information:
1. Lamp type and performance data.
2. Ballast type and performance data.
3. Combined lamp/ballast certification of performance and compatibility by respective Manufacturer.
4. Verify instructional signage is placed inside each lighting fixture in compliance with Contract Documents.

END OF SECTION 26 5000
031616/223029
SECTION 27 2000

ELECTRONIC NETWORK SYSTEMS INFRASTRUCTURE

PART 1 - GENERAL

1.01 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Specifications Sections and Drawings for related work required to be included as work under Division 26.
   2. General provisions and requirements for electrical work.

B. Provide Electronic Network Systems Infrastructure for the following systems:
   1. Computer Data Networks
   2. Telephone and Intercom Voice Communications
   3. Multimedia, Audio/Video/TV, (base band transmission television) LAN
   4. Other special systems described in the Contract documents.

1.02 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. Drawings Submittals
   1. Drawings shall be submitted on reproducible sepias and Autocad® Version 2.2 (or later revision) data files on CD/DVD-ROM disk, WINDOWS®-XP or Version-7 or Version-8 format.
   2. Submit redrawn Building Floor Plan for each building area, same scale as the Contract Drawing.
   3. Plans shall show walls, doors, windows, furniture, infrastructure, outlets and network systems equipment locations. Show point-to-point interconnecting cables, pathways, conduit, conduit sizes, circuit types, along with circuit identification names, numbers and quantities between all components.
   4. Provide scaled Elevation Drawings of each equipment rack, terminal blocks, terminal backboard and terminal room/closet showing location and arrangement of each equipment component, outlet and cable training provisions, with estimated weight of each complete assembly.
   5. Submit block wiring diagrams showing major system components, outlets, equipment racks, terminal blocks, signal loss with interconnecting circuit conductors, splices, portable patch cords and connectors. Riser type diagram shall be provided if the building has more than one floor level, with information shown on riser diagram corresponding for each respective floor.
B. Submit Manufacturer's standard catalog data for each component. The submittal shall be arranged in the order of the Specification and shall list the Specification paragraph number, the name, the proposed model and Manufacturer for each item as well as a reference indicating the specific piece of data which can be easily located in the brochure. The Manufacturer's data sheets shall be marked to indicate the specific item being proposed in cases where the sheet covers several types or sizes of items. The data sheet shall completely describe the proposed item. Where modification to the equipment is necessary to meet the operational requirements of the Contract Documents, the brochure shall include complete Mechanical and Electrical Shop Drawings, detailing the modification. The brochure shall include a listing of the outlet rough-in requirements for every device and equipment item. The applicable symbol which illustrates that rough-in item on the Job Plans shall be drawn on the proposal, opposite the description of the rough-in to facilitate locating the data by Field Personnel. Submit elevation and dimensional information.

C. Performance Calculation:
   1. Provide Engineered Calculations showing the Passive Cable System Signal Attenuation losses of the proposed installed system. The intent is not to require calculations for every system segment, port and outlet. The intent is to require engineered calculations for proposed typical worst case port to port; head end to farthest distance outlet and patch port to outlet signal attenuations.
   2. Provide calculations for a minimum of 50 complete channel/circuit paths. The calculations shall include attenuation insertion losses for each system component including individually itemized cable-fiber/wire; outlet, termination, connector, electronic component (if any), coupler and patch cord along the entire path from the head end equipment to the end use outlet.
   3. The calculations shall serve as the basis for verifying the system performance with the system testing specified in the Contract Documents.

D. Provide proposed nameplate and outlet identification/color coding system. Indicate proposed identification naming sequence and methods, itemized for review.

E. Submit Manufacturer Certified Test Reports showing Test Documentation for the proposed material that the material meets or exceeds the performance standards defined in the Contract Documents. The testing and results shall reflect worst case performance based on a minimum of ten samples. Tests shall be certified by a Nationally Recognized Independent Test Lab (i.e., ETL, UL, etc.). The Manufacturer shall certify in writing the material has been manufactured and tested to comply with the requirements defined in the Contract Documents.

F. Submit three (3) samples of each of the following, fully assembled with 24-inches of cable type connected:
   1. Copper wire outlet and connector, with each type of specified inserts.
   2. Copper cables and patch cords, each type.
   3. Patch panels each type.
   4. Coverplate each type.

1.03 APPLICABLE STANDARDS

A. Individual Component Production/Manufacturer Testing and Labeling.
   1. The equipment shall be UL listed, labeled, and approved for the application shown in the Contract Documents.
2. ETL (USA) each network systems infrastructure component. Third party testing, documentation and certification for performance compliance of each component with the UL, ANSI, TIA and EIA applicable Standards specified in the Contract Documents.

B. The complete system material, equipment, testing, installation, workmanship and installed performance shall comply with the mandatory requirements and the guideline/recommendation requirements of the following latest published version, supplements, latest revision including Addendums and TSB. Both the mandatory and advisory criteria shall be included as requirements of the Contract Documents:
   1. TIA-526 Optical Power and loss measurements – multimode and single mode fiber.
   2. ANSI/TIA/EIA-568C Commercial Building Telecommunications Standards.
   3. ANSI/TIA/EIA-569B – Commercial Building Standards for Telecommunications Pathways.
   5. ANSI/TIA/EIA-598B Optical Fiber Cabling Color-Coding.
   7. ANSI/TIA/EIA-607 Commercial Buildings Grounding and Bonding Requirements for Telecommunications.
   9. ISO/IEC 11801
10. National Electrical Code (NEC) and California Electrical Code (CEC) including Articles 770 and 800 with ETL verified testing and local code jurisdictions.
11. NECA/NEIS, National Electrical Contractors Association, National Electrical Installation Standards:
   a. 301 – Standard for Installation and Testing for Fiber Optic.
   b. 568-Standard for Installing Building Telecommunications Bonding and Grounding.
   c. 607-Telecommunications
12. Manufacturer’s recommendations for the respective equipment.

C. Network Performance
   1. The entire completed Electronic Network Systems Infrastructure shall be tested and provide electronic data/network and telephone/voice multi-channel communications latest revisions, standards and addendums for the following protocols:
      a. IEEE 802.3/ETHERNET latest revisions.
   2. Twisted pairs copper wire (100 meter path length unless indicated otherwise)
      a. 10Mbps 10Base-T, 100Mbps 100Base-Tx;
      b. 1000Mbps (1Gbps) 1000 Base-Tx;
      c. 10,000 Mbps (10Gbps) 10Gb Base-Tx.
      d. IEEE-802.3 for Power Over Ethernet (POE) and Power Over Ethernet-Plus (POE Plus).
   3. Fiber optic, 550 meter communications pathway distance, OM4 standard multimode and OS2 single-mode.
      a. 10Mbps 10Base-F1, 100Mbps 100Base-FX,
      b. 1000Mbps 1000Base-Lx-Sx
      c. 10,000 Mbps (10Gbps) for fiber optics
      d. Single Mode path length performance increase requirement to 3000 meters.
   4. IEEE 802.5/TOKEN RING.
   5. APPLETALK (Phone-net).
6. FDDI - Distributed data interface on fiber or copper wire, 100Mbps.
7. 100VG – Any LAN
8. TIA/EIA serial and Bi-directional RS-232 and RS-485, including Star-Hub repeaters.
9. ANSI - TPPMD 55Mbps, 155Mbps and 622Mbps Asynchronous Transfer Mode - ATM.

D. The Complete Telephone/Voice Infrastructure System shall be suitable for the telephone/voice analog and digital communications and VoIP protocols. The system shall be compatible with the telephone/voice equipment installed as part of the Contract.

E. Installation of All Infrastructure Equipment, Devices, Splices, Terminations, Cables, Outlets, etc. shall comply with Manufacturer's recommendations.

1.04 EQUIPMENT QUALIFICATIONS

A. Equipment
1. The Supplier of the equipment shall be the Factory Authorized Distributor and service facility for the brands of equipment and material provided.
2. Network systems infrastructure equipment and materials shall all be the product of one of the individual same Manufacturers as follows. Typical unless specifically described otherwise:
   Leviton or approved equal

B. Installation Certification
1. Work and material for cables, cable terminations, outlets and related components for infrastructure systems shall be performed by Certified Installers. The Installer shall be certified by the respective Product Manufacturers.
2. The Manufacturers of the indicated work and material shall provide an Installer education/training and certification program for the supplied products.
3. The Installers performing the Contract Work for the indicated products, shall have attended and successfully completed each of the respective Manufacturer's installation training education programs for the specified products.
4. Submit six (6) copies of the Manufacturer's Certifications for each Installer performing the work. The submittal shall be approved by the OWNER'S Representative prior to initiating any related Contract Work.
5. Contract material installed and work performed by Installers not complying with these requirements shall be removed. Removal of work and material not in compliance with these requirements shall done at the CONTRACTOR'S expense, without any additional cost to the Contract and without any additional Contract completion due date extensions. New material and work required to replace the non-complying removed work and material shall be provided at the CONTRACTOR'S expense, without any additional cost to the Contract and without any additional Contract completion due date extensions.

C. Extended Material and Performance Warranties
1. In addition to the warranty requirements described elsewhere in the Contract Documents, provide the following extended material and performance warranties. The warranty period shall be for not less than 15-years from the Contract Notice of Completion.
2. Warranty Scope includes materials and performance for network cables and terminations, network workstation plug-in outlets, and patch panel plug-in outlets, cable splices and connectors.
3. Repair or replace the defective material with new material at the Project premise, to comply with the performance standards outlined in the Contract Documents during the warranty period.

4. Submit seven (7) copies of proposed warranty statements, with Shop Drawing submittals.

1.05 ABBREVIATIONS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Terminology</th>
</tr>
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<tbody>
<tr>
<td>ACR</td>
<td>Attenuation to Cross Talk.</td>
</tr>
<tr>
<td>AHJ</td>
<td>Authority Having Jurisdiction.</td>
</tr>
<tr>
<td>Backbone</td>
<td>Circuit interconnections between MDF and IDF patch panel locations.</td>
</tr>
<tr>
<td>dB</td>
<td>Decibel.</td>
</tr>
<tr>
<td>dBm</td>
<td>Decibel referenced to a milliwatt.</td>
</tr>
<tr>
<td>Demarc</td>
<td>Demarcation location where operational control change occurs or ownership change occurs.</td>
</tr>
<tr>
<td>ft</td>
<td>Feet.</td>
</tr>
<tr>
<td>GHz</td>
<td>Gigahertz.</td>
</tr>
<tr>
<td>Gbps</td>
<td>Gigabits per second.</td>
</tr>
<tr>
<td>Horizontal Connection,</td>
<td>Circuit interconnections between and/or individual workstation outlet Horizontal location to respective IDF or MDF wiring equipment rack patch panel.</td>
</tr>
<tr>
<td>IDF</td>
<td>Intermediate Distribution Frame (horizontal or vertical cross connect) for an individual building area/ floor.</td>
</tr>
<tr>
<td>km</td>
<td>Kilometer-lkm.</td>
</tr>
<tr>
<td>kPSI</td>
<td>1000 pounds per square inch.</td>
</tr>
<tr>
<td>m</td>
<td>Meter = 39.37 inches.</td>
</tr>
<tr>
<td>Mbps</td>
<td>Megabits per second.</td>
</tr>
<tr>
<td>MDF</td>
<td>Main Distribution Frame (central/main cross connect) for multi-building site or for a single individual building.</td>
</tr>
<tr>
<td>MHz</td>
<td>Megahertz.</td>
</tr>
<tr>
<td>MIC</td>
<td>Micrometer</td>
</tr>
<tr>
<td>mm</td>
<td>Millimeter = 10^-3 meter.</td>
</tr>
<tr>
<td>NEXT</td>
<td>Near end cross talk.</td>
</tr>
<tr>
<td>nm</td>
<td>Nanometer = 10^-9 meter.</td>
</tr>
<tr>
<td>pF</td>
<td>Picofarad = 10^-12 farad.</td>
</tr>
<tr>
<td>Provide</td>
<td>Furnish, install and connect.</td>
</tr>
<tr>
<td>RTDE</td>
<td>Equipment rack mount fiber optic termination distribution enclosure, with fiber optic patch panel.</td>
</tr>
<tr>
<td>RMSE</td>
<td>Equipment rack mount fiber optic enclosure, splice only (without patch panel).</td>
</tr>
<tr>
<td>STP</td>
<td>Shielded individual twisted pairs copper wire.</td>
</tr>
<tr>
<td>ScTP</td>
<td>Shield Screened Twisted Pairs copper wire.</td>
</tr>
<tr>
<td>Trunking-Cable</td>
<td>Individually insulated twisted pair copper wire cable, consisting of 24-pair or more of conductors inside a common cable jacket. Terminate and connect to common terminal-block location at each end of the trunking-cable.</td>
</tr>
</tbody>
</table>
Um.......................................................Micrometer = 10^{-6} \text{ meter.}
USE ....................................................Universal Splice Enclosure.
UTP.....................................................Unshielded twisted pairs copper wire.
VOIP ...................................................Voice communications Over Internet Protocol.
WGNA.................................................WideBand Gigabit Networking Alliance.
Workstation or.....................................Spaces remote from the MDF/IDF terminal
Workstation location room/closet, where user equipment interacts
and connects with the electronic systems
infrastructure equipment connection outlet
device.
WMIC..................................................Wall Mount fiber optic cable Interface Cabinet.

1.06 MATERIALS AND METHODS

A. Material and Labor not complying with the Contract Documents shall be removed by
the CONTRACTOR from the Project Site. Material and labor complying with the
Contract Documents shall be provided.

B. All the cost to remove deficient work and material, provide work and material
complying with the Contract Documents and the direct, indirect, incidental damages
and Contract delays resulting from complying with these requirements shall be the sole
responsibility of the CONTRACTOR and shall be included in the bid price.

C. System Performance Requirements
1. The work, performance and type of materials provided as part of the Contract
shall comply with the following ANSI/TIA/EIA-568C and related standards for all
Electronics Network Systems Infrastructure work and materials described in the
specifications and shown the Drawings:
   a. Computer/data network systems: Category-6A
   b. Telephone/intercom voice systems: Category-6A
   c. Multimedia – audio/video/TV (baseband transmission television) systems:
      Category-6A.
   d. Intrusion Detection/access control systems: Category-6A
   e. Broadband transmission radio frequency for television, digital or analog
cable television, digital satellite system, broadcast quality Coaxial-RG6
   (QUAD SHIELDING).
   f. Trunking-cable, analog circuits copper wire twisted pairs: Category-5E.
2. The Electronic Network Systems Infrastructure system shall be based on “star-
topology”; for MDF to IDF backbone connections and workstation outlet to
MDF/IDF horizontal connections.

PART 2 - PRODUCTS

2.01 COPPER WIRE CABLES (TWISTED PAIRS)

A. General
   1. Conductors shall be copper wire, individually insulated and color coded, with
      multiple conductors arrange in twisted pairs.
   2. An overall non-conductive jacket shall encase the copper wires and any shielding
      (where shielding is specified) shall also be encased by the jacket.
3. Cables shall be UL listed, complying with NEC National Electrical Code, National Fire Protection Agency and NFPA requirements for each installation location shown. ETL tested and certified to comply with or exceed specified requirements.
   a. NEC - MPP/CMP, FHC-25/50 (Plenum type locations and locations where not continuously enclosed inside conduit).
   b. NEC - MPR/CMR (Vertical riser type locations).
   c. ANSI/TIA/EIA-568C; including related Standards, Amendments and TSB.

4. Electronic network systems infrastructure cables that are not installed inside conduit raceways. Electronic network systems infrastructure cables that are installed in concealed spaces including plenums and non-plenums; access floors, ceiling spaces, walls, floor, etc., and/or installed without continuous raceways. The cable insulation and jacket shall be listed and labeled “Limited Combustible Cable” (LC or LCC) and shall comply with the latest published revision of all of the following additional requirements.
   a. Limited combustible “FHC-25/50” per UL-2424.
   b. NEC/CEC;CMP, additional listing/labeling where the install location is an environmental air plenum, copper wire “FHC-25/50-CMP”.
   c. NFPA-90A; ceiling cavity plenums, wall cavity spaces and raised floor cavity plenums, limited-combustible.
   d. NFPA-5000; defines combustible material including wire and cable.
   e. NFPA-75 computer rooms and electronic equipment room.
   f. NFPA-13; spaces containing “Limited Combustible Loading”.

5. Cables shall qualify as 100% recyclable materials disposal, RoHS regulations complaint.

6. Cables installed in air plenums, air-handling spaces and cables installed without raceway or conduit shall also be UL listed and labeled for installation in air plenums.

7. Cables installed in raceways or in conduits below grade, or through in-grade manholes and pullboxes, shall be rated for installation in water/wet locations.

8. The outer cable jacket shall be imprinted with date, Manufacturer’s model and catalog number and Agency (AHJ) listing identification.

9. Copper wire Electronic Network Systems Infrastructure cable shall be a product of the same Manufacturer, including portable patch cables.

10. The outer jacket of cables with less than nine (9) pair of conductors shall be color-coded. The jacket color shall be different for each system type; multimedia; telephone/voice; computer/data network; and fiber cable jackets.

11. 300-volt RMS insulation material for each data conductor shall be the same material; shall be the same electrical characteristics and shall be the same dielectric constant, for all data conductors contained within the respective common cable jacket, along the entire installed length of the cable. Data cables employing differing insulation materials for individual data conductors contained within a common cable jacket are not acceptable and shall not be provided.

12. Propagation and “Skew” Rate
   a. Skew rate (nominal velocity of propagation delay) between any twisted pair in a combination of four (4) twisted pair conductors grouped in the same cable, shall not exceed 35-nano seconds between any wire pair contained in the conductor group, and as required by the cable Category rating, over a cable length of 328-feet (100 meters), for all frequencies up to the cable maximum frequency rating.
   b. Nominal velocity of propagation, exceeding 70% of the speed of light.
13. Large capacity feeder cables and trunking-cables
   a. Copper wire cables with more than twenty-four (24) twisted pairs of conductors shall be constructed with twenty-five (25) pair binder groups of conductors. The cable binder groups shall be enclosed in colored binders and assembled to form a single cable. The twisted pair/binder groups shall be enclosed with multi-layer dielectric protective sheaths underneath a cable jacket enclosing the entire cable assembly. A corrugated metal 100% shield shall be provided under the cable jacket enclosing all conductors.
   b. Cables shall be wet location rated and listed for installation in conduit, where the conduit is in a wet environment and/or high-temperature environment, including:
      · Underground conduit.
      · Inside manholes and pull boxes.
      · Outdoor conduit exposed to weather and/or sunlight.
   c. ANSI/TIA/EIA Category rating of cable assembly shall be Category-5E, trunking-cable.

B. Category-6A Computer/Data Enhanced Cables – [ScTP] [UTP]
   1. Category-6A cables shall be tested and shall pass the ANSI/TIA/EIA test recommendations for Category-6A.
   2. Operation Characteristics:
      a. Wire size 23AWG solid copper (23AWG stranded copper for portable patch cables)
      b. Quantity of twisted pairs As indicated but in no case less than four (4) twisted pairs
      c. Impedance 100 OHM ± 15%, 1-500Mhz
      d. Maximum Signal Attenuation 2.1dB @ 1Mhz
         Per 328-feet 3.8dB @ 4Mhz
         (100 meters) 5.9dB @ 10Mhz
         7.5dB @ 16Mhz
         8.4dB @ 20Mhz
         10.5dB @ 31.25Mhz
         15.0dB @ 62.5Mhz
         19.1dB @ 100Mhz
         27.6dB @ 200Mhz
         31.1dB @ 250Mhz
         34.3dB @ 300Mhz
         40.1dB @ 400Mhz
         45.3dB @ 500Mhz
      e. Mutual Maximum Capacitance of Any Pair 4.4nF/100m
f. Worst Pair "NEXT" Loss Per/328-feet (100 meters)
   67.0dB @ 1Mhz
   67.0dB @ 4Mhz
   67.0dB @ 10Mhz
   67.0dB @ 16Mhz
   67.0dB @ 20Mhz
   67.0dB @ 31.25Mhz
   65.6dB @ 62.5Mhz
   42.3dB @ 100Mhz
   58.0dB @ 200Mhz
   56.5dB @ 250Mhz
   55.3dB @ 300Mhz
   53.5dB @ 400Mhz
   52.0dB @ 500Mhz

3. ScTP, all the wires in the cable shall be enclosed in a common, 100% metallic 
   foil shield with copper "drain" wire, shield and drain wire located under the cable 
   jacket.

2.02 COPPER WIRE OUTLET CONNECTORS

A. General
   1. Connectors shall comply with FCC part-68 Subpart F for gold plating.
   2. Connectors shall be UL listed and shall comply with UL94V-0.
   3. Provide a removable blank dust cover for each plug-in outlet insert. The dust 
      cover shall protect the insert from contamination until a workstation or patch cord 
      is "plugged" into the outlet.
   4. Copper wire outlet connectors shall be color coded to distinguish telephone/ 
      voice separately from computer/data. The outlet cover plate shall be engraved to 
      identify telephone/voice, computer/data and other infrastructure outlets 
      separately.
   5. Copper wire outlet connectors shall be UL listed, complying with National 
      Electrical Code, ETL tested and certified to comply with or exceed specified 
      requirements, ANSI/TIA/EIA-568C including related Standards, Amendments and 
      TSB.
   6. Copper wire outlet connectors shall be the product of the same Manufacturer.

B. Universal Outlet Connector (for twisted pair Copper Wire Premise/Workstation Wiring 
   and copper wire patch panels).
   1. General
   a. Connections for twisted pairs copper conductors shall provide a universal 
      outlet connector between the building premise copper wire, and plug-in 
      workstation locations. Patch panel/equipment plug-in connectors. The 
      connector components shall assemble with "snap-in" spring loaded 
      retainers to prevent dislocation during insertion or removal of external plug- 
      in devices.
   b. The contacts shall be gold plated with a 250 insertion/withdrawal cycle 
      rating.
   c. Unless specifically noted otherwise the universal outlet connector shall 
      comply with ANSI/TIA/EIA-568C; related Standards, Amendments and 
      TSB.
   d. Operational characteristics shall match or exceed and shall be compatible 
      with the respective twisted pair’s cable.
e. A metal ground shield with EMI/RFI metal ground clip shall be provided where shielded cable is connected to the universal outlet connector for each universal outlet connector assembly.

f. Each universal outlet connector shall consist of three major components.
   1) Universal edge connector assembly.
   2) Plug-in adapter inserts.
   3) Connector housing.

   g. Provide snap-in blank removable insert covers for connector installed without plug-in adapter inserts.

2. Universal edge connector:
   a. Insulated assembly shall connect to the premise copper wire. The connectors shall be multiple plug type connector contacts, one contact (total of eight (8) contacts) for each individual premise wire connection interconnected to the individual wire terminations.
   b. Connector shall provide insertion of individual insulated copper wire, gas tight, 110-style punch down/displacement termination, for 22-26 AWG insulated premise wire.
   c. The edge connector assembly shall provide termination of eight (8) separate wire conductors, twisted or untwisted pairs, solid or stranded, shielded or unshielded, with color codes and numbered identification of each contact. Integral cable/conductor strain relief to prevent pullout of terminated premise wire conductors.

3. Plug-in adapter inserts:
   a. Plug-in adapter inserts shall be internally factory connected to the universal edge connector assembly to adapt the universal connector to the specific outlet type configuration (i.e. "RJ" style computer/data, telephone/voice, (multimedia) modular jacks, etc.).
   b. Inserts shall be certified for shielded or unshielded wire, to match premise wire type connected to the universal edge connector.
   c. Inserts shall provide correct pin-to-pin connections, electrical and mechanical matching characteristics for the specific equipment connected to the respective outlet.
   d. Inserts for different infrastructures shall be color coded with different colors from each other, for system identifications.
   e. Plug-in adapter insert type:
      1) Computer/data network systems:
         a) ANSI/TIA/EIA-568C, female modular jack 8-position/contact "RJ-45" style.
      2) Telephone/intercom voice systems:
      3) Multimedia audio/video TV (baseband only):
         a) ANSI/TIA/EIA-568C female modular jack 8-position/contact RJ-45 style.
         b) Each multimedia audio/video outlet location provides a Balun to match the circuit impedance of the premise wiring to the multimedia outlet signal type.

4. Connector housing:
   a. Connector housing shall contain the universal edge connector assembly and the plug-in adapter inserts in a rigid assembly. Connector housing shall provide integral cable strain relief for the premise wiring connection.
b. The connector housing shall mount to a metal panel, metal device cover plate or plastic device cover plate with spring loaded snap-in retainers. Nominal depth of connector housing behind the mounting panel and/or device cover plate shall not exceed 1.625-inch including premise wiring termination depth requirements.

2.03 COPPER WIRE PATCH PANELS

A. General
   1. Copper wire patch panels shall be UL listed, complying with National Electrical Code, ETL tested and certified to comply with or exceed specified requirements, ANSI/TIA/EIA-568C including related Standards, Amendments and TSB.
   2. Copper wire patch panels shall be the product of the same Manufacturer.

B. Equipment Rack Mounted Patch Panel
   1. Standard EIA 19-inch wide metal panel, Manufacturer's standard color. Prepunched for copper wire outlet connectors. Panel shall mount on an EIA Standard 19 inch wide enclosed or open frame equipment rack assembly. Nominal twenty-four (24) copper wire outlet connectors in a horizontal row, quantity of rows as required for total quantity of connectors. Provide not less than two spare empty rows for future copper wire outlet connectors.
   2. The patch panel shall provide the following self-contained functions.
      a. Copper wire cable termination including conductor/shield termination and strain relief.
      b. Plug-in copper wire outlet connectors for port to port patching with copper wire portable patch cords.
   3. Patch panel height shall be based on the quantity of copper wire outlet connectors described plus the specified space for future outlets and shall not exceed the following dimension height:

<table>
<thead>
<tr>
<th>Outlet Quantity</th>
<th>Nominal Patch Panel Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-24</td>
<td>3.5 inches</td>
</tr>
<tr>
<td>25-48</td>
<td>7 inches</td>
</tr>
<tr>
<td>49-72</td>
<td>10.5 inches</td>
</tr>
<tr>
<td>73-96</td>
<td>14 inches</td>
</tr>
</tbody>
</table>

   4. Horizontally mounted, cable support metal bracket shall be provided for each twenty-four (24) outlet/connector groupings. The brackets shall be bolted to the equipment rack located at the backside of the patch panel; the brackets shall support and provide strain relief for each incoming copper wire cable connecting to the patch panel.
   5. The copper wire connector installed in the patch panel shall be the same configuration, Manufacturer and type as the corresponding copper wire connector provided in the remote workstation outlet locations connecting to the respective patch panel outlet, unless indicated otherwise.
   6. Each multimedia, audio/video/TV multimedia and intrusion detection/access control outlet. Provide a Balun, to match the circuit impedance of the premise wiring and to the outlet signal type.
2.04 TELEPHONE/VOICE TERMINAL BLOCKS

A. General
1. Terminal blocks Type 110, shall consist of wiring blocks, connecting blocks, direct wire/patch cord cross connection and designation strips. Arrange in unitized, modular, vertical mounting sections, for telephone/voice.
2. Completely 100% front accessible for cross connections, terminating conductors, training, and fanning of cables. Rear access for any reason shall not be permitted.
3. Telephone/voice terminal blocks shall be UL listed, complying with National Electrical Code, ETL tested and certified to comply with or exceed specified requirements. Telephone terminal blocks and connections performance shall comply with ANSI/TIA/ EIA-568C and related Standards, Addendums and TSB and shall comply with and be listed under UL 1863. Category rating shall match the cables connecting to the patch panel.
4. The telephone/voice terminal blocks shall provide cross connection of telephone/voice four (4) pair premise copper wiring from telephone/voice handset outlets to multiple copper wire telephone/voice feeder cables and external free standing telephone equipment.
5. Each full height vertical section terminal block assembly shall terminate a minimum of 900 pairs (including specified spares for future construction phases) of telephone/voice conductors, plus associated cross connection wiring and patch cords in a nominal 20-inches wide by 90-inches high space. Provide multiple vertical sections of terminal block assemblies adjacent to each other, total quantity as required for quantity of telephone/voice conductor pairs and telephone/voice feeder cable pairs shown on the Drawings and requirements, plus specified spares.
6. Each telephone/voice terminal block vertical section assembly shall provide 15% or 100 (whichever is the larger quantity) of spare unused conductor pair terminals for future telephone/voice connections.
7. Provide a common ground bus in each terminal block section with a minimum of six (6) ground conductor termination positions, #10AWG through #6AWG.
8. Terminal blocks shall be the product of the same Manufacturer.

B. Wiring Blocks
1. One piece molded, die-electric thermoplastic blocks. The wiring block shall support and secure all the components of the terminal block assembly, and provide cable/conductor training and organization.
2. Fire retardant complying with UL 94V-0.
3. Standoff type support legs for mounting to backboard with pre-drilled anchor holes.
5. Horizontal index strip rows, for termination of not less than twenty-five (25) conductor pairs on each row. Color coded and marked in groups of four pairs or five pairs to match connecting cables.
6. Removable retainers at the ends of each horizontal connecting block index strip row, shall support cross connect wires at corner turns.
7. Distribution rings shall retain cross connect wire horizontal routing between terminations.
8. A full width, horizontal trough between each 100 pair wiring block shall provide a path for patch cord training and retention.
C. Connecting Blocks
1. Connecting blocks shall provide gas tight conductor electrical connections with conductor insulation displacement punch down slots, for insertion onto the telephone/voice wiring block index strips.
2. Connecting blocks shall electrically connect one-to-one between each conductor terminated at the wiring block index strips, and each cross connect/patch cord conductor terminated/connected to the opposite front side of the connecting block.
3. Both sides of the connecting blocks shall terminate telephone/voice UTP 22-26AWG stranded or solid copper wire individually insulated conductors. The front side of the connecting blocks shall also provide "plug-in" connections for portable patch cords, 110 style "plug-in" connectors.
4. Connection blocks shall be 4-pair insulated copper conductor type.
5. Provide insulated, removable termination caps for each connector block.
6. Connector blocks shall be marked to indicate tip and ring conductors and to indicate polarization.

D. Designation Strips
1. Designation strips shall provide retention of interchangeable labels. The labels shall show circuit identification of each terminated conductor pair.
2. The designation strips shall mount on the center and outside positions of the wiring block.

E. Telephone/Voice Cross Connection
1. The cross circuit connection between incoming and outgoing feeder cables and telephone voice outlet wiring shall be provided in the terminal block assembly.
2. The cross connection wiring shall terminate incoming and outgoing circuit conductors between respective connecting blocks.
   a. Direct connect cross connection shall provide internally wired one-to-one conductor twisted pair cross connection. Provide cross connection of each 4-pair telephone/voice outlet cable to corresponding 4-pairs of the telephone/voice feeder cable and cross connection of feeder to feeder cables, as applicable.
   b. Patch panel cross connect, 110 terminal connector style, plug-in. Provide one twisted pair, 110 connector type portable patch cords.
   c. Prewired 50 pin-Amphenol connectors:
      1) Provide factory prewired fifty (50) pin Amphenol connectors for connection from telephone/voice terminal blocks to the telephone switch equipment and Telephone Utility Company outside telephone service lines.
      2) Provide fifty (50) pair ANSI/TIA/EIA-568C and related Standards, Addendums and TSB cables, connected to fifty (50) pin Amphenol connectors at one end (telephone equipment connection) and connected to the respective telephone/voice terminal wiring blocks at the other end.
      3) The 50 pin Amphenol connectors shall group together and be positioned at the top of the respective terminal block section near the ceiling.
      4) The pin-to-pin conductor assignments shall conform to the Telephone Switch Manufacturer's requirements.
5) The Amphenol connector/cable assemblies shall connect to and extend the telephone/voice outlet premise wiring from telephone/voice terminal block to the telephone switch equipment. The Amphenol connector/cable assembly shall connect to and extend the Telephone Utility Company outside telephone service lines to the telephone switch equipment.

d. Prewired "RJ" style modular jacks
   1) Provide factory prewired eight (8) position/contact plug-in "RJ" style jacks for patch panel portable patch cord cross connects, located on the front side of the terminal blocks.
   2) The pin-to-pin conductor assignments shall conform to the Telephone Switch Manufacturer's requirements.

2.05 WORK STATION OUTLETS

A. General
   1. Engrave outlet cover plates with the port number corresponding to the port number at the respective terminal block, patch panel, or head-end equipment.
   2. The outlet cover plates shall be factory prepunched and formed to accommodate the installed outlet connector with attachment screws.
   3. Workstation outlets shall be UL listed, complying with National Electrical Code, ETL tested and certified to comply with or exceed specified requirements, ANSI/TIA/EIA-568C including related Standards, Amendments and TSB.
   4. Workstation outlets shall be the product of the same Manufacturer.

B. Computer/Data Workstation Copper wire Outlets
   1. The outlets shall be the same configuration and type as the corresponding connector provided in the copper wire patch panel outlet, unless noted otherwise.
   2. ANSI/TIA/EIA-568C, and related Standards, Addendums and TSB.
   3. The copper wire outlet connectors for twisted pair wire connections in computer workstation outlets shall be universal outlet connector RJ-45 type.

C. Telephone/Voice Handset Twisted Pair Wire Connection Work Station Outlets
   1. The copper wire outlet connectors provided in telephone/voice handset outlets, shall be universal outlet connector type, unless noted otherwise, ANSI/ TIA/EIA-568C and related Standards, Addendums and TSB.
      a. RJ-45 type
      b. [RJ-11 type]

D. Multimedia Audio/Video and TV Workstation Outlets
   1. ANSI/TIA/EIA–568C and related standards, addendums and TSB.
      a. RJ-45 type, for twisted pair wire connection.
      b. BNC for coaxial cable connection type
   2. At each audio/video, multimedia, TV outlet location provide a Balun, to match the circuit impedance of the premise wiring to the multimedia outlet type.

E. Outlet Boxes
   1. General for Low Voltage Outlets Requirements
      a. Shall be UL approved and labeled for Life-Safety Appliances.
      b. UL listed and label for low voltage CEC/NEC Class-2 wiring and devices.
      c. Shall be adjustable to fit into the wall/ceiling and attach into the wall/ceiling thickness at each install location.
      d. Provide cable “Strain-Relief” attachment and “Sharp-Edge” protection for each outlet cable connections.
2. Wall mounted
   a. Flush or surface wall mounted outlet box and size as indicated on the
      Drawings, but in no case less than 4.69-inches by 4.69-inches by 2.125-
      inches deep.
   b. Two (2) gang wide extension ring for outlet box to extend outlet flush with
      finish surface, or as noted on the Drawings.
   c. Two (2) gang wide cover plate, or as noted on the Drawings.

3. Pedestal Mounted "Poke-Thru".
   a. Shall combine a computer/data and a telephone/voice copper wire
      universal outlet connector in a duplex outlet in the pedestal/poke-thru
      outlet.

4. Inside flush floor boxes and other locations where indicated in the Contract
   Documents.

5. Low Voltage Outlets in Fire rated walls and ceilings
   a. Provide metal outlets for low voltage devices installed (recessed into) in fire
      rated walls or fire rated ceilings.
   b. Provide metal outlet box enclosed type, for each outlet location. Provide
      UL labeled and listed “Fire-Wrap” complete coverage protection on the
      exterior of each outlet box. The combined outlet box and “Fire-Wrap”
      protection shall be equal or greater than the respective wall or ceiling fire-
      rating location.

6. Low Voltage Outlets in Non-Fire Rated walls and ceilings
   a. Outlets for low voltage devices installed (recessed into) walls or ceilings,
      only where the wall/ceiling is not fire-rated.
   b. Provide the following for each outlet location
      1) Metal outlet box, enclosed type. All locations where one (1) or more
         conduit(s) are required to connect to the outlet, then only metal outlet
         box shall be provided.
      2) Or device mounting bracket with trim ring, without (backless) enclosed
         outlet box. Do not use bracket-trim/ring configuration where conduit
         connection to the outlet with conduit is required, provide metal outlet
         boxes. Shall provide attachment for low voltage device(s), cover
         plates and low voltage wire strain relief.

7. Low Voltage outlet installed into accessible suspended ceiling with removable
   ceiling panels.
   a. Support outlet independent of ceiling supports and ceiling.
   b. Provide a minimum of three (3) independent hanger wires for each outlet.
      Attach hanger wires to building structure above ceiling and to outlet.

8. Low Voltage Outlets in existing walls and existing ceilings
   a. Outlets installed (recessed into) existing walls or (recessed into) existing
      ceilings. Cut and patch to match existing surfaces for outlet installation.
   b. Provide “cut-in” retrofit mounting-attachment into existing ceiling/wall
      construction. Shall be UL rated for retrofit into “old-work”.
   c. Provide the following for each outlet location,
      1) Metal outlet box, enclosed type. Required for all Fire rated
         construction locations. Also permitted for non-Fire rated construction
         locations.
      2) Or device mounting bracket with trim ring. Permitted only for non-Fire
         rated construction locations only where no conduit connection to the
         outlet is required. Do not use in Fire rated construction locations. Do
         not use where conduit connection to outlet is required.
   d. Where the existing wall/ceiling existing fire rating is indeterminate,
      Contractor shall assume the existing fire rating is not less than 2-hours.
      Provide metal outlet box and Fire-Wrap for each recessed outlet box.
F. Multi-outlet Raceway Work Station Outlets
   1. Copper wire outlet:
      a. Where copper wire connection is indicated for the workstation outlet, provide one universal outlet connector for each outlet.
      b. Each universal outlet connector shall be single connector housing type.
      c. Provide a rectangular cutout and metal device plate in the raceway sized to Outlet Manufacturer’s recommendations. The workstation copper wire outlet shall mount a modular faceplate kit with outlet bezel and faceplate sized to match the workstation outlet.
      d. Offset the location of outlets for electronic network systems 6-inches in the raceway from other outlets, do not "stack" outlets one above the other in the raceway.
   2. Fiber optic outlet.

G. Combination Outlets
   1. Infrastructure outlet connectors shown at the same location for either wall box outlet locations and floor box outlets locations.
   2. The outlet connectors shall be installed in a common outlet box with a common cover plate in the respective wall location or floor location.
   3. In infrastructure patch panels install the connectors in the respective patch panels.

2.06 PORTABLE PATCH CORDS

A. General
   1. Provide portable patch cords for all copper wire and fiber optic cable infrastructure outlets:
      a. For interconnecting electronic network equipment to electronic network workstation outlets.
      b. For interconnecting equipment rack patch panel outlet patch locations with each other.
      c. For interconnecting patch panel outlets equipment rack mounted hubs, switches, routers, telephone equipment, A/V equipment, access control and intrusion detection equipment etc.
   2. Patch cords shall be factory assembled tested and certified with factory terminated plugs at each end. Field terminated portable patch cords shall not be permitted. Terminated plugs shall incorporate integral bending radius limiting molded “boots” and strain relief. Patch cord assemblies shall be rated for “heavy duty”, “high-abuse” service.
   3. Patch cords shall be UL listed, complying with National Electrical Code, ETL tested and certified to comply with or exceed specified requirements. ANSI/EIA/TIA-568C, related Standards, Addendums and TSB.
      a. NEC - OFNG/OFN for fiber optic portable patch cords.
      b. NEC - MPP/CMP/CMR/CMG/MPG for copper wire twisted pair portable patch cords.
      c. NEC - CATV for coaxial cable portable patch cords.
   4. Patch cords which are not installed shall be delivered to the OWNER in cardboard boxes. The patch cords shall be neatly bundled and tied together. Mark each box with quantity and type of cords contained in the box.
   5. Patch cords shall comply with the same cable communication performance, requirements, protocol requirements and testing requirements as the respective infrastructure cables and outlets to which the patch cords are intended to be connected (plug-in). Patch cords shall be the product of the same Manufacturer.
6. The outer jacket of each portable patch cord shall be imprinted with date, Manufacturer’s model and catalog number and AHJ listing identification.

7. Provide a permanent, visible, factory applied identification number on each end of each patch cord. The identification number shall be the same on each end. However, the numbers shall increase sequentially on each patch cord and shall be unique and not duplicated on other patch cords. Permanently apply the identification numbers on the cable jacket or connectors.

B. Twisted Pairs, Copper Wire Portable Patch Cords

1. Twisted Pairs portable patch cords, general:
   a. "Male" eight (8) positions modular "RJ" male style jacks install on each end of the patch cord cable. The jack shall be provided with a rear "fin" to prevent the plug tab from snagging when pulled backwards through adjacent wiring. RJ-45 style "male" jack, typical unless noted otherwise.
   b. Patch cord cable shall be UTP [or ScTP] and ANSI/EIA-Category rating, shall match respective premise wiring, 4-pair twisted, stranded copper individually insulated wires, thermoplastic jacket over all the wires and shield.
   c. Connectors shall comply with FCC 68.5 and Part 68 Subpart F.
   d. Connectors UL listed and shall comply with UL-94V-O.
   e. Contacts gold plated with not less than a 750 insertion/withdraw cycle rating.

2. Portable patch cord quantities and lengths for connecting port-to-port equipment rack patch panels
   a. Patch cord quantity: Provide one (1) complete patch cord assembly for each copper wire equipment workstation outlet patch port in the equipment rack patch panels. One-to-one straight through pin-to-pin wiring. Provide additional spare patch cords, quantity equal to 25% of the total quantity of patch cords provided for copper wire computer workstation outlets in the equipment rack patch panels. Cable jacket color shall be blue:
   b. Provide the following lengths of copper wire patch cables for copper wire equipment rack patch panel outlets.
      1) 2-feet long - 10% of total quantity
      2) 4-feet long - 30% of total quantity
      3) 6-feet long - 30% of total quantity
      4) 10-feet long - 20% of total quantity
      5) 16-feet long - 10% of total quantity

3. Portable patch cord quantities and lengths - for connection from equipment workstations to equipment workstation outlets, located remote from equipment racks.
   a. Patch cord quantity: Provide one complete patch cord assembly for each copper wire workstation outlet located remote from the equipment rack patch panels. Provide additional spare patch cords, quantity equal to 15% of the total quantity of patch cords provided for each copper-wire computer workstation outlets. Cable jacket color shall be blue:
      1) Infrastructure network outlet segments the pin-to-pin patch cord wiring configuration and jacks shall be compatible with the equipment protocol communications interface, and the respective workstation outlet.
b. Provide the following lengths of copper wire patch cables for equipment copper wire infrastructure network workstation outlets. The patch cords shall provide internal cross-over wiring to conform the pin-to-pin connections required between the equipment workstation outlet and the equipment protocol communications interface installed in the respective workstation equipment:
   1) 8-feet long - 30% of total quantity
   2) 15-feet long - 70% of total quantity

4. Portable patch cord quantities and lengths for connection from electronic equipment rack patch panel ports to equipment installed in equipment racks, such as HUB’s, servers, switches, router, telephone and concentrator equipment ports. Cable jacket color shall be white.
   a. Patch cord quantity: Provide one complete patch cord assembly for each copper wire outlet port located in electronic equipment. Provide additional spare patch cords, quantity equal to 25% of the total quantity of the equipment rack equipment ports.
      1) The pin-to-pin patch cord wiring configuration and jacks shall be compatible with the respective equipment and patch panel outlets as applicable.
   b. Provide the following lengths of copper wire patch cables for outlet ports located in electronic equipment installed in equipment racks. The patch cords shall provide quantity of conductors, wiring shall conform the pin-to-pin connectors and jack/connectors to the ports in the equipment mounted in the equipment racks.
      1) 4-feet long - 15% of total quantity
      2) 6-feet long - 30% of total quantity
      3) 10-feet long - 35% of total quantity
      4) 16-feet long - 20% of total quantity

5. Portable patch cord quantities and lengths for connection of equipment requiring customized pin-to-pin wiring configurations and/or customized port connector configurations. Cable jacket color shall be tan.
   a. Patch cord quantity: Provide one complete patch cord assembly for each outlet port install as part of the Contract and not identified in any other patch cord descriptions. The patch cords shall be customized and configured to comply with the respective Manufacturers recommendations.
   b. Provide one patch cord for each port-to-port connection length as required for actual installation condition.
      1) Provide 100% spare but not less than one spare patch cord for each custom configuration.

C. Telephone/Voice Copper Wire Portable Patch Cords-110 style
   1. 110 style jacks for plugging into the 110 style connecting blocks located in the telephone/voice terminal blocks.
   2. Patch cords shall be UTP 4-pair 2-pair, 3-pair twisted; 24AWG stranded copper individually insulated wires with a thermoplastic jacket over all the wires. Cable shall be ANSI/TIA/EIA-568C.
   3. Patch cord quantity and length - telephone/voice terminal block:
      a. Provide one complete patch cord assembly for each copper wire telephone/voice outlet connecting to the telephone/voice terminal block. Provide additional spare patch cords, quantity equal to 25% of the total quantity of patch cords provided for telephone/voice 110 patch cords.
      b. Provide the following lengths of copper wire patch cables for telephone/voice 110 style connecting block portable patch cords.
         1) 3-feet long - 25% of total
PART 3 - EXECUTION

3.01 NETWORK CABLE TESTING AND COMMISSIONING (ADDITIONAL REQUIREMENTS)

A. General

1. In addition to the testing recommended in ANSI/TIA/EIA-568C and related standards, Amendments and TSB. End-to-End test 100% of all individual optical fiber, individual copper wire conductors, each outlet and each connector in all terminated and unterminated cables, portable patch cord, outlets and patch panels provided in the Contract, shall be tested after installation as a complete channel pathway installation, splicing outlets and termination is completed, including the following end-to-end tests on each installed individual circuit:
   a. Each circuit wire and fiber map and length
   b. Each circuit insertion Loss
   c. Each circuit NEXT (Pair-to-Pair) Loss
   d. Each circuit NEXT Loss (Power Sum) PS
   e. Each circuit ELFEXT Loss (Pair-to-Pair)
   f. Each circuit ELFEXT Loss (Power Sum) PS
   g. Each circuit return Loss (RL)
   h. Each circuit propagation delay
   i. Each circuit propagation delay-skew

2. The test equipment and (Tester) shall comply with the accuracy requirements for Field Testers as defined in the ANSI/EIA/TIA Standards for the specific cable type. The Tester including the appropriate interface adapter shall meet the specified accuracy requirements. The Tester shall be within the calibration period recommended by the vendor in order to achieve the vendor-specified measurement accuracy. The Tester shall be calibrated to extend the reference plane of the Return Loss measurement to the permanent link interface. The CONTRACTOR shall provide proof that the interface has been calibrated within the period recommended by the vendor.

3. The Pass or Fail condition for the channel pathway link-under-test is determined by the results of the required individual tests (ANSI/EIA/TIA) Any Fail result yields a Fail for the link-under-test. In order to achieve an overall Pass condition, the results for each individual test parameter must Pass. A Pass or Fail result for each parameter is determined by comparing the measured values with the ANSI/EIA/TIA test limits for that parameter. The test result of a parameter shall be marked with an asterisk (*) when the result is closer to the test limit than the accuracy of the field test. The Field Test Equipment Manufacturer shall provide documentation as an aid to interpret results marked with asterisks.


5. Provide six (6) copies of all test reports, bound in three ring binders. Provide three (3) digital CD/DVD ROM copies. Organize test reports into rows-and-columns spread-sheet format, with data common groupings by IDF and NDF location. Submit to Owner’s Representative.

6. The CONTRACTOR shall repair or replace equipment, cables, outlets, connectors, splices, terminations, etc. identified during testing as not complying with the Contract Documents, without additional cost to the Contract. Retest all replaced or repaired components at CONTRACTOR’S expense.
B. Twisted Pair Copper Wire Testing
   1. Channel insertion loss (dB).
   2. Channel near-end cross-talk NEXT loss (dB).
   3. Channel equal-level far-end cross-talk ELFEXT (dB).
   4. Channel return loss (dB).
   5. Channel power sum PSACR (dB).
   6. Channel propagation delay, propagation speed, and delay skew.
   7. Channel wire map and circuit length.
   8. Channel ring-out test for continuity and correct point-to-point matching terminals.
   9. Channel DC resistance and capacitance.
  10. Channel attenuation-to-cross-talk ratio ACR.

3.02 COPPER WIRE CABLE TYPE

A. General
   1. Cables shown as copper wire type shall comply with the following installation conditions, unless noted otherwise on the Drawings.
   2. Provide matching compatible outlets and terminate all copper wire cables into matching copper wire connectors.

B. Cable Types and Quantities - Cable types and quantities shall be as follows unless specifically noted otherwise on the Drawings. The following minimum type and quantity of copper wire cables from each individual workstation/device outlet, to the respective terminal equipment patch panel/bay, (unless specifically noted otherwise), but in no case less than what is shown on the Drawings and in no case less than one (1) 4-pair cable to each outlet “Jack” position:
   1. Two (2) Category-6A, UTP 4-pair cable:
      a. Each network workstation outlet location.
      b. Each network “wireless-access-point” outlet location.
   2. One (1) Category-6A UTP 4-pair cable, for each telephone handset (instrument) workstation outlet location.
   4. Other locations as indicated on the Drawings or described in Contract Documents.

C. Provide plenum rated copper wire cable for any of the following installation location conditions in building spaces.
   1. Any air plenum (supply or return) when a conduit or enclosed raceway is not provided for the entire cable length. Additionally, cables shall be rated Limited-Combustible (LC) type UL FHC-25/50.
   2. All building space locations where the cable is installed without a conduit or the cable is not fully enclosed in a raceway along the entire cable length in the building. Additionally, cables shall be rated Limited-Combustible (LC) type UL FHC-25/50.
   3. Building spaces and/or cavities that are 100% fully protected with fire sprinklers, including fire sprinklers located above in ceiling cavities and fire sprinklers located below in access floor cavities. Cables installed in these locations shall be rated with one or more of the following additional characteristics.
      a. Limited–Combustible (LC) UL FHC-25/50 plenum rated cable.
      b. Or plenum rated cable without the UL FHC-25/50 Limited-Combustible (LC) rating.
D. **OSP Insulated Copper Wire Cables**
   1. Outside – Plant (OSP) CEC/NEC rated, UL listed, labeled and approved insulated copper wire cable assemblies. Moisture barrier resistant and UV resistant cable jacket. Non-flammable, water blocking, non-conductive gel internally filled infrastructure cable assembly.
   2. Provide rated insulated copper wire OSP type cable for any of the following copper wire infrastructure cable install locations.
      a. In underground conduit or in conduit under the building.
      b. In conduit exterior to the building, or in conduit exposed outdoor on the building.
      c. Outdoor aerial with aerial messenger wire cable carrier.
   3. Except for aerial install locations, install all OSP cable in continuous conduit pathways, end-to-end.

### 3.03 CABLE INSTALLATION

**A. General**

1. Cables connecting to equipment racks and terminal blocks shall be installed with not less than 6-feet of slack cable between the equipment rack/terminal block and terminal backboard. The slack cable shall be coiled and supported on the backboard and/or cable tray.
2. Cables in terminal closets and terminal rooms shall be trained, dressed and racked on the plywood backboards. Provide cable, metal support arms and re-enterable type cable support rings not less than 12-inches on center mounted onto the plywood along the entire length of all cables.
3. Provide separate routing paths on plywood backboards for fiber optic cables, computer data and copper wire cables and telephone/voice copper wire cables and multimedia, audio/video, TV cables. Provide separate routing paths on plywood backboards for shielded copper wire cables and unshielded copper wire cables.
4. Cables shall be routed parallel to floors and walls. Do not route cables diagonally on backboards.
5. **Spare cable slack**
   a. Provide 25-feet of cable slack where unterminated cables are specified at terminal backboards.
   b. Provide a minimum of 18-inches of slack cable in each workstation outlet box and outlet locations.
   c. Provide 10-feet of cable slack in ceiling above each work station outlet.
   d. Provide 24-inches of slack in each cable at patch panel locations.
   e. Coil and "Velcro" wrap slack cable.
6. Provide “horizontal wiring” cables installed from individual equipment locations and workstation outlets to respective MDF/IDF terminal closet/room patch panel. Cables shall be continuous without cutting or splices.
7. Provide “backbone” cables installed from each IDF location to respective MDF/Sub-MDF location terminal closet/room patch panels. Cables shall be continuous without cutting or splices.

**B. Cable Pulling Lubrication**

1. Cable pulling lubricants shall be specifically approved by the Cable Manufacturer. The following lubricants shall be used where approved by the Cable Manufacturer.
   a. Slip X -300, American Colloid Co.
   b. Bishop #45, Bishop Electric.
   c. MacLube CA51, MacProducts.
d. Minerallac H2B, Minerallac Electric.

e. Winter grade #7437-PC, General Machine Products.

f. Gel-lube 7/5, Cable associates.


2. Lubricants shall be continuously applied as cable enters raceway.

C. Cable Installation:

1. Do not pull conductors until factory test reports have been submitted and reviewed.

2. Minimum bending radius of fiber optic cables shall not be less than the following. Maximum pulling tension shall not exceed the following. In no case shall the Manufacturer's recommendations be violated.

<table>
<thead>
<tr>
<th>Cable Type</th>
<th>Cable Fiber</th>
<th>Minimum Bend Radius</th>
<th>Maximum Pulling Tension</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loose Tube</td>
<td>2-84</td>
<td>9 inches</td>
<td>600 pounds</td>
</tr>
<tr>
<td>Loose Tube</td>
<td>86-192</td>
<td>10 inches</td>
<td>600 pounds</td>
</tr>
<tr>
<td>Tight Buffered</td>
<td>2-12</td>
<td>5 inches</td>
<td>400 pounds</td>
</tr>
<tr>
<td>Tight Buffered</td>
<td>14-24</td>
<td>7 inches</td>
<td>600 pounds</td>
</tr>
<tr>
<td>Tight Buffered</td>
<td>26-28</td>
<td>11 inches</td>
<td>1100 pounds</td>
</tr>
<tr>
<td>Tight Buffered</td>
<td>48-72</td>
<td>12 inches</td>
<td>1200 pounds</td>
</tr>
</tbody>
</table>

3. The minimum bending radius for copper wire cables shall be 10 times the cable outside diameter. The maximum pulling tension and minimum bending radius shall not violate Manufacturer's recommendations.

4. Cables installed in manholes and pullboxes on terminal backboards shall be installed on wall mounted cable support racks.

5. Provide a full 360-degree loop of cable around manhole and pullbox interiors.

6. The attachment of pulling devices directly to the cables shall be with individual split mesh basket grips. Direct connection for pulling cables to cable fibers and copper wires shall not occur. Securely tape cable ends to prevent moisture or pulling compound from penetrating cable.

7. The attachment of the pulling device to the cable basket grips shall be made through a swivel connector.

8. The Contractor shall ensure that the cables are fed straight into the raceway taking care to avoid short bends, sharp edges and cable "cross-overs".

9. All lashings used for temporary bunching of the individual cables shall be removed before the cables enter the raceway.

10. Cables shall be "pulled through" or pulled from a "center of run pull" without splices or terminations and minimize cable rolling tension. Lead-out the cables at all manholes, pullboxes and conduits taking care to feed them in again by hand for the next portion of the cable run.

11. For each cable pull where a cable direction change is required, flexible feed-in tubes, pullout devices, multi-segmented sheaves etc. shall be used to insure proper cable pulling tensions and side wall pressures. Cables shall not be pulled directly around a short right angle bend. Any device or surface the cable comes in contact with when under pull-in tension shall have a minimum radius 50% greater than the final specified minimum installed cable bending radius. The maximum possible size radius sheaves and feed-in tubes, usable in the available working space, shall be provided in all situations, to insure the minimum possible cable side-wall pulling pressure. Do not use devices with multi-segment "roller" type sheaves.
12. Cable lengths over 50 feet shall be machine pulled not hand pulled into and through all raceways. Cables shall be pulled in a continuous, smooth operation without jerking or stop-start motion after initiation of pull. Maximum cable pulling speed shall be less than 50 feet per minute. Minimum cable pulling speed shall be greater than 15 feet per minute.

13. Cables shall be pulled straight into or out of the raceway without bends at the raceway entrance or exit. Pull in cable from the end having the sharpest bend (i.e., bend shall be closest to reel). Keep pulling tension to minimum by liberal use of lubricant, hand turning of reel, and slack feeding of cable into duct entrance. Employ not less than one man at reel and one at manhole or pull-hole during this operation. Cables shall be pulled directly from cable reels.

14. Cables shall be trained or racked in trenches, vaults, manholes and pull boxes with consideration given for the minimum specified bending radius of the cable and the possibility of cable movements due to load cycling. The cables shall be racked and supported in such a manner that adequate space is allowed for splicing and the cables shall always be fanned out from the duct or conduit so as not to cross other ducts, conduits or cables. To prevent damage from falling objects or Personnel entering the manhole the cables shall not pass directly under the manhole opening.

15. Existing conductors shall be protected at all times when Contract Work occurs in the same area, including but not limited to pullboxes, vaults manholes, cable trenches etc. Provide temporary electrical insulating blankets and barriers over existing conductors to reduce the possibility of accidental mechanical damage to existing conductors.

16. Where cable tray is provided, all cables shall be routed and trained on the cable tray. The cables shall enter the cable tray and route along the tray prior to entering any equipment racks or computer works station outlets.

17. A dynamometer to measure pulling tension shall be used on all cable runs in excess 200-feet or with more than 180 degrees in bends. The actual pulling tension value shall be calculated and recorded for each pull.

18. Bends shall not be made in cable splices or terminations.

19. The portions of cables installed without raceways or cable tray supports shall be installed with metal “J-hook” cable supports.
   a. The “J-hooks” shall provide multi-tiered “J” shaped hooks, with wide flat cable support base (0.5 inch wide minimum) and smooth rounded corners. Specifically designed for copper wire and fiber optic infrastructure cable support as manufactured by Erico Inc.
   b. The individual “J-hook” attachment to the building structure shall be metal, “beam clamp”, “hanger rod”, clevis hanger styles as applicable for each attachment location.
   c. Install “J-hooks” not more than 48-inches on center along the entire cable length and within 6 inches of each cable change in direction. Locations of “J-Hooks” and tension of cables shall insure between 4-inches and 6-inches of cable sag between adjacent hooks. Secure cables to “J-hooks” with re-enterable cable tie wraps. “J-hook” supported cables, bundle cables together with re-enterable tie wraps not less than 12 inches on center along the entire cable length.
   d. Each J-hook shall not support more than 12 individual cables. Provide multiple “tiered” J-hooks for additional cable quantities at each location.
   e. “Bridle rings” shall NOT be used to support cables.
   f. Cables shall not lie directly on nor attach to ceilings, ceiling hangers, lighting fixtures, air ducts, piping, or equipment.
20. Re-enterable cable tie wraps shall be, “limited-combustible” and air plenum rated, reusable, color coded. Chemically and mechanically compatible with the respective cables and install locations. Shall allow multiple open-close operations for securing cables.

21. Electronic network cables containing non-dielectric components shall be installed with a minimum separation from other electrical power conductors and equipment as follows:

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Minimum Separation</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Lighting fixtures</td>
<td>12 inches</td>
</tr>
<tr>
<td>b. Electric motors, electric solenoids, electric Heaters</td>
<td>40 inches</td>
</tr>
<tr>
<td>c. Transformers</td>
<td>48 inches</td>
</tr>
<tr>
<td>d. Circuits over 100 volts to ground, in metallic raceways</td>
<td>5 inches</td>
</tr>
<tr>
<td>e. Circuits over 100 volts to ground, in non-metallic raceway or without any raceway</td>
<td>12 inches</td>
</tr>
<tr>
<td>f. Circuits over 100 volts to ground, suspended on overhead pole lines</td>
<td>48 inches</td>
</tr>
</tbody>
</table>

D. Movement, Storage, and Handling of Cable:
1. Reels of cable shall not be dropped from any height, from trucks or other transporting equipment.
2. Lift and move cable reels using following methods:
   a. Crane or boom type equipment-insert shaft (heavy rod or pipe) through reel hubs and lift with slings on shaft, with spreader or yoke to reduce or avoid sling pressure against reel head.
   b. Forklift type of equipment may be used to move smaller, narrower width reels. Fork tines should be placed so that lift pressure is on reel heads, not on cable, and shall reach all the way across reels so lift is against both reel heads.
   c. Reels may be moved short distances by rolling. Reels shall be rolled in the direction indicated by arrows painted on reel heads. Surfaces over which the reels are to be rolled shall be solid clear of debris, and also clear of protruding stones, humps, etc. which might damage the cable if the reel straddles them.
3. Storage of reels of cable:
   a. Cable ends shall be sealed prior to shipment to prevent moisture entry into cable. Cable ends shall remain sealed at all times including during installation. Where ends seals are removed, reseal cable ends by stripping cable finishes back 2-inches down to insulation. Then apply four layers of an insulating tape criss-cross over the cable end and carry back at least 4-inches onto cable outer finish. Add a containing cover of two layers of vinyl electrical tape completely over the end seal.
   b. Cable reels shall be shipped with factory applied lagging (protective cover) left in place until removal is absolutely necessary. Additional covering such as tarpaulin, plastic sheeting, etc. shall be used if cable is to be stored outdoors.
   c. Store reels of cable on a firm surface, paved, or on planking to prevent settling into soft ground.
   d. Use fencing or other barriers to protect cables and reels against damage by vehicles or other equipment moving about in the storage area.
3.04 CABLE SPLICES

A. General
1. Splice(s) in cables shall occur only in the following locations:
   a. Pullboxes or manholes.
   b. Terminal backboard, closets or rooms.
   c. Equipment racks.
   d. Wall mounted interface cabinet.
   e. Do not splice cables in conduit, cable tray, raceways or plenums.
2. Polarity and color-coding shall be maintained consistent through splices, terminations and outlets for the entire electronic network system.
3. Cable splices in outdoor areas, manholes, pullholes shall be water tight, inside universal splice enclosures.

B. Copper Wire Splice
1. Copper wire extending from infrastructure workstation outlets to respective equipment rack patch panel outlets shall not be cut or broken and shall be continuous end to end.
2. Copper wire extending from telephone/voice workstation outlets to respective terminal blocks shall not be cut or broken and shall be continuous end to end.
3. Continuity of cable shields (where occurs), polarity and color coding shall be maintained across all splices.
4. Copper wire splices shall be performed to maintain the data transmission rates specified for the entire respective system.

3.05 CABLE TERMINATIONS

A. General
1. Infrastructure workstation outlets connecting to ports in patch panels and terminal blocks shall be grouped together in the patch panel and terminal block by outlet function, room location and building area location (i.e. Group #1 Room #120 1st floor; Group #2 Room #200 east wing, etc.). Each group shall be identified with engraved (etched) nameplates indicating grouping identification and individual port numbers.
2. Polarity and color coding of cable connections at splices, terminations and outlets shall be consistently maintained throughout the entire electronic network system.
3. Terminate all cables onto respective outlets connectors, interconnection couplers and terminals. Terminations shall comply with Manufacturer’s recommendations; ANSI/TIA/EIA-568C related Standards, Amendments and TSB.
4. Fiber optic cable fiber strands and copper wire cable conductors terminated at outlet locations shall be connected with a strain relief device attached to the cable jacket to prevent cable tension from being transmitted to the termination connectors.
5. Cable terminations shall be performed to maintain the data transmission rates specified for respective entire system.

B. Copper Wire Terminations
1. Where occurs, the shield on metal shielded copper wire shall be terminated and connected to the shield grounding connection at each termination point.
2. Twisted wire pairs shall not be untwisted for a length of more than 0.4-inch at any location and the cable jacket shall not be stripped back not more than 0.5 inch any location including splices and terminations.
3. Unless specifically directed otherwise by the Owner's Representative, Pin assignment for wiring terminations shall comply with ANSI/TIA/EIA-568C type T568A or Type T568B as required for compatibility with the electronic network equipment. The termination type shall be consistent throughout the project Contract area.

4. Copper wire termination's shall be performed to maintain the transmission rates specified for the respective entire system.

3.06 TELEPHONE/VOICE TERMINAL BLOCKS

A. The Telephone/Voice Terminal Blocks shall be assembled in vertical sections, for wall mounting. Install adjacent vertical sections with not less than 8-inch blank space between sections, for cable training space.

B. Install Terminal Blocks on plywood terminal backboard with #8 x 1-inch wood screws. Minimum 6-inches on center, along each side of each terminal block.

C. Terminal Block Wire Pair Capacity:
   1. The minimum wire termination capacity shall not be less than 600 [900, 1200] pairs of telephone/voice conductors, at any telephone/voice terminal block.
   2. The quantity of wire pair terminations provided at each terminal block shall be based on the following formula. However, under no case shall any terminal block wire pair capacity be less than the specified minimum.

   Total quantity of telephone/voice feeder copper wire pairs connected to the terminal board = QFP

   Total quantity of telephone/voice outlets connected to terminal board - QTO

   \( QFP \times (QTO \times 4) + (\text{specified spares}) = \text{Minimum terminal block pair capacity.} \)

3.07 IDENTIFICATION (ADDITIONAL REQUIREMENTS)

A. General
   1. Fiber optic and copper wire cables shall be identified in each manhole, pull box, equipment rack, patch panel and computer workstation outlets.
   2. Infrastructure documentation, identification labels and color coding shall comply with ANSI/TIA/EIA-606A Administration Standard for Telecommunications Infrastructures, Class-1 thru Class-4. Provide Management Software MS-Windows-based single user license, with all as-built data entry documentation information complete.

B. Identification Tags shall include the following information:
   1. Cable name as indicated on Drawings (i.e., HV1, F4, MSB3 etc.).
   2. Installation month and date (i.e., 3/92, 4/78 etc.).
   3. Conductor size conductor type (i.e., loose tube fiber; #24AWG ScTP Category 5, 200-pair, telephone/voice etc.).
   4. Feeder taps to equipment or building shall also be identified with equipment name or building (i.e. library, SW1, Rack #21, etc.)
C. Identification Tags
   1. Tags shall be ¼-inch thick 98% lead, approximately 2-inch square with chamfered corners. Two (2) holes shall be drilled for attachment to primary cable. Lettering shall be ¼-inch high, engraved or die stamped. Attach tags to primary cables with two (2) #14AWG (THWN insulated) solid copper conductors "twist-tied", with insulated CAP wire-nut on the tie-wire ends, to cover sharp edges of tie-wire conductor.
   2. Alternate identification tags, at the CONTRACTOR’S option in lieu of lead tags. Provide polypropylene tag holders with interchangeable, yellow polypropylene tag with black alphanumeric characters sets. Characters shall be approximately .25-inch high. As manufactured by Almetek industries "EZTAG" - Ledgewood, New Jersey.

D. Equipment and Outlet Naming Identification and Color-Coding shall comply with ANSI/EIA/TIA latest revision.
   1. Naming method for equipment, outlets and cables; where a position in the naming string is unused, provide multiple "****" symbols.
      Typical naming string "ADM-02-1141-PP17-1271"
      a. "ADM" - Abbreviated Building Name or Number (i.e., Administration, B127, etc.)
      b. "02" - Floor Level #2 or as applicable.
      c. "1141" - Outlet, Equipment or Terminal Room/Closet name or room number as applicable.
      e. "1271" - Individual Outlet or Port Identification.
   2. Connecting hardware color coding shall be as follows:
      "Green" - Main central terminal location for entire site.
      "White" - Distributed terminal locations other than the main terminal.
      "Blue" - Horizontal wiring hardware systems for workstations.

E. Provide Warning Nameplates on fiber optic patch panels, fiber optic outlets, and any location where fiber optic cables are terminated. Minimum ⅛-inch high engraved/etched letters. "WARNING - LASER LIGHT SOURCE. DO NOT LOOK DIRECTLY AT OUTLET OR FIBER CABLE ENDS. RISK OF SEVERE EYE DAMAGE OR BLINDNESS".

END OF SECTION 27 2000
031616/223029
PART 1- GENERAL

1.01 SCOPE

A. 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 Section, complete as shown on the Drawings and/or specified herein. Work includes, but is not necessary limited to the following:
   1. Examine all other Sections for work related to those other Sections and required to the included as work under this Section.
   2. General provisions and requirements for electrical work.
   3. Design, provides equipment for, and installs a complete instructional classroom Audio-Video technology system.

1.02 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. Submit Product Data Sheets for all Wire, Supports, Conduit, Fittings and Splicing Equipment.

B. Product Data:
   1. Provide a complete bill of materials, including all quantities of components, devices, equipment, and wiring required to complete this work.
   2. Submit product data, including Manufacturer’s data sheets for all proposed system components.

C. Shop Drawings, Indicate on a Floor Plan for each room System topology with the following:
   1. All equipment part numbers shall be listed to the bill of materials and the System Drawings.
   2. Configuration.
   3. Wiring diagram.
   4. Sizes.
   5. Materials.
   6. Finishes.
   7. Locations.
   8. Utility connections, types, and locations.

D. Manufacturer's Qualification Statement.

E. Specimen Warranty.

F. Certificate: Certify that products of this Section meet or exceed specified requirements.

G. Evaluation Service Reports: Show compliance with specified requirements.

H. Installer's Qualification Statement.

I. Project Record Documents: Record actual locations of equipment and wiring types with color coding.
J. Warranty: Submit Manufacturer warranty, dated at Substantial Completion and ensure that forms have been completed in District's name and registered with Manufacturer.

K. Maintenance Materials: Furnish the following for District's use in maintenance of Project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Spare Parts: One (1) of each kind of equipment or portable device.
   3. Tools: One (1) each of every special tool required for maintenance of equipment.

1.03 REFERENCE STANDARDS


B. NFPA 70 - National Electrical Code; National Fire Protection Association; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the installation of conduits, switches, and equipment with size, location and installation of service utilities.

B. Pre-installation Meeting: Conduct a pre-installation meeting 1-week prior to the start of the work of this Section; require attendance by all affected installers.

C. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this Section, with not less than 3-years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5-years of experience.
   1. Must be an Authorized Extron Reseller at time of bid.
   2. Must be an Epson Reseller at time of bid.
   3. Must have a CTS-D Engineer on Staff at time of bid.
   4. Must have a RCCD on Staff at time of bid.
   5. Installing Technicians must be Trained and Certified for the implementation of PoleVault Systems at time of bid.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver Equipment to Project Site in unopened boxes.

B. Store Equipment under cover and elevated above grade.
   1. Equipment shall be kept in a locked environment to avoid theft.
1.07 WARRANTY

A. See Section 01 7800 Closeout Submittals, for additional warranty requirements.
B. Correct Defective Work within a 2-year period after Date of Substantial Completion.
C. Provide 5-year Manufacturer Warranty for Equipment.

PART 2 - PRODUCTS

2.01 REGULATORY REQUIREMENTS

A. All systems must be approved under Part 15, Subpart B, and Section 17.107b of the FCC Rules and Regulations.
B. All material and systems must be UL approved.
C. The system shall follow Local and National Codes and be installed in accordance.
D. All enclosures and A/V equipment shall be anchored to the structure and shall comply with CBC Section 163A.

2.02 BASE BID MANUFACTURER

A. Extron Electronics: www.extron.com; 1230 South Lewis Street, Anaheim, California 92805, (714) 491-1500 or (800) 633-9876.
B. Other Acceptable Manufacturers:
   1. Substitutions: Extron matches District Standards. No substitutions will be approved.

2.03 SYSTEM DESCRIPTION

A. Provide a complete Audiovisual System in each classroom where shown on Plans. The system switching and audio amplification equipment shall be securely mounted and concealed in an enclosure mounted to the ceiling. Audio and image source equipment can be connected to the system and displayed via active (powered) interface panels located throughout the room. The audio and image signals from source devices shall be transmitted from the active interface panels over Standard UTP Cabling Architecture.
B. Classroom Definition: Rooms that has fixed instructional media video projection capabilities, internet connectivity at the Teacher's station, student networking (usually wireless), a document camera, DVD/VCR and/or other multimedia input devices, standard laptop interface, multimedia control system that is connected to the network and capabilities for additional add-on modular features.
C. Technology Enhanced Classrooms (TECs) use standardized control/interface systems and employ a standardized operational protocol. The Principles of this recommendation are to establish desirable goals with respect to classroom design and installed technology. The TEC classroom standard includes control systems that have ADA, Section 508 compliant buttons that are discernible without activating the controls or buttons on the control panel, easily reached control panel locations, closed captioning, hearing assistance capability and user friendly operator protocols among the features that are consistent with universal design principles.
D. Provide the following media source equipment for the audiovisual system in each classroom, conference room and platform area listed above and shall include the following:
   1. Pole Vault PVS-400
   2. District provided, Contractor installed LCD projector
   3. All required connectors, cabling and installation for a complete Audio/Video Integrated System

2.04 GENERAL EQUIPMENT REQUIREMENTS

A. The room shall be equipped with a standard easy to operate Teacher interface (a tactile button keypad layout). The audio system may be monaural or stereo for program sound. The instructional media system will be controlled by a control system with a control panel mounted near the Teacher's area. System parameters can be monitored, administered and controlled over the data network. The instructional media equipment will be located within close proximity to the Teacher's area or through a Graphical User Interface (GUI) on a computer to allow for ease of operation during instruction.

B. Acceptable functionality requirements are listed below in this Specification categorized by type of equipment. Quantities are listed for movable, portable or loose equipment, and other selected entries. Where quantities are not listed, refer to the System Drawings.

C. Deviations from this Specification must be documented in writing to the Architect and Owner at least 10-business days before the submittal date.

D. The System components shall all be correctly listed and labeled by Underwriters Laboratories Incorporated (UL) for their intended use.

E. All Products shall be new and under warranty at the time of installation. B-stock, previously installed, refurbished or used equipment shall not be allowed on this Project.

F. Where Specification lists several Manufacturers for a major item, or group of items, the A/V Contractor shall provide that entire item from one Manufacturer only.

G. The Contractor shall provide all options, accessories and hardware necessary to meet the function of the design even if they are not specifically listed (i.e. mounting kits, separate or additional power supplies, input modules, transformers, etc.).

2.05 FIXED EQUIPMENT

A. Provide the following Audio Visual System as an all-inclusive system as described below, one system for each room:
   1. Projector Mounting - shall be mounted using the following components.
      a. Extron PCM 340 projector drop ceiling mount with adjustable pole.
         1) The PCM 340 projector mount must be capable of mounting to the structural ceiling (concrete or wood joists) above the suspended t-bar ceiling via trunbuckles and tie wire or threaded rod, to provide a full 100 degrees of adjustment enabling a PMP Series pole to hang level.
         2) The mount shall be capable of supporting up to 50 pounds (23kgs) of A/V equipment.
3) The mount must also include a 1.5-inches threaded pipe adapter for projector mount poles.

b. Extron UPB 25 Universal Projector Bracket.
   1) The bracket shall be able to support projectors up to 25 pounds.
   2) The projector bracket must have independent adjustments of horizontal tilt or roll (± 4 degrees of horizontal tilt), vertical angle or pitch (± 25 degrees of vertical angle), and rotation or yaw (360 degrees of rotation).
   3) The projector bracket shall also use a 1.5-inches NTP (National Tapered Pipe) threaded pipe adapter for mounting a projector pole.
   4) The projector bracket should also maintain positioning adjustments even if the projector is removed for service.
   5) The bracket should also feature security flanges that enable the entire unit to be padlocked to prevent theft.

c. Extron PMP Projector Mounting Pole.
   1) The projector mounting pole shall be 1.5-inches NTP (National Tapered Pipe) threaded pipe threaded at both ends to facilitate mounting the projector to the ceiling mount and to the universal projector mount.
   2) The projector mounting pole shall be of a custom length for proper mounting from building structure.
   3) The pole shall provide a cutout section to all for cable access.

d. Extron PMK 550 Pole Mount Kit.
   1) The Project Mounting Kit is a lightweight, fully enclosed vented housing for quickly installing and securing Extron PoleVault System components above a pole-mounted projector. These products may be Extron PVS 305SA TP, Switcher, power supplies, audio amplifiers, IP Link products and other Extron quarter rack product options.

2. Media Source Switching:

a. System source selection and switching shall be provided by a PVS A/V Switcher.

b. The switcher shall have two (2) RGB video inputs capable of VGA - UXGA RGBHV, RGBS, RBsB and RsGsBs input resolution via two (2) pairs of female RJ-45 connectors.

c. The switcher shall have two (2) inputs that can be configurable for either composite video via two (2) female RJ-45 connectors or two (2) additional RGB video inputs capable of VGA-UXGA RGBHV, RGBS, RBsB an RsGsBs input resolution via two (2) pairs of female RJ-45 connectors.

d. Audio input shall be via four (4) stereo, balanced/unbalanced inputs via the same four (4) and/or six (6) (4 and/or 6) RJ-45 RGB and composite video connectors.

e. The switcher shall have two (2) video outputs, one (1) RGB output capable of outputting VGA - UXGA RGBHV, RGBS, RBsB and RsGsBs (following input type) via a 15-pin HD female connector and one (1) composite video via one (1) RCA female connector.

f. Connection from the switcher to the display device shall be provided with one 3-foot VGA to VGA and one 3-foot composite video cable.

g. An onboard audio amplifier shall provide gain/volume adjustment from -10db to +10db, adjustable in 1db steps. The speaker amplifier shall have two (2) channels, one (1) stereo (default) or dual mono channels via one (1) 5.0mm 4 pole captive screw connector. The output of the amplifier shall be 25watts (rms) per channel at 2/4/8 ohms.
h. In addition to the stereo/mono speaker output, an additional audio output that will produce line level output shall also be available. This line level audio output must be capable for being set at "fixed" or "variable" and with Balanced or Unbalanced settings.

3. Media Source Control:
   a. Provide Media Source Controllers, MLC 104 IP Plus, in each designated classroom.
   b. The room media sources shall be controlled with a MediaLink Controller with IP Link.
   c. The MediaLink Controller shall contain six (6) tri-color, multi-status LEDs push-buttons for device selection and projector on/off control. A rotary volume control knob with five (5) LED volume indicators shall permit system volume level control.
   d. The MLC Controller shall feature Extron IP Link Ethernet for monitoring, scheduling and control. This IP technology shall enable the device to be controlled, scheduled, and monitored over a LAN, WAN or the Internet using Extron Global Viewer or MLC controller software.
   e. The Controller shall contain a serial host port which shall consist of one (1) bi-directional RS-232 front panel 2.5mm mini stereo jack. This host connection port shall be for configuration and control of the controller itself and to install device drivers for the equipment to be controlled.
   f. The Controller shall also feature two (2) bi-directional serial ports to provide device control. These two (2) ports shall control the display device and PBS Switcher respectively via two (2) bi-directional RS-232 control via one (1) 3.5mm direct insertion captive screw connector.
   g. The Controller shall also have two (2) configurable (via software) digital input/outputs for devices such as sensors, switches, LEDs and relays via one (1) 3.5mm 4-pole direct insertion captive screw connector.
   h. Connection from the MLC Controller to the display shall be provided by one (1) 50-foot Projector control cable.
   i. Connection from the MLC Controller to the PVS Switcher shall be provided by one (1) 50-foot Switcher Control cable.

4. Audio and Speech Reinforcement:
   a. Speakers: In suspended ceiling applications, provide one (1) pair of Extron FF120 speakers in each designated classroom and conference room.
      1) These speakers shall be 3.5-inches deep low profile featuring a deep aluminized composite enclosure, rectangular shape with a metal grille.
      2) The coverage angle of the speaker offers an extraordinary wide dispersion area of 170 degrees, providing a very wide room coverage pattern.
      3) Meeting the Regulatory Compliance Safety Specifications of NFPA90A, NFPA70, UL listed for use in plenum air-spaces, meets UL 2043 for heat and smoke release meets UL 1480 for commercial and professional audio.
      4) The speakers feature a frequency response of 68Hz to 18kHz-10db, half space.
      5) The power capacity is 16watts of continuous pink noise or 32watts of continuous program media.
      6) The nominal impedance is 8ohms.
      7) The input connector shall be one (1) 5mm captive screw for one (1) input.
8) Connection from the PVS 305SA Plus switcher to the FF120 speaker is provided by one (1) 50-foot plenum rated 18 Gauge Speaker Cable Extron SPK-18.

5. Media Source Interfacing:
   a. The media source equipment shall be connected to the audiovisual system via two (2) or four (4) Active (powered) Twisted Pair Transmitter Wall Plates as shown on plans. These wall plates shall enable the system to display video and graphic data from Laptop computers, DVD and VCRs, document camera, camcorders, etc.
   b. These active interface transmitters shall be placed in convenient locations throughout the room to facilitate easy connection of sources.
   c. Provide two types of active interface transmitter panels. The RGB Video Twisted Pair Transmitter – Wall plate shall be used to connect up to one (1) RGB device to the system and transmit the video and audio data to the switcher.
   d. The RGB Video Twisted Pair Transmitter - Wall Plates shall fit a standard, single-gang electrical box with typical type faceplates.
   e. The RGB Video Active Twisted Pair Transmitter – Wall plates shall transmit RGB video over UTP cable to the PVS Switcher and support video input resolutions of VGA - UXGA RGBHV, RGBS, RBsB and RsGsBs via one (1) female 15-pin HD connector. The RGB input plate shall also support EDID emulation.
   f. Stereo audio shall be input via one (1) 3.5mm mini stereo jack.
   g. Connection to each PVT RGB D shall be provided via an Extron male VGA to male VA and male 3.5mm TRS to male 3.5mm TRS cable for RGBHV and audio, length to be coordinated by Owner.
   h. The output of the interface shall be via two (2) female RJ-45 connectors.
   i. Connection to the PVS Switcher shall be via two (2) UL plenum rated UTP cables.
   j. The System shall include one (1) Extron PVT CV D Composite Video Twisted Pair Transmitter – Wall Plate.
   k. The Composite Video Active Twisted Pair Transmitter – Wall Plates shall transmit composite video over UTP cable to the PVS Switcher and support video input via a RCA female connector.
   l. The Composite Video Twisted Pair Transmitter – Wall plates shall fit in a standard, single-gang electrical box and feature Decora® type faceplates.
   m. Stereo audio shall be input via two (2) RCA female connectors.
   n. Connections to the PVT CV D from the DVD/VCR shall be provided via one (1) Extron male 3 x RCA to male 3 x RCA cable for composite video and audio, cable length to be coordinated by Owner.
   o. The output of the interface shall be via one (1) female RJ-45 connector.
   p. Connection to the PVS Switcher shall be via one (1) UL plenum rated UTP cable.
   q. Provide USB Extender D Rx and connect via one (1) UL plenum rated UTP cable to USB Extender Rx located at the PVS switcher.

2.06 ACCESSORIES

A. Supports:
   1. All supports shall meet or exceed the load requirements of the intended application with a minimum safety factor of five.
   2. Provide support structure and hardware with a SAE Grade 8 load rating (minimum).
PART 3 - EXECUTION

3.01 GENERAL

A. All Equipment and Enclosures described in this Specification shall be installed plumb and square per Manufacturer’s instructions.

B. All Equipment, except that designated as movable, portable or loose equipment, shall be secured and permanently attached to the permanent structure in a manner which will require the use of a tool (e.g.: screw driver, nut driver, etc.) for removal.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify that related conditions, including equipment that has been previously installed under other sections, are acceptable for product installation in accordance with Manufacturer’s instructions.

B. All Devices Connected to Equipment specified in this Section shall bear the UL label and comply with the applicable California Electrical Code (CEC) standards.

3.03 INSTALLATION

A. Contractor shall furnish all equipment, labor, system setup, and other services necessary for the proper installation of the products/system as indicated on the Drawings and specified herein. System setup information shall include each components proper mounting and alignment and properly verified signal pathways and operation. Proper operational and network support control functions shall be verified.

B. Install in accordance with Manufacturer’s handling and installation instructions.

C. Install in accordance with all local and pertaining Codes and Regulations

D. Utilize an Installer with demonstrated experience in Projects of similar size and complexity.

E. Equipment shall be configured and ready for use to condition at the end of installation.

F. Energize and commission equipment in accordance with Manufacturer’s instructions.

3.04 PROTECTION AND CLEANING

A. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the Manufacturer.

B. Repair or Replace Damaged Components before Substantial Completion of the Project.

C. Remove Temporary Tags, Coverings, and Construction Debris from interior and exterior surfaces of the equipment. Remove construction debris from equipment area and dispose of properly.

END OF SECTION 27 4100
031616/223029
SECTION 27 5313
CLOCK SYSTEM

PART 1- GENERAL

1.01 SCOPE
A. 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 Section, complete as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Sections for work related to those other Sections and required to be included as work under this Section.
   2. General provisions and requirements for electrical work.

1.02 SUBMITTALS (ADDITIONAL REQUIREMENTS)
A. Submit Product Data Sheets and Descriptive Literature for all Component Parts.

B. Submit Block Wiring Diagram of the Clock and Paging systems. Showing headend equipment, terminal cabinets, remote power supplies, and typical clock for each zone.

1.03 EQUIPMENT QUALIFICATION
A. The Specification is based on the Equipment of Manufacturers who have been approved by the District and the Manufacturers herein named shall be considered as meeting the requirements of this Specification. For all items which are identified by part number and Manufacturer the Performance Specifications which are published in the most recent Manufacturer's data sheets available at the time of bidding this Project shall be applicable to the present work as though fully written out herein.

B. All Equipment shall conform to all Local applicable Codes and Ordinances, and shall be listed by Underwriters Laboratories.

1.04 QUALIFICATIONS
A. To qualify as an acceptable Bidder, whether the bid is submitted to the District, his Agent, a General Contractor or a Sub-contractor, the System Bidder or Contractor shall be Qualified Sound Contractor and shall hold a valid C61 License issued by the Contractors State License Board of California. The System Bidder or Contractor shall hereinafter be referred to as the Contractor. The Contractor shall hold all other licenses required by the legally constituted Authorities Having Jurisdiction over the work. The Contractor shall be the Factory Authorized Distributor for the brand of equipment offered and shall have been engaged in the business of supplying and installing the specified type of system for at least 5-years. The Contractor shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment.
1.05 GENERAL REQUIREMENTS AND SCOPE

A. Furnish and Install a complete new GPS Wireless clock system using Innovation Wireless or equal. All bids shall be based on the equipment as specified herein.

B. Section includes Transmission Systems GPS Receiver, Primary Transmitter, and Satellite Transmitter.
   1. Clocks:
      a. Digital

1.06 RELATED SECTIONS

A. Division 26 – Electrical (120 volt grounded outlet required for transmitter).

1.07 REFERENCES

A. This Technical Specification and Associated Drawings.

1.08 SYSTEM DESCRIPTION

A. GPS Wireless Clock System shall continually synchronize clocks throughout the facility, and shall be capable of clock readouts in multiple time zones where desired.

B. The System shall provide wireless time using GPS and be synchronized to UTC. The system shall not require hard wiring. Clocks shall automatically adjust for Daylight Saving Time.

C. Analog Clocks shall be synchronized to within 10-milliseconds 6-times per day, and the system shall have an internal oscillator that maintains plus or minus 1-second per day between synchronizations, so that clock accuracy shall not exceed plus or minus 0.2 seconds.

D. The System shall include an internal clock reference so that failure of the GPS signal shall not cause the clocks to fail in indicating time.

E. The System shall incorporate a “Fail-Safe” design so that failure of any component shall not cause failure of the system. Upon restoration of power or repair of failed component, the system shall resume normal Operation without the need to reset the system or any component thereof.

F. Clock Locations shall be as indicated, and clocks shall be fully portable, capable of being relocated at any time.

G. The System must operate in accordance with a “Radio Station Authorization”, Form FCC 601 – LM, granted by the Federal Communications Commission (FCC). This license will be issued to and held by the end user.

1.10 REGULATORY REQUIREMENTS

A. Equipment and Components Furnished shall be of Manufacturer’s latest model.
B. The End User Will Hold a License, known as a “Radio Station Authorization” granted by the FCC.
   1. This license grants the end user protected use for wireless transmission at the designated frequency.
   2. This license will designate a unique “call sign” for each end user.

C. Transmitter and Receiver shall comply with Part 90 of FCC rules as follows:
   1. This device may not cause harmful interference, and
   2. This device must accept interference received, including interference that may cause undesired operation.
   3. Transmitter frequency shall be Governed by FCC Part 90.35.
   4. Transmitter output power shall be Governed by FCC Part 90 257 (b)

D. System shall be installed in compliance with Local and State Authorities Having Jurisdiction.

E. Operating License: Submit evidence of application for FCC Radio Station Authorization prior to installing equipment. Furnish the license or a copy of the application for the license, to the District/End User prior to operating the equipment. The original license must be delivered to the District/End User.

F. Samples: Submit one (1) clock for approval. Approved sample shall be tagged and shall be installed in the work at location directed.

G. Manufacturer's Instructions: Submit complete installation, set-up and maintenance instructions.

H. Floor Plans indicating the location of system transmitter(s), approved by Manufacturer, will be submitted to District prior to installation.

1.11 QUALITY ASSURANCE

A. Permits: Obtain Operating License for the Transmitter from the FCC.
   1. Qualifications:
      a. Manufacturer: Company specializing in manufacturing commercial time system products with a minimum of 30 continuous years of documented experience including 4 years’ experience producing GPS wireless time systems.
      b. Installer: Company with documented experience in the installation of commercial time systems.
   2. Prior to installation, a site survey must be performed to determine proper transmitter placement.

1.12 DELIVERY STORAGE AND HANDLING

A. Deliver all Components to the Site in the Manufacturer's original packaging. Packaging shall contain Manufacturer's name and address, product identification number, and other related information.

B. Store Equipment in finished building, unopened containers until ready for installation.
1.13 PROJECT SITE CONDITIONS
Clocks shall not be installed until painting and other finish work in each room is complete. Coordinate installation of GPS receiver for access to the roof or exterior side wall so that the bracket and related fasteners are watertight.

1.14 SYSTEM STARTUP
At completion of installation and prior to final acceptance, turn on the equipment; ensure that all equipment is operating properly, and that all clocks are functioning.

1.15 WARRANTY
Manufacturer will provide a 1-year warranty on GPS receiver, transmitter, and satellite transmitter. All other components will have a 1-year warranty.

PART 2 - PRODUCTS

2.01 MANUFACTURER
A. GPS Wireless Clock System shall be manufactured by Innovation Wireless, Culver City, California.

2.02 SEQUENCE OF OPERATION
A. Transmitter Operation: When power is first applied to the transmitter, it checks for and displays the software version. It then checks the position of the switches and stores their position in memory. The transmitter looks for the GPS time signal. Once the transmitter has received the GPS time, it sets its internal clock to that time. The transmitter then starts to transmit its internal time once every second. The transmitter updates its internal clock every time it receives valid time data from the GPS.

2.03 EQUIPMENT
A. General: The Clock System shall include a transmitter, a roof or window mounted GPS receiver, indicating clocks, and all accessories for complete operation.

B. Clocks shall be digital display LED Clocks, 4-inch 4-digit white LED, single sided, Innovation Wireless, Part #632402.

PART 3 - EXECUTION

3.01 EXAMINATION
A. Verify that construction is complete in spaces to receive equipment and that rooms are clean and dry.

B. Verify that 120-volt electrical outlet is located within 6 feet (1.83m) of location of transmitter and the outlet is operational and properly grounded.

3.02 INSTALLATION
A. Provide All Equipment necessary for a complete and operable system.
B. Transmitter:
Locate transmitter where indicated, a minimum of 2 feet to 3 feet (.6 to 1 meter) above the floor, away from large metal objects such as filing cabinets, lockers or metal framed walls. Transmitter(s) will be placed at locations indicated below:
1. Attach receiver to transmitter using cable.
2. Connect antenna to transmitter, using care not to strip threads.
3. Connect power supply to the transmitter. Set the channel number on the display to correspond to the FCC license.
4. Plug power supply into electrical outlet.

C. Clocks shall perform the following operations with each clock:
1. Set clock to correct time in accordance with Manufacturer's instructions.
2. Observe clock until valid signals are received and analog clock adjusts itself to correct time.
3. Install the clock on the wall in the indicated location, plumb, level and tight against the wall. If using 12½-inch (317.5mm) clock, attach using clock-lock hanging method and suitable fasteners as approved by Clock Manufacturer.
4. Wire guards: Secure to wall, using approved theft-resistant fasteners.

3.03 ADJUSTING
A. Prior to final acceptance, inspect each clock, adjust as required, and replace parts which are found defective.

3.04 CLEANING
A. Prior to final acceptance, clean exposed surfaces of clocks, using cleaning methods recommended by Clock Manufacturer. Remove temporary labels from clock faces. Do not remove labels from backs of clocks.

3.05 DEMONSTRATION
A. Provide Training to District's Representative on setting and adjusting clocks, replacing batteries and routine maintenance.

3.06 PROTECTION
A. Protect Finished Installation Until Final Acceptance of the Project.

3.07 TESTING
A. All Devices must be tested at their operational location under normal operational conditions to assure reception of signal.
SECTION 28 3100

FIRE ALARM

PART 1 - GENERAL

1.01 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
1. Examine all other Specifications Sections and Drawings for related work required to be included as work under Division 26, 27, and 28.
2. General provisions and requirements for electrical work.

1.02 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. Submit eight (8) copies of the following to the Architect for approval.
   1. A listing of all fire alarm components and equipment including the California State Fire Marshal (CSFM) listing numbers.
   2. CSFM listing sheets of all devices being used.
      a. The submittal shall be arranged in the order of the Specification and shall list the Specification paragraph number, the name, the proposed model and Manufacturer for each item as well as a reference indicating the specific piece of data which can be easily located in the brochure.
      b. The Manufacturers’ data sheets shall be marked to indicate the specific item being proposed in cases where the sheet covers several types or sizes of item. The data sheet shall completely describe the proposed item.
      c. Where modification to the equipment is necessary to meet the operational requirements of the Contract Documents, the data sheets shall include complete Mechanical and Electrical Shop Drawings detailing the modification.
   4. A listing of the outlet rough-in needed for every device and equipment item. The applicable symbol which illustrates that rough-in item on the Job Plans shall be drawn on the proposal, opposite the description of the rough-in to facilitate locating the data by Field Personnel.
   5. Elevation and dimensional information.

1.03 APPLICABLE STANDARDS

A. The Equipment shall be listed, labeled, and approved for the application shown in Contract Documents, as fire alarm equipment complying with the following requirements:
   1. List of applicable Codes as of January 1, 2014:
      a. 2013 Building Standards Administrative Code, Part 1, Title 24 C.C.R.
      b. 2013 California Building Code (CBC), Part 2, Title 24 C.C.R.
      c. 2013 California Electrical Code (CEC), Part 3, Title 24 C.C.R.
      d. 2013 California Mechanical Code (CMC), Part 4, Title 24 C.C.R.
      e. 2013 California Plumbing Code (CPC), Part 5, Title 24 C.C.R.
      f. 2013 California Fire Code (CFC), Part 9, Title 24, C.C.R.
      g. 2013 California Referenced Standards Code, Part 12, Title 24, C.C.R.
2. NFPA Standards and Guides:

3. The fire alarm system shall conform to the applicable Standards and Guides referenced in CBC Chapter 60.

B. Written Certification by the Fire Alarm Equipment Manufacturer shall be submitted to the Architect, stating that the system and its component parts are listed and approved by the California State Fire Marshal and the installation has been tested, is operational and conforms to the requirements as set forth in Part 3, Article 24, Title 19, California Code of Regulations.

1.04 EQUIPMENT AND INSTALLING QUALIFICATIONS

A. The equipment shall be manufactured by Simplex to match existing fire alarm equipment on campus.

B. The Specification is based on the equipment of Manufacturers who have been approved by the District and the Manufacturers herein named shall be considered as meeting the requirements of this Specification. For all items which are identified by part number and Manufacturer the Performance Specifications which are published in the most recent Manufacturer’s data sheets available at the time of bidding this Project shall be applicable to the present work as though fully written out herein.

C. All equipment shall conform to all local applicable Codes and Ordinances, and shall be listed by Underwriters Laboratories.

D. To qualify as an acceptable Bidder, whether the bid is submitted to the District, his Agent, a General Contractor or a Sub-Contractor, the System Bidder or Contractor shall be qualified Fire Alarm Contractor and shall hold a valid C10 License issued by the Contractors State License Board of California. The system bidder or Contractor shall hereinafter be referred to as the Contractor. The Contractor shall hold all other licenses required by the legally constituted authorities having jurisdiction over the work. The Contractor shall be the Factory Authorized Distributor for the branch of equipment offered and shall have been engaged in the business of supplying and installing the specified type of system for at least 5-years. The Contractor shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment. The Contractor shall be financially able to provide a performance bond covering the work and the guarantee described. The Contractor shall provide that bond if requested.

E. Installation Certification
   1. Work and material for cables, cable terminations and related components shall be performed by Certified Installers. The Installer shall be certified by the respective Product Manufacturers.
2. The Manufacturers of the indicated work and material shall provide an Installer education/training and certification program for the supplied products.
3. The Installers performing the Contract Work for the indicated products shall have attended and successfully completed each of the respective Manufacturer's installation training education programs for the specified products.
4. Submit six (6) copies of the Manufacturer's certifications for each Installer performing the work. The submittal shall be approved prior to initiating any related Contract Work.
5. Contract material installed and work performed by Installers not complying with these requirements shall be removed. Removal of work and material not in compliance with these requirements shall done at the CONTRACTOR’S expense, without any additional cost to the Contract and without any additional Contract completion due date extensions. New material and work required to replace the non-compiling removed work and material shall be provided at the CONTRACTOR’S expense, without any additional cost to the Contract and without any additional Contract completion due date extensions.

PART 2 - PRODUCTS

2.01 GENERAL SYSTEM OPERATION

A. System shall be microprocessor-based, addressable, and power-limited with Class A or Class B supervised circuits.
   1. The microprocessor shall execute all supervisory and control programming to detect, report the failure or disconnection of any system module or peripheral device and initiate programmed control sequences. An isolated supervision "watchdog" circuit shall monitor the microprocessor and, upon failure, shall activate the system trouble circuits.
   2. The automatic fire detection and alarm system shall consist of main control panel, transponder panel(s), notification alarm devices, remote annunciator, automatic detection devices, manual stations, printer, and CRT/keyboard, installed and wired in accordance with the Drawings and shall function as specified herein.
   3. The system shall be programmable in the field, by a non-computer trained person. All programmed information shall be stored in non-volatile memory.
   4. The system shall operate both addressable and non-addressable ionization, thermal and photoelectric detecting devices, manual stations, water-flow switches, and external control modules.
   5. The control panel shall provide power, annunciation, supervision and control for the fire detection and alarm system. The system shall be designed such that alarm indications override trouble and control conditions.
   6. External circuit supervision shall not require additional wires other than the pair used for detection or alarm (only two (2) wires shall be used from the control panel to each loop of initiating devices and two (2) wires for the notification alarm devices). These two wires shall provide both supervision and notification alarm signals. There shall be no loss of supervision for Class "B" wired addressable devices. Class "A" supervision may be provided by adding an additional pair of wires.

B. Alarm Conditions
   1. Actuation of any manual or automatic alarm initiating device, connected to the system shall cause the following automatic functions.
      a. All notification alarm signaling units shall activate continuously. Audible notification alarms shall sound the California State Coded Signal.
b. The respective zone alarm lamp or annunciator alpha numeric readout on the central control panel, and remote annunciator panel, shall be activated.
c. Activate the Digital Alarm Communicator system.

2. Actuation of HVAC air duct smoke detectors shall stop the designated fans and motors in the building’s air distribution system.
3. Actuation of smoke detectors on either side of smoke doors shall energize the release mechanism on the smoke door causing the door to close.
4. Notification alarm signal duration shall be capable of continuous sounding or adjustable from three to 10-minutes.
5. Perform any additional functions as specified herein or shown on the Drawings.

C. Trouble Condition
1. A single open or single trouble condition in a manual or automatic fire initiating wiring circuit shall activate the respective zone trouble lamp or annunciator readout on the fire alarm control panel and sound a trouble signal at the control panel.
2. A single open or single trouble condition in the notification alarm signaling wiring circuit shall activate the trouble lamp or annunciator readout in the control panel and sound a trouble signal at the control panel.
3. 120 volt AC normal power shall be monitored with indication by a "power on" lamp. Upon normal power outage, the system shall activate a power trouble condition lamp or annunciator readout, and indicate a trouble condition.
4. The control panel shall monitor the standby batteries and, upon a low battery condition, activate the low battery lamp or annunciator readout and indicate a trouble condition.
5. System ground detection shall be provided for the entire system. Upon ground detection, activate the ground detection lamp or annunciator readout and indicate a trouble condition.

D. Control panels employing alphanumeric readouts shall display the trouble condition along with a prompt to review the list chronologically. The end of the list shall be indicated.

2.02 FIRE ALARM CONTROL PANEL

A. General
1. The fire alarm control panel shall be software programmable, microprocessor controlled, solid state, electronic integrated system. The panel shall be the product of one Manufacturer. The control panel shall provide power, annunciation, supervision and control for the detection and alarm system. The detection system shall remain 100% operational, responding to an alarm condition while in the routine maintenance mode.
2. Addressable detection and control devices shall be individually identified by the system, and any quantity of addressable detection devices shall be in alarm and any quantity of addressable control units shall be operable at any time up to the total number connected to the system.
3. The microprocessor shall access the system program, which is stored in non-volatile programmable memory, for all Control-by-Event (CBE) functions. The system program shall not be lost upon failure of both primary and secondary power. Volatile memory shall not be acceptable.
4. A means shall be provided for acknowledging each abnormal condition. Each activation of the appropriate acknowledge button shall sequentially acknowledge every point in the system. After all the points have been acknowledged, the LEDs shall glow steady and the panel audible signal will be silenced.
The total number of alarms, supervisory, and trouble conditions shall be displayed along with a prompt to review each list chronologically. The end of the list shall be so indicated.

5. An alpha numeric annunciator readout shall indicate on the control panel the activation by type, loop, and address of the specific device, sub-loop or alarm/monitor/control point via an alpha numeric display. An audible alert shall sound at the control panel and an alarm light shall flash.

6. If the microprocessor fails, the system shall execute a default signaling program. This program shall enable the control panel to sound the audible signals and summon the Fire Department. In addition, a red LED shall light to indicate the communication loop wherein the alarm originated. Inability of the system to sound signals or summon the fire department during microprocessor failure shall not be acceptable.

7. Protected access to the system controls shall be provided to allow the user/operator access to the following system functions:
   a. Status of all addressable points.
   b. Status of all events logged.
   c. Set/change the real-time clock and date.
   d. Perform an operational manual test of the system from the control panel, including actuation of any initiating device and trouble circuit without alarming the remote central station. The panel shall automatically return to normal mode in the event the panel remains unattended in the service mode.
   e. Retrieve from event log the last 300 alarms, or control points and 300 trouble conditions.

8. Individual input (monitor) and output (control) device addressability shall all be performed on the same pair of wires. Wiring shall be Class "A" or "B". When Class "B" wiring is used, no special wiring sequence shall be required on addressable device circuits. An unlimited number of wiring branches shall be permitted with no loss of supervision.

9. A minimum of 25% addressable monitor, trouble and control points shall be provided.

B. Cabinet
   1. A metal tamper resistant cabinet shall contain the control panel components. Panel shall be surface or flush mounting as indicated on the Drawings. Provide a full height tamper resistant hinged locking cabinet door. The door shall have transparent, high impact windows to allow visual observation of all indicators and switches without opening the panel door.
   2. "In-out" circuit conductors shall terminate on numbered screw-type terminals.
   3. All groups of circuits or common equipment shall be clearly marked and shall be expandable by inserting interchangeable units.

C. The control panel shall provide positive protection against the fire alarm system inadvertently being left in a non-operating status. The alarm system shall automatically restore and resound alarms and trouble signals, if subsequent alarm initiating or trouble signals are received under any of the following conditions:
   1. After the alarm or trouble silence switch have been activated.
   2. Prior to resetting system after previous alarm or trouble conditions.
D. The system indicating and operational control devices shall be mounted on the control panel face behind the panel door and shall provide the following minimum functions:

1. Individual visual indicating pilot lights annunciator or alpha numeric readout to monitor the following alarm system conditions:
   a. Input power.
   b. System common alarm.
   c. System common trouble.
   d. Alarm or trouble signal silenced.
   e. Ground fault.
   f. Battery condition.
   g. Each individual alarm, control or initiating zone-activation.
   h. Each individual alarm, control or notification zone-trouble.
   i. Report, by specific device number, any device removed from an addressable initiating circuit, all other devices shall continue to function.

2. Manual control switches to allow the following system controls:
   a. Alarm silence.
   b. Trouble silence.
   c. Test all indicating pilot lights and readouts.
   d. System reset, including remote devices connected to the alarm panel.
   e. Alarm test to initiate an alarm condition from the control panel.
   f. Alarm disconnect for system testing without activating the Digital Alarm Communicator system.
   g. Changing the status of configured circuits (arming or disarming and changing status of relays). If any change in status degrades system operation as configured, a trouble condition shall be reported and remain until system operation again meets configured status.
   h. Perform multiple operations at the same time. These operations shall include but not be limited to timed functions and multiple configured sequences.

E. Alarm initiating zone modules.

1. Shall supervise and accept remote alarm actuating device input signals. An alphanumeric readout shall indicate separate zone alarm and trouble indicators for each zone.
2. Zones shall be compatible, and designed to operate with the connected initiating devices either addressable or non-addressable type.
3. A spare double throw set of software programmable auxiliary alarm relay contacts shall be provided for control of remote devices for each zone. Contacts shall be rated 120-volt, 60 Hz 3 Ampere.
4. Each device on the system shall report as its own unique address.

F. Notification alarm signal control.

1. Shall supervise and activate remote notification alarm devices.
2. Notification alarm shall be compatible and designed to properly operate with the connected audio and visual notification alarm devices, with no signal degradation.
3. The notification alarm shall provide group notification signal control of all notification zones.
4. The alarm modules shall be field resettable to provide either continuous or Coded notification alarm signals. The Coded alarm signal shall provide an intermittent "on-off" pulsed sound activation of audible notification alarm devices.
5. A notification alarm circuit trouble indicating readout shall be provided for each notification zone.
G. Automatic ground detection shall detect either positive or negative voltages when earth connections of 50,000 OHMS or less occur, and activate the ground trouble signal.
   1. A Ground Fault Code shall provide indication of either a positive or negative ground fault and shall operate the general trouble devices as specified herein but shall not cause an alarm to be sounded.
   2. A short circuit error message shall be a standard feature of the fire alarm control panel. Each communication loop shall be monitored for short circuits and shall have a distinctive error message for visual indication of circuits and operating trouble devices as specified herein but shall not cause an alarm to be sounded.

H. Power Supply
   1. The power supply shall be adequately sized to properly operate the equipment, including remotely connected, spare and future indicated equipment with all alarm devices in alarm condition. Provide 20% spare power supply capacity for future expansion. Provide transfer modules and multiple power supplies as required for proper operation.
   2. Input voltage 120/240 volt or 120/208 volt 60 Hz AC.
   3. Surge transient voltage protection on the input and output phases of the power supply shall be provided.
   4. Supervised voltage types (i.e., 120V-60HZ AC, 24 volt AC, 24 Volt D.C., etc.) required by special connected equipment shall be supplied, including but not limited to:
      a. Alarm initiating devices.
      b. Notification alarm devices.
      c. Control and annunciator panels.
      d. Fire and smoke dampers.
   5. A solid-state power transfer circuit shall provide (UPS) Uninterrupted Power Supply between internal standby power and line power automatically and instantaneously if normal power fails or falls below 15% of normal ("brown out" conditions).
   6. Individual circuit fuses shall be provided for smoke alarm detector power, main power supply notification circuits, battery standby power, and auxiliary output.

I. Battery Back-Up Operation
   1. Internal batteries and battery power supplies shall be provided to allow 60 hours continuous automatic normal operation of the entire control panel and fire alarm system after the failure of the incoming utility power. Sufficient battery capacity shall remain at the end of 60 hour period to provide ten minutes of continuous operation of all connected notification alarm devices.
   2. Batteries shall be maintenance free, sealed, lead-acid or lead calcium or gelled electrolyte type rated 25% larger than required to provide power for the entire system upon loss of normal 120 VAC power for a period of 60-hours with 5-minutes of alarm signaling at the end of this 60-hour period.
   3. The battery charger shall be automatic, dual rate with capacity to recharge completely discharged batteries in 18 hours. Charger shall be temperature compensated.

J. Lightning and transient voltage surge protection shall be a standard feature of the fire alarm control panel and shall be incorporated in the power supply circuit, common control circuits, signal circuits, and telephone line circuit.
K. Circuitry shall be provided in the control panel to permit transmission of trouble and alarm signals over leased or privately owned telephone cables to a remote receiving panel. A reverse polarity or a master box circuit as required shall be provided in the control panel. There shall be a supervised disconnect switch to allow testing of the fire alarm signal without transmitting an alarm signal to the central station.

L. The alphanumeric annunciator (printer and CRT/keyboard) shall list upon request:
   1. Alarms with time, date and location.
   2. Troubles with time, date and location.
   3. Status of output functions, "on" or "off".
   4. Sensitivity of addressable smoke detectors.
   5. Detection device number, type and location.
   6. Status of remote relays, "on" or "off".
   7. Acknowledgment time and date.
   8. Signal silence time and date.
   9. Reset time and date.

M. The system shall also provide the following:
   1. Counting the number of addressable detectors within a "zone".
   2. Which are in alarm.
   3. Counting "zones" which are in alarm.
   4. Counting the number of addressable detectors which are in alarm.
   5. Alarm on the system.
   6. Differentiating among types of addressable detectors such as smoke detectors, manual stations, water-flow switches, thermal detectors.
   7. Assigning priorities to types of detectors, zones or groups of detectors.

M. Control Functions
   1. Control functions shall be assigned on the basis of multi-relational system initiation patterns of detection devices including full logic element equations using as "anding" zones, counting zones, counting devices, "anding" groups, conditional "if", "then", "or" programming and "anding" types of detection devices.
   2. Control functions shall be assigned on the basis of cycle, delay, count, time of day, day of week, day of month and with a holiday schedule of up to 30-holidays per year. Each addressable detection device shall report its condition to the system control unit not less than every 4-seconds in a manner such that failure of the connections to the internal electronics of the device will result in a trouble signal which identifies the specific device involved.
   3. The system shall be field programmable for the response of control points to monitored devices.
   4. The operating software program shall provide programmable control for the Event-Initiated-Programs (E.I.P.) which shall allow automatic operation of system control points in the event of an alarm condition. To program these E.I.P.'s, the system shall use a specifically designed user friendly programming language, which shall not require a knowledge of computer programming to learn and understand.
   5. The operating software shall support the following additional capabilities:
      a. Three levels of designated and unique Priority Alarms for each point.
      b. Designated "Sense Mode" for status interpretation for each point.
      c. Designated Print/No Print/Vectoring Mode for each point.
6. The input statement defines the conditions required to activate the associated output statement. The input statement shall consist of single or multiple monitor point status, subroutine status, time comparison and the utilization of AND, OR, NOT, COUNT, and DELAY logic functions.

7. The output statement defines the action to be taken by the control panel. The output statement shall consist of activation/deactivation of single or multiple control functions, subroutines, and remote Annunciator status LED's. Output statements shall also include the "Alert" messages.

8. The software shall provide an "alert" message, unique to each point in the system, which will provide specific instructions for the operator on duty. These messages shall be up to 5 lines with up to 70 characters in each line. Each system monitor point shall have 5 specific alert messages when in alarm. Control points shall also be assigned alert messages.

9. The hardware and software shall have the capacity to accept up to 64 independent programs. Each program shall have "Edit" or "No Edit" capability. Each program shall be written in an equation format comparable to ladder-logic equations. The Equations shall consist of an input and an output statement.

10. Provide initial programming services for coding, loading and debugging the initial Owner specified programs, as part of the Contract.

11. Programming Command Definition
   a. Timing command shall provide time delay and time control functions based on internal clock/calendar by time of day; day of week; day of month; month in year.
   b. Count command shall provide a specific number of events to occur before a control action is initiated.
   c. Pulse command shall provide on control for a specific period of time.
   d. Cycle command shall provide on-off control for preset periods of time.
   e. Print command shall provide printing of specified information after an event occurs.

2.03 FIRE ALARM DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Enclosure shall be red.

B. Panel shall be solid state with eight (8) zones for off premise monitoring of the fire alarm control panel.

C. System shall monitor alarm and trouble conditions. System shall be power limited.

D. System shall include dual telephone line switcher for central station reporting. Telephone lines shall be supervised.

E. System shall include dual battery harness, batteries, and battery charger.

F. System shall be UL listed for central station fire signaling systems (NFPA 71).

G. System shall be California State Fire Marshal approved for Central Station Reporting.

H. System shall be Radionics D8112FA Series or Simplex 5071 Series. System shall be approved for connection to the fire alarm control panel.

I. Verify specific requirements with District and Central Station prior to submittals.
2.04 MANUALLY ACTIVATED ALARM INITIATING DEVICES

A. An electronic, digital multiplex, addressable module shall be incorporated into each device. The module shall communicate the status and trouble condition of each device with a unique Address Code. The module shall communicate with and be supervised and monitored by the fire alarm control panel.

B. Devices shall be suitable for use on a Class "B", 2-wire supervised alarm initiating circuit.

C. Numbered screw type terminals shall be provided for "in-out" connections of the alarm circuit wiring.

D. The face of the station shall have lettering indicating "FIRE" and operational instructions. Stations shall be tamper resistant, semi-flush mounting.

E. Auxiliary spare switch contact shall be provided for control of remote devices rated 120 volts - 60Hz, AC - 3AMP minimum.

F. Stations shall provide visual indication the station has been activated. A key (and/or special tool) shall be required to gain access into the station to reset the station after being activated.

G. Stations shall be "non-break-glass" type.

H. RF and transient filtering shall be provided in the device electronics.

I. Pull stations shall be Non-Coded double action, requiring a two district manual "pulling" actions to initiate the fire alarm system.

J. Stations installed outdoors shall be weather resistant construction, double action to activate the pull station.

2.05 AUTOMATIC ALARM INITIATING DEVICES

A. General
   1. An electronic digital, multiplex, addressable module shall be incorporated into each device. The module shall communicate the status and trouble condition of each device with a unique Address Code. The module shall communicate with and be supervised and monitored by the fire alarm control panel.
   2. Devices shall be suitable for use on a Class "B", 2-wire supervised alarm initiating circuit. Where initiating devices are shown connected to an existing system, devices shall operate on 2-wire or 4-wire circuits plus 2-wire power circuit as required by the existing equipment.
   3. Numbered screw type terminals shall be provided for "in-out" connectors of the alarm circuit wiring.
   4. Auxiliary double throw spare relay contact shall be provided for activation of remote rated devices 120V, 60Hz, AC - 1 Ampere minimum.
   5. RF and transient filtering shall be provided in the initiating device electronics.
   6. Initiating devices shall be reset from the control panel and shall not require individual resetting.
B. Smoke Detector
   1. Detectors shall comply with UL standard 268, 167 and 168, and shall use solid state electronic circuits throughout.
   2. The smoke detector shall operate on a total of two (2) circuit wires. Alarm signaling and detector power shall use the same conductors. Detector sensitivity shall be factory set at 1.5%.
   3. A fine mesh insect screen shall be provided on all detector openings.
   4. The detector shall lock-in on alarm and shall provide a visual alarm/trouble indicator light. An electromechanical test feature shall provide functional testing of the unit without smoke.
   5. The detector shall also incorporate a fixed temperature heat detector rated at 135 degrees F. The heat detector shall operate the alarm circuit and alarm/trouble light.
      a. Photo electric type smoke detectors shall employ a Light Emitting Diode (LED) as the detector light source, activated by the presence of combustion smoke products. Failure of the LED shall activate the alarm/trouble light on the detector.
      b. Ionization type smoke detector shall employ the triple chamber (dual chamber) ionization principle, activated by the presence of combustion products. The ionization chamber shall be RF shielded.
      c. Air duct smoke detector photo electric or ionization type for installation on a mechanical air ducts. Two (2) air tubes shall extend into the air duct. The sampling tube shall extend across the entire width of the air duct. The second tube shall allow air to escape back into the duct.

C. Fire Detector - Heat
   1. Heat detectors shall be dual action electro-thermostatic combination rate of temperature rise and fixed temperature operation. An indicator shall be visible when detector has activated.
   2. The rate of rise element shall be self-restoring, after activation.
   3. The fixed temperature unit shall be set at 136 degrees F (190 degrees F for high temperature areas i.e. over 110 degrees F.)
   4. Provide a wire guard cover for the detector.

D. Fire Sprinkler Water Flow Detector.
   1. Vane-type water flow detectors shall be provided on the sprinkler system piping as shown on the Drawings. Detectors shall be designed for mounting on either vertical or horizontal piping, but shall not be mounted in a fitting or within 12 inches of any fitting that changes the direction of water flow.
   2. The detectors shall have a sensitivity setting to signal any flow of water that equals or exceeds the discharge from one sprinkler head.
   3. Detector switch mechanisms shall incorporate an instantly recycling pneumatic retard element with an adjustable range of 0 to 70 seconds. Switches shall have a minimum rated capacity of 7 amp 125-volt, AC - .25 amp 24-volt, D.C. A D.P.D.T. switch shall be actuated by a polyethylene vane extending into the waterway of the piping.
   4. Detectors shall be of weatherproof, dust tight construction and shall provide a ¾-inch conduit entrance. Detector shall be finished in red baked enamel.
   5. Flow switch shall be sized to match the fire sprinkler riser pipe diameter.

E. Fire Sprinkler Valve Tamper Switch
   1. Tamper switch shall monitor the position of the fire sprinkler shut-off valve. Operation of the valve shall activate the switch and activate a trouble alarm.
2.06 NOTIFICATION ALARM DEVICES

A. General
1. Notification alarm devices shall activate automatically from the control panel. Devices shall operate on a Class "B" (Style Y), 2-wire supervised alarm notification circuit. Series wired alarm devices shall not be used.
2. Numbered screw type terminals shall be provided for "in-out" connections of the alarm circuit wiring.
3. Devices shall be installed in a box, 3½-inches deep maximum, flush mounting unless indicated otherwise on the Drawings. Size as required for the alarm indicating device and wiring connections. Provide a trim ring and metal grill cover assembly. Cover assembly shall be a minimum of 1/16-inch minimum thick flat stainless steel or aluminum. Finish color as selected by Architect. The word "fire" shall appear on the grill minimum ½-inch letters. The grill shall be attached with screws to the box.
4. Each audible notification visual devices shall incorporate a visual alarm indicator. The visual alarm indicating device shall be an integral part of the audible alarm box assembly.
5. Audible notification device and visual notification devices shall be connected to separate notification alarm signal circuits. Do not connect these devices to the same circuit conductors.

B. Audible Alarm Horns
1. Horns installed indoors shall be electronic type.
2. Horn shall provide a minimum sound level of 75dB at 10 feet, when installed in the field operating conditions shown on the Drawings.
3. Outdoor horns shall be electro-mechanical, weatherproof and shall be mounted in a recessed backbox with vandal resistant grille, Soundolier 193-8/VP-161 Series.
4. Audible devices shall provide a minimum sound level of 10dB over the ambient level measured 48-inches above the floor.

C. Visual Alarm Indicator
1. Lamp/Strobe internally illuminated projecting lens assembly, with flasher system. Unit shall flash on and off to provide visual indicating of fire alarm.
2. The word "fire" shall appear on the lens or lens plate.
3. Flash rate, one flash per second, with a flash duration of approximately 0.001 second, flash rate independent of audible device.
4. Light source, Xenon high intensity flash strobe tube white/clear color.
5. Strobe shall have a minimum output of 75 candelas with a maximum flash intensity of 120 candelas.
6. Strobe shall comply with NFPA requirements.

2.07 REMOTE FIRE ALARM ANNUNCIATOR

A. General
1. The annunciator panel shall be powered and operated from the fire alarm control panel. "In-out" circuit conductors shall terminate on numbered screw-type terminals.
2. A metal tamper resistant weatherproof cabinet shall contain the annunciator components. The panel shall be surface or flush mounted as indicated on the Drawings. Provide a full height tamper resistant, hinged locking cabinet door. Door shall have transparent high impact windows to allow visual observation of all indicators and switches.
3. An electronic digital, multiplex, addressable module shall be incorporated into the annunciator. The module shall communicate the status and trouble condition of each device with a unique Address Code. The module shall communicate with and be supervised and monitored by the fire alarm control panel.

B. Each alarm initiating zone (including spares) shall be individually annunciated in the annunciator panel.

C. A common fire trouble alarm shall be annunciated in the annunciator panel from the fire alarm control panel.

D. Annunciator lamp circuits shall be automatically supervised. Provide lamp test switch in the annunciator panel.

E. An audible alarm/trouble buzzer with silence switch and automatic resound for subsequent alarm/trouble signals shall be provided. The annunciator panel shall be automatically reset when the control panel is reset.

F. A keyed switch shall be provided for remote reset of the system. The annunciation panel shall also be automatically reset when the control panel is reset.

G. Provide a floor plan of the facility framed under acrylic and mounted adjacent to the fire alarm annunciator. The floor plan shall be to scale and shall have room numbers clearly displayed on all rooms corresponding to the annunciator for the purpose of easily identifying the fire zones.

2.08 REMOTE EQUIPMENT MONITORING AND CONTROL

A. An electronic digital multiplex addressable module shall be provide at each device or equipment indicated to be controlled by the multiplex system. Multiple addressable control ports shall be provided in each module quantity as required for each point controlled or monitored. The module shall communicate the monitor status control action and trouble condition of each device with a unique Address Code. The module shall communicate with and be supervised and monitored by the fire alarm control panel.

B. Where multiple points are monitored or controlled, provide digital, multiplex, Multi-Points, Monitor, Control Panel (MMCP). The panel cabinet shall be self-contained NEMA 1 construction and hinged locking door. Provide tamper switch detection zone on the cabinet door; provide 60 hour battery UPS backup and power supply, the same as required for the fire alarm control panel. Panel shall be expandable using plug-in circuit monitor/control printed circuit cards. Provide barriered numbered terminal strips.

C. Each control point shall provide a supervised "dry" relay contact single pole double throw maintained contact rated 10 ampere, 227 volt, 60Hz AC.

D. Each monitor point shall provide not less than one of the following supervised methods of monitoring a remote device or equipment action or status.

1. Remote "dry" contact operation normal open, normally closed or momentary contact operation.
PART 3 - EXECUTION

3.01 IDENTIFICATION (ADDITIONAL REQUIREMENTS)

A. The inside cover of alarm initiating devices shall be marked with the zone initiating number corresponding to the zone number in the control panel. Marking shall be with a felt-tip pen.

B. Each fire alarm terminal cabinet shall be painted red.

C. Provide nameplate: "Power to Main Fire Alarm Control Panel" screwed onto the branch circuit overcurrent device supplying power to the main fire alarm control panel.

3.02 WIRING (ADDITIONAL REQUIREMENTS)

A. Review the total system point-to-point wiring layout to assure that the correct number and type of wires and conduit sizes are installed.

B. Final connections, testing, adjusting and calibration shall be made under the direct supervision of a Factory-Trained Technician of the System Supplier.

C. All wiring shall be in conduit.

D. All wiring in cabinets shall be neatly formed, laced and made up on bolt and nut terminal blocks. Tag all spare conductors. All conductors shall terminate on terminal strips with spade lugs, of adequate size for all incoming and outgoing conductors. The strips shall be labeled as to their use and wiring diagram shall be placed on the cabinet door showing connections of all related equipment to these strips.

E. Wiring requirements for shielding certain conductors shall be as recommended by the Manufacturer. Provide all conduit, raceways and conductors per Manufacturers recommendations and include all material and labor costs in the Contract price.

F. The conductors used for digital, multiplex communication between the fire alarm control panel and external remote initiation devices, control points and annunciators, shall be twisted, shielded, multi-conductor cable, #16 AWG copper minimum with a separate internal ground/drain conductor, UL listed for fire alarm system use. One spare pair of multiplex conductors shall be provided in all main and branch device/equipment connections for future system use. "Tees" and taps at any junction box location in the communication lines, shall be permitted by the system to additional devices without affecting proper system operation.

G. Wire Size: Wire shall be sized to insure installed circuit voltage drop does not exceed 10% to all devices.

3.03 OUTLET BOXES (ADDITIONAL REQUIREMENTS)

Device outlet boxes shall be flush mounted unless indicated otherwise on the Drawings. Provide extension rings to finish flush with finish surface. Where the Drawings indicate surface mounted devices, outlet boxes shall be cast metal with threaded hubs. Where the conduit entrances are not exposed for surface mounted devices, provide flush outlet box behind the device box and omit the conduit hubs on the device box. Size device boxes and outlet boxes per Manufacturers recommendation and as required by Code for wire fills.
3.04 SPECIAL INSTALLATION REQUIREMENTS

A. Air duct smoke detectors shall be installed in the supply air ducts and return air ducts with an air flow of 2000 CFM or greater, coordinate with mechanical Contractor. Sampling tube shall extend across entire duct width. Provide ¾-inch conduit with 2#12 to respective motor control device to automatically shut down the respective fan motor upon detection of smoke in the air duct.

B. Water flow switches shall be installed on each main fire sprinkler rise pipe, coordinate with the Fire Sprinkler Contractor.

C. Tamper switches shall be installed on each main fire sprinkler shut-off valve, coordinate with the Fire Sprinkler Contractor.

D. Equipment shall be weatherproof gasketed where installed in locations exterior to the building, or where indicated on the Drawings. Weatherproof equipment shall be tamper resistant.

E. Provide clear vandal resistant protective cover for all audio-visual devices located in student restrooms and public hallways.

F. Provide wire guard for ceiling mounted smoke and heat detectors located in student restrooms.

G. Connect fire alarm control panel with security/intrusion control panel for monitoring by Remote Monitoring Company.

H. Connect fire alarm control panel with master clock system to turn off class passing schedule, with paging system to turn off system when fire alarm system in alarm condition.

I. Conduit with fire alarm wiring shall be painted red.

J. Fire alarm system shall be programmed per actual building and room designation. Submit printout for review.

3.05 TESTING

A. The entire fire alarm system shall be tested in the presence of the Local DSA Inspector and a Representative of the Manufacturer after the installation is complete. 
1. Individually activate each manual initiating station and verify correct alarm operation and control panel response.
2. Individually test each automatic initiating device and verify correct alarm operation, control panel response and remote equipment operation.
3. The communication loops and the notification alarm circuits shall be opened in at least two (2) locations per building to check for the presence of correct supervisory circuitry.

B. Test the battery back-up system by disconnecting the incoming normal power and allowing this alarm system to operate 24 hours on battery power. Sound the alarm system for 5-minutes at the end of 24 hours on battery power.
C. Perform all Electrical and Mechanical Tests required by the Equipment Manufacturer's certification form. Measure and adjust each automatic detection detector to the maximum stable sensitivity setting. Detector tests shall be performed with the detector at its operational location and under normal operational environmental conditions in the area. Bench settings are not acceptable. An operational check-out test and report shall be performed. Submit six (6) copies of test report results. The tests and report shall include, but not be limited to:

1. A complete list of equipment installed and wired.
2. Indication that all equipment is properly installed and functions and conforms with these Specifications.
3. Test of individual zones as applicable.
4. Serial numbers, locations by zone and model number for each installed detector.
5. Voltage (sensitivity) settings for each ionization and photoelectric detector as measured in place with the HVAC system operating.
6. Technician's name, certificate number and date.
7. The completed manual and automatic monitoring and control system shall be tested to insure that it is operating properly. This test will consist of exposing the installed units to a standard fire test.
8. Acceptance of the system shall also require a demonstration of the stability of the system. This shall be adequately demonstrated if the system operates for a 90-day test period without any unwarranted alarms. Should an unwarranted alarm(s) occur, the Contractor shall readjust or replace the equipment and detector(s) and begin another 90-day test period. As required by the Architect, the Contractor shall recheck the detectors using the fire test after each readjustment or replacement of detectors. This test shall not start until the District has obtained beneficial use of the building under tests.

D. After the testing has been completed to the satisfaction of the Inspectors, provide the NFPA certificate of compliance to the District, the Local Fire Official, the Architect and DSA.

E. Upon the receipt of Certificate of Compliance, the Installer/Supplier shall supply the Owner with a written operating, testing and maintenance instructions, Point-To-Point As-Built Drawings, and Equipment Specifications.

3.06 INSTRUCTIONAL / TRAINING SESSIONS

Provide a 2-hour instructional sessions conducted by a Factory- Authorized Technician at the job site after completion of all tests to instruct School District Personnel on the use of the system. The first session shall be videotaped and conducted prior to final acceptance of the Project. The second session shall be held within eleven months of final acceptance of the Project, when requested by the District.
SECTION 31 1000
SITE CLEARING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   2. Conform to work restrictions for hazardous materials.
   3. Dust control measures.

B. Related Sections:
   1. Section 01 5713: Temporary Erosion and Sedimentation Control: slope Protection and erosion control.
   2. Section 02 4113: Selective Site Demolition.
   3. Section 31 2316: Excavation

1.02 REFERENCES


B. ASTM International (ASTM):
   1. ASTM D1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft·lbf/ft³ (2,700 kN·m/m³)).


1.03 QUALITY ASSURANCE

A. Comply with SSPWC as minimum requirement.

1.04 SUBMITTALS

A. Shop Drawings: Site plan indicating extent of site clearing.

PART 2 – PRODUCTS  (Not Applicable)

PART 3 – EXECUTION

3.01 TREE AND STUMP REMOVAL

A. Remove trees and stumps indicated or required to be removed.
   1. Remove trees, together with bulk of roots, to minimum depth of 4 feet below required grade, and within radius of approximately 7 feet beyond perimeter of trunk at grade.

B. Fill and compact excavation from tree and stump removal.
   1. Fill in 6 inch layers, each compacted to 90 percent of maximum density in accordance with ASTM D 1557.
2. Back filling shall not commence until excavation is inspected and tested.

3.02 CLEANUP

A. Remove and legally dispose of rubbish, debris and waste materials off Project Site.

END OF SECTION 31 1000
PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Excavating for footings, slabs-on-grade, paving, and site structures.
B. Trenching for utilities outside the building to utility main connections.

1.02 RELATED REQUIREMENTS

A. Geotechnical Reports
B. Section 01 5713: Temporary Erosion and Sedimentation Control: slope protection and erosion control.
C. Section 01 7700: Closeout Procedures
D. Section 31 1000: Site Clearing.
E. 2015 Standard Specifications For Public Works Construction (SSPWC) "Greenbook"
F. 2012 Standard Plans For Public Works Construction (SPPWC)
G. 2006 LA County Additions and Amendments to SSPWC "Graybook"

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the work are as indicated.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.
B. See Section 31 1000 for additional requirements.
C. Locate, identify, and protect utilities that remain and protect from damage.
D. Notify utility company to remove and relocate utilities.
E. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
F. Protect plants, lawns, rock outcroppings, and other features to remain.
3.03 EXCAVATING

A. Underpin adjacent structures that could be damaged by excavating work.

B. Excavate to accommodate new structures, construction operations, and utilities.

C. Notify Engineer of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

D. Slope banks of excavations deeper than 4 feet (1.2 meters) to angle of repose or less until shored.

E. Do not interfere with 45 degree bearing splay of foundations.

F. Cut utility trenches wide enough to allow inspection of installed utilities.

G. Hand trim excavations. Remove loose matter.

H. Correct areas that are over-excavated and load-bearing surfaces that are disturbed.

I. Grade top perimeter of excavation to prevent surface water from draining into excavation.

J. Remove excavated material that is unsuitable for re-use from site.

K. Stockpile excavated material to be re-used in area designated on site in accordance with Section 31 1000.

L. Remove excess excavated material from site.

3.04 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Greenbook standards.

B. Provide for visual inspection of load-bearing excavated surfaces before placement of foundations.

3.05 PROTECTION

A. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

END OF SECTION 31 2316
SECTION 32 0523
CONCRETE FOR EXTERIOR IMPROVEMENTS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Site concrete work consisting of:
      b. Sign post footings for parking signage.
      c. Planter walls.
      d. Precast wheel stops.

B. Related Sections:
   1. Section 03 3000: Cast-in-Place Concrete; formwork, reinforcing, and mixes.
   2. Section 07 9200: Joint Sealants; concrete paving joints.
   3. Section 31 2316: Excavation
   4. Section 32 1723: Pavement Markings
   5. Section 32 1726: Tactile Warning Surfacing

1.02 REFERENCES

A. ASTM International (ASTM):
   1. ASTM D 994 – Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type)


1.03 QUALITY ASSURANCE

A. Refer to Section 01 4500 for concrete testing requirements.

1.04 SUBMITTALS

A. Shop Drawings: Plans, elevations and details of site concrete work.

B. Product Data: Mix designs and manufacturer’s technical data for materials and products.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Concrete, Mortar and Related Materials:
   1. Refer to Section 03 3000 for reference standards, formwork, reinforcing, and mix design requirements.

B. Comply with applicable provisions of SSPWC Section 201 – Concrete, Mortar and Related Materials for items not covered in Section 03 3000.
4. Portland Cement Concrete (PCC) for non-structural uses:
   a. Meet requirements of SSPWC Subsection 201-1 and 302-6, and Section 303.

B. Form Materials:
   1. Refer to Section 03 3000.

2.02 PRECAST WHEEL STOPS

A. Concrete Wheel Stops: Precast, air-entrained concrete, smooth finish, 3,000 psi minimum compressive strength, with continuous steel reinforcing, approximately 5 inches high by 7 inches wide by 4 feet long, or as indicated.
   1. Provide chamfered corners and drainage slots on underside.
   2. Provide holes for anchoring to asphalt substrate.
   3. Anchorage Dowels: Galvanized steel, diameter 3/4 inch, minimum length 18 inches.

PART 3 - EXECUTION

3.01 CONSTRUCTION OF FORMS FOR CAST-IN-PLACE STRUCTURES


B. Parking lot signage post footings below grade, may be placed directly in excavations conforming to required sizes.

E. Reinforcement installation and concrete placement, surface finishes, curing and removal of forms shall be performed in compliance with applicable provisions of Section 03 3000.

F. Finishing: After completion of floating and when excess moisture or surface sheen has disappeared, complete troweling and finish surface to match existing or as indicated.
   1. Provide slip resistant finish texture on concrete surfaces as follows:
      a. Portland cement concrete walks shall have medium broom finish on surfaces sloped less than 6 percent and slip resistant heavy broom finish on surfaces sloped greater than 6 percent, per CBC Section 11B-403.2.

3.02 JOINTS

A. General: Construct expansion, weakened-plane (contraction), and construction joints true to line with face perpendicular to surface of concrete.
   1. Construct transverse joints at right angles to centerline, unless otherwise indicated.

B. When joining existing structures, place transverse joints to align with previously placed joints, unless otherwise indicated.

C. Weakened-Plane (Contraction) Joints: Provide weakened-plane (contraction) joints, sectioning concrete into areas as shown.
   1. Construct weakened-plane joints for depth equal to at least one-quarter (1/4) concrete thickness, as follows:
2. Sawn Joints: Control joints are to be made using beveled saw blades, such as those manufactured by Soff-Cut International, Inc., No. XL-R250, or approved equal.
   a. Use joint protectors to prevent joint intersections from breaking down initial joint.

D. Construction Joints: Place keyed construction joints at end of placements and at locations where placement operations are stopped for more than one-half hour, except where such placements terminate at expansion joints.
   1. Expansion joints are to be slip doweled at 18 inches on center, using plastic alignment accessory Speed Dowel or equal.

3.03 CONCRETE WHEEL STOPS

A. Provide in locations indicated.
   1. Set units level and flush.
   2. Secure each unit with 2 steel stakes of type and size specified.

3.04 CLEAN UP

A. Remove and legally dispose of rubbish, debris, and waste materials off Project Site.

3.04 PROTECTION

A. Protect Work until Substantial Completion.

END OF SECTION 32 0523
PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Material and installation for following:
      a. Base course
      b. Asphalt (bituminous) surfacing.
      c. Seal coat for asphalt surfacing

B. Related Sections:
   1. Section 31 2316: Excavation

1.02 REFERENCES


B. ASTM International (ASTM):
   1. ASTM D 1188 – Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples

C. American Association of State Highway and Transportation Officials (AASHTO):

1.03 QUALITY ASSURANCE

A. Comply with SSPWC as minimum requirement.

1.04 SUBMITTALS

A. Product Data:
      a. Gradation and quality certifications shall be dated within 30 days of submittal.
   2. Bituminous Materials:
      a. Manufacturer’s technical data for materials and products
      b. Site plan indicating extent of paving and accessories.
   3. Manufacturer's product information and application procedures for seal coating.

1.05 PROJECT CONDITIONS

A. Information on Drawings does not constitute guarantee of accuracy or uniformity of soil conditions over Project Site.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Sealer Material: Agitate bulk materials during transport.
1.07 MAINTENANCE

A. Extra Material: Furnish 10 gallons of sealer material in unopened containers.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Untreated Base Materials:
   1. Following base materials are classified, in order of preference, in conformance with requirements of SSPWC, Section 200 - Rock Materials.
      a. Crushed aggregate base or crushed slag base.
   2. Material Approval:
      a. Base material shall be inspected by Project Inspector prior to installation.
      b. Owner may choose to have additional tests performed by geotechnical testing laboratory, before installation.

B. Bituminous Materials:
   1. Provide materials of class, grade, or type indicated, conforming to relevant provisions of SSPWC, Section 203 - Bituminous Materials.

C. Headers and Stakes:
   1. Headers: Redwood, Construction Heart Grade, size 2 x 6, unless otherwise indicated.
   2. Stakes: 2 x 4 redwood or 2 x 3 Douglas fir, Construction Grade.
   3. Nails: Common, galvanized, 12d minimum.

D. Seal Coat:
   1. Provide seal coat materials by one of following or approved equal:
      a. Guard-Top, Division of Western Emulsions Inc.
      b. OverKote by Diversified Asphalt Products
      c. Park Top by Western Colloid Products

PART 3 – EXECUTION

3.01 BASE COURSE INSTALLATION

A. Install base course material in layers not exceeding 4 inches in thickness, unless required otherwise.
   1. Grade and compact to indicated levels or grades
      a. Cut and fill,
      b. Water and roll until surface is hard and true to line, grade and required section.
      c. Provide relative compaction of at least 95 percent, unless otherwise required.
   2. Grade base course to elevations indicated, ready to receive surfacing, in accordance with Section 32 2300.

3.02 HEADER INSTALLATION

A. Install headers along edge of bituminous surfacing abutting turf, earth, or planting area, unless indicated otherwise.
B. Install headers so bottom surface has continuous bearing on solid grade.
   1. Where excavation for headers is undercut, thoroughly tamp soil under header.
   2. Compact backfill on both sides of header to density of adjacent undisturbed earth.

C. Fasten headers in place with redwood or Douglas fir stakes of length necessary to extend into solid grade minimum of 12 inches.
   1. Stakes shall be of sound material, neatly pointed, driven vertically, and securely nailed to headers.
      a. Space stakes, not to exceed 4 feet on centers with top of stakes set one inch below top of header.
      b. Provide minimum of 2-12d galvanized common nails through each stake.

D. Remove existing headers where new surfacing is installed adjacent to existing surfacing.

E. Install temporary headers at transverse joints of paving where continuous paving operations are not maintained.

F. Provide additional stakes and anchorage as required to fasten headers in place.

3.03 CONSTRUCTION OF ASPHALT CONCRETE PAVEMENT

A. Thickness of Surfacing: Unless otherwise indicated or specified, install bituminous surfacing to compacted thickness of 3 inches.

B. Provide surfacing material over base course as specified.

C. Surfaces of walls, concrete, masonry, or existing bituminous surfacing indicated to be in direct contact with installed bituminous surfacing shall be cleaned, dried and uniformly coated with an asphalt emulsion film.

D. Thicken edges of bituminous surfacing that do not abut walls, concrete, or masonry, and edges joining existing bituminous surfaces.
   1. Remove headers at existing bituminous surfacing where new bituminous surfacing is to be installed.
   2. Thicken edges an additional 2 inches and taper to the indicated or specified thickness 6 inches back from such edges.

E. Provide adequate protection for concrete, planting areas, and other finish Work adjacent to areas indicated to receive bituminous surfacing.

F. Placing:
   1. Do not install bituminous surfacing when atmospheric temperature is below 40 degrees F or when fog or other unsuitable weather conditions are present.
      a. Temperature of mixture at time of installation shall not be lower than 260 degrees F in warm weather or higher than 320 degrees F in cold weather.
   2. Where 2 inch or 3 inch thick surfacing is indicated or specified, install surfacing in one course.
      a. Where surfacing is indicated or specified 4 inches or more in thickness, except for thickened edges, install bituminous surfacing in courses of approximately equal thickness, with each course not exceeding 2-1/2 inches in thickness unless otherwise required by Architect.
G.  Stakes or Screeds: Provide grade or screed stakes spaced not more than 15 feet apart in flow lines with grades of less than one percent.
   1. Continuous screeds may be provided instead of stakes.

H.  Spreading: Install bituminous surfacing in manner to cause least possible handling of mixture.
   1. In open areas and wherever practicable, install by mechanical means with self-propelled mechanical spreader.
   2. In confined or restricted areas, install mixture with hot shovels and rakes, and smooth with lutes.

I.  Joints: Provide vertical joints between successive runs.
   1. Install joints true to line, grade, and cross section.
   2. Lapped joints are not permitted.

J.  Rolling:
   1. Finish roll with self-propelled tandem roller weighing at least 8 tons.
      a. Break down roll with self-propelled roller weighing between 1-1/2 tons and 8 tons.
   2. Roll in manner that preserves flow lines and established finished grades.
      a. Break down roll in areas adjacent to flow lines parallel to flow lines.
      b. Break down roll after bituminous surfacing is installed without shoving or cracking of mixture under roller.
      c. Continue finish rolling until surfacing is unyielding, true to grade, and meets requirements for specified smoothness.
      d. Areas inaccessible to finish roller may be finish rolled with breakdown roller or tamped with hot tamping irons and smoothed with hot smoothing irons or hand roller.
   3. Where bituminous surfacing abuts concrete, masonry, and walks or paving, tamp joint smooth, when necessary, as described above to obtain uniformly even joint, true to line and grade.
      a. Tamp and smooth to properly compact.
   4. Compacted bituminous surfacing shall be provided with bulk specific gravity of at least 2.31 when tested in accordance with ASTM D 1188.

3.04 TOLERANCES

A.  Smoothness: Surface of bituminous surfacing after rolling, shall be even, smooth and uniform in texture with no voids or rock pockets
   1. Free of roller marks, or other irregularities
   2. Not varying by more than 0.03 foot, except at local depressions or raised areas as indicated, when 10 foot straightedge is placed on surface.

B.  Grade: Finished grade shall not vary more than 0.02 foot above or below required grade.
   1. Variations within prescribed tolerance shall be compensating so that average grade and cross-section are provided.

3.05 TESTING

A.  Flood test completed bituminous surfacing in presence of Project Inspector before seal coat has been installed.
   1. Repair areas of standing water or puddles and flood test locally.
   2. Install seal coat and retest as necessary.
3.06 SEAL COAT

A. General: After bituminous surfacing has passed flood test, clear and allow to dry and provide two coats of surface seal as specified.
   1. Where indicated, provide multiple coats of surface seal to existing bituminous surfacing.
   2. Where new bituminous surfacing joins existing bituminous surfacing, overlap surface seal minimum of 12 inches onto existing bituminous surfacing.

B. Surface Preparation:
   1. Thoroughly wash surfaces with water to remove dirt, debris, excessive oil and grease, or other foreign matter.

C. Application:
   1. Install seal coat in strict accordance with manufacturer's written directions and recommendations.
   2. Install 2 coats of seal coat to new bituminous surfacing.
      a. First coat shall be installed before flood testing.
      b. Clean surface and allow to dry before installing second coat.
      c. Second coat shall be installed after bituminous surfacing has passed flood test.
   3. Where new bituminous surfacing is installed adjacent to existing bituminous surfacing, overlap surface seal a minimum of 12 inches onto existing bituminous surfacing.
   4. Where existing bituminous surfacing is indicated to be patched and sealed, apply 2 coats of surface seal after patching.

3.07 CLEANING

A. Remove and legally dispose of rubbish, debris, and waste materials off Project Site.

3.08 FIELD QUALITY CONTROL

A. Testing: Owner reserves right to obtain samples, perform tests to ensure compliance with Specifications, and to review weight slips and invoices of materials delivered to Project Site.

3.09 PROTECTION

A. Protect Work until Substantial Completion.

END OF SECTION 32 1216
SECTION 32 1313

CONCRETE PAVING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Exterior concrete paving for following:
      a. Driveways and Roadways.
      b. Curbs Gutters,
      c. Aprons, and Swales.
      d. Walkways.

B. Related Sections:
   1. Section 03 3000: Cast-in-Place Concrete; structural concrete requirements.
   2. Section 31 2316: Excavation; subgrade preparation.
   3. Section 32 0523: Concrete for Exterior Improvements; miscellaneous non-structural concrete.
   4. Section 32 1216: Asphalt Paving
   5. Section 32 1723: Pavement Markings
   6. Section 32 1726: Tactile Warning Surfacing; installation in concrete paving.

1.02 REFERENCES

A. ASTM International (ASTM):
   1. ASTM A615 – Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.
   2. ASTM C31 – Standard Practice for Making and Curing Concrete Test Specimens in the Field
   4. ASTM C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
   5. ASTM C42 – Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
   7. ASTM C143 – Standard Test Method for Slump of Hydraulic-Cement Concrete
   10. ASTM C172 – Standard Practice for Sampling Freshly Mixed Concrete by the Pressure Method
   11. ASTM C231 – Standard Test Method for Air Content of Freshly Mixed Concrete
   14. ASTM C1059 – Standard Specification for Latex Agents for Bonding Fresh To Hardened Concrete
   15. ASTM C1064 – Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete

B. American Concrete Institute (ACI):
1. ACI 211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete
2. ACI 301 – Specifications for Structural Concrete.
3. ACI 304R – Guide for Measuring, Mixing, Transporting, and Placing Concrete
4. ACI 305R – Guide to Hot Weather Concreting
5. ACI 306.1 – Standard Specification for Cold Weather Concreting
6. ACI 309R – Guide for Consolidation of Concrete
7. ACI 318 – Building Code Requirements for Reinforced Concrete.

C. Concrete Reinforcing Steel Institute (CRSI):
2. Placing Reinforcing Bars.

1.03 QUALITY ASSURANCE

A. Concrete Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.

B. Installer Qualifications: Experienced installer who has completed pavement work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

C. Concrete Testing Service: Engage qualified independent testing agency to design concrete mixes.

1.04 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixes: For each concrete pavement mix.
   1. Include alternate mix designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

PART 2 – PRODUCTS

2.01 FORMS

A. Forms: Metal, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal and to provide full-depth, continuous straight, smooth exposed surfaces.
   1. Use flexible or curved forms to form radius bends as required.

B. Form Release Agent: Provide commercial formulation form-release agent complying with local volatile organic compound (VOC) limitations, that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
2.02 REINFORCING MATERIALS

A. Reinforcing Bars: ASTM A 615,
   1. Grade 40, deformed, for No. 4 and smaller.
   2. Grade 60, deformed, for No. 5 and larger.

B. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60.
   1. Cut bars to length with ends square and free of burrs.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcement bars, welded wire fabric, and dowels in place.
   1. Manufacture bar supports according to CRSI "Manual of Standard Practice" from steel wire, plastic, or precast concrete or fiber-reinforced concrete of greater compressive strength than concrete, and as follows:
   2. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

2.03 CONCRETE MATERIALS

A. General: Use same brand and type of cementitious material from same manufacturer throughout Project.

B. Portland Cement, ASTM C 150 Type I or II.

C. Aggregate: ASTM C 33, uniformly graded, from a single source, with coarse aggregate as follows:
   1. Class: IN
   3. Do not use fine or coarse aggregates containing substances that cause spalling.

D. Water: ASTM C 94.

2.04 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cement and to be compatible with other admixtures.


C. Water-Reducing Admixture: ASTM C 494, Type A.

2.05 CURING MATERIALS

A. Moisture-Retaining Cover: ASTM C 171, non-staining, reinforced, waterproof sheet.

B. Water: Potable.

2.06 RELATED MATERIALS

A. Control Joint Material:
2.07 CONCRETE MIXES

A. Prepare design mixes for each type and strength of normal-weight concrete by either laboratory trial batch or field experience methods as specified in ACI 301.
   1. For trial batch method, use qualified independent testing agency for preparing and reporting proposed mix designs.
   2. Do not use Owner's field quality control testing agency as independent testing agency.
   3. Limit use of fly ash to 15 percent of cement content by weight.

B. Proportion mixes according to ACI 211.1 and ACI 301 to provide normal-weight concrete with following properties:
   2. Slump Range: 3 inches to 4 inches.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having air content of 2.5 to 4.5 percent.

2.08 CONCRETE MIXING

A. Ready-Mixed Concrete: Comply with requirements and with ASTM C 94.
   1. When air temperature is between 85 degrees F and 90 degrees F., reduce mixing and delivery time from 1-1/2 hours to 75 minutes.
   2. When air temperature is above 90 degrees F., reduce mixing and delivery time to 60 minutes.

PART 3 – EXECUTION

3.01 SURFACE PREPARATION

A. Proof-roll prepared subbase surface to check for unstable areas and verify need for additional compaction.
   1. Do not begin paving work until such conditions have been corrected and subbase is ready to receive paving.

B. Remove loose material from compacted subbase surface immediately before placing concrete.

3.02 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for paving to required lines, grades, and elevations.
   1. Install forms to allow continuous progress of Work and so forms can remain in place at least 24 hours after concrete placement.

B. Check completed formwork and screeds for grade and alignment to following tolerances:
   1. Top of Forms: Not more than 1/8 inch in 10 feet.
   2. Vertical Face on Longitudinal Axis: Not more than 1/4 inch in 10 feet.
C. Clean forms after each use and coat with form release agent as required to ensure separation from concrete without damage.

3.03 PLACING REINFORCEMENT

A. General: Follow CRSI recommended practice for "Placing Reinforcing Bars" for placing and supporting reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, or other bond-reducing materials.

C. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement.
   1. Maintain minimum cover to reinforcement.

3.04 JOINTS

A. General: Construct control, construction, and expansion joints and tool edgings true to line with faces perpendicular to surface plane of concrete.
   1. Construct transverse joints at right angles to centerline, unless indicated otherwise.
   2. When joining existing paving, place transverse joints to align with previously placed joints, unless indicated otherwise.

B. Tooled Control Joints (CJ):
   1. Form tooled control joints after initial floating by grooving and finishing each edge of joint with groover tool to following radius.
      a. Repeat grooving of control joints after applying surface finishes.
      b. Eliminate tool marks on concrete surfaces.
   2. Jointer Tool: 1/4 inch wide at surface, tapered, with top edges rounded to 1/4 inch radius.
   3. Location: As indicated, but not more than 15 feet on center both ways.
      a. Typical sidewalk joints shall be 5 feet on center or as directed by Architect.

C. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades.
   1. Cut 1/8 inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
   2. Prior approval of Architect is required.

D. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to following radius.
   1. Repeat tooling of edges after applying surface finishes.
   2. Eliminate tool marks on concrete surfaces.
   3. Radius: As indicated.

E. Construction Joints (CJ): Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than 1/2 hour, unless paving terminates at isolation joints.
   1. Continue reinforcement across construction joints unless indicated otherwise.
   2. Do not continue reinforcement through sides of strip paving unless indicated.
3. Use bonding agent on existing concrete surfaces that will be joined with fresh concrete.

F. Expansion Joints (EJ): Form expansion joints of preformed joint filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
   1. Locate expansion joints at intervals of 30 feet, unless indicated otherwise.
   2. Extend joint fillers full width and depth of joint, not less than 1/2 inch or more than 1 inch below finished surface where joint sealant is indicated.
      a. Place top of joint filler flush with finished concrete surface when no joint sealant is required.
   3. Furnish joint fillers in one-piece lengths for full width being placed wherever possible.
      a. Where more than one length is required, lace or clip joint filler sections together.
      b. Do not leave gaps between ends of joint filler units.
   4. Protect top edge of joint filler during concrete placement with a metal or other temporary preformed cap.
      a. Remove protective cap after concrete has been placed on both sides of joint.
   5. Install dowel bars and support assemblies at joints where indicated.
      a. Lubricate or asphalt-coat one half of dowel length to prevent concrete bonding to one side of joint.

G. Installation of sealants is specified in Section 07 9200.

3.05 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in.
   1. Notify other trades to permit installation of their work.

B. Moisten subbase to provide uniform dampened condition at time concrete is placed.
   1. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

C. Comply with requirements and with ACI 304R for measuring, mixing, transporting, and placing concrete.

D. Deposit and spread concrete in a continuous operation between transverse joints.
   1. Do not push or drag concrete into place or use vibrators to move concrete into place.
   2. When concrete placing is interrupted for more than 1/2 hour, place construction joint.

E. Consolidate concrete by mechanical vibrating equipment supplemented by handspading, rodding, or tamping.
   1. Use equipment and procedures to consolidate concrete complying with ACI 309R.
   2. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator.
   3. Keep vibrator away from joint assemblies, reinforcement, or side forms.
   4. Use only square-faced shovels for hand-spreading and consolidation.
5. Consolidate with care to prevent dislocating reinforcing, dowels, and joint devices.

F. Screed paved surfaces with straightedge and strike off.
   1. Use bull floats or darbies to form smooth surface plane before excess moisture or bleed water appears on surface.
   2. Do not further disturb concrete surfaces prior to beginning finishing operations.

G. Cold-Weather Placement: Comply with ACI 306.1 and as follows.
   1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   2. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain concrete mixture temperature of not less than 50 degrees F and not more than 80 degrees F at point of placement.
   3. Do not use frozen materials.
   4. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators.

H. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows when hot-weather conditions exist.
   1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F.
   2. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water.
   3. Using liquid nitrogen to cool concrete is Contractor's option.
   4. Cover reinforcement steel with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
   5. Fog-spray forms, reinforcement steel, and subgrade just before placing concrete.
      a. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.06 CONCRETE FINISHING

A. General: Wetting of concrete surfaces during screeding, initial floating, or finishing operations is prohibited.

B. Float Finish: Begin floating when bleed water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations.
   1. Float surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units.
   2. Finish surfaces to true planes within tolerance of 1/4 inch in 10 feet as determined by 10 foot long straightedge placed anywhere on surface in any direction.
      a. Cut down high spots and fill low spots.
      b. Refloat surface immediately to uniform granular texture.

C. Medium Textured Broom Finish: For slopes less than 6 percent provide medium texture by drawing soft bristle broom across concrete surface perpendicular to line of traffic to provide uniform fine line texture finish.
D. Heavy (Coarse) Textured Broom Finish: For slopes 6 percent and greater, provide coarse finish by straiting surface 1/16 inch to 1/8 inch deep with stiff-bristled broom, perpendicular to line of traffic.

3.07 CURING AND PROTECTION

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
   1. Comply with ACI 306.1 for cold-weather protection and follow recommendations in ACI 305R for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations.
   1. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, or combination of these as follows:
   1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with following materials:
      a. Water.
      b. Continuous water-fog spray.
      c. Absorptive cover, water saturated, and kept continuously wet.
         1) Cover concrete surfaces and edges with 12 inch lap over adjacent absorptive covers.
   2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
      1) Immediately repair holes or tears during curing period using cover material and waterproof tape.

3.08 PAVEMENT MARKING

A. Comply with requirements specified in Section 32 1723 and as follows:
   1. Do not apply pavement marking paint until layout, colors, and placement have been verified with Architect.
   2. Allow concrete pavement to cure for 28 days and be dry before starting pavement marking.
   3. Sweep and clean surface to eliminate loose material and dust.

3.09 FIELD QUALITY CONTROL

A. Testing Services: Testing shall be performed according to following requirements:
   1. Sampling Fresh Concrete: Representative samples of fresh concrete shall be obtained according to ASTM C 172, except modified for slump to comply with ASTM C94.
   2. Slump Tests: ASTM C 143; one test at point of placement for each compressive-strength test but no less than one test for each day's pour of each type of concrete.
a. Additional tests will be required when concrete consistency changes.

3. Compression Test Specimens: ASTM C 31; one set of four standard cylinders for each compressive-strength test, unless directed otherwise.
   a. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.

4. Air Content: ASTM C 231, pressure method; one test for each compressive strength test, but not less than one test for each day's pour of each type of air entrained concrete.

5. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 degrees F and below and when 80 degrees F and above, and one test for each set of compressive-strength specimens.

6. Compressive-Strength Tests: ASTM C 39; one set for each day's pour of each concrete class exceeding 5 cubic yards, but less than 25 cubic yards, plus one set for each additional 50 cubic yard.
   a. One specimen shall be tested at 7 days and two specimens at 28 days.
   b. One specimen shall be retained in reserve for later testing when required.

7. When frequency of testing will provide fewer than five compressive-strength tests for given class of concrete, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

8. When total quantity of given class of concrete is less than 50 cubic yards, Architect may waive compressive-strength testing if adequate evidence of satisfactory strength is provided.

9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, current operations shall be evaluated and corrective procedures shall be provided for protecting and curing in-place concrete.

10. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive compressive-strength test results equal or exceed specified compressive strength and no individual compressive-strength test result falls below specified compressive strength by more than 500 psi.

11. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 24 hours of testing.
   a. Reports of compressive-strength tests shall contain following:
      1) Project identification
      2) Name and number
      3) Date of concrete placement
      4) Name of concrete testing agency
      5) Concrete type and class
      6) Location of concrete batch in pavement,
      7) Design compressive strength at 28 days
      8) Concrete mix proportions and materials
      9) Compressive breaking strength
     10) Type of break for both 7 and 28 day tests.

12. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection.

13. Additional Tests: Testing agency shall make additional tests of concrete when test results indicate slump, air entrainment, concrete strengths, or other requirements have not been met, as directed by Architect.
   a. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.
3.10 REPAIRS AND PROTECTIONS

A. Remove and replace concrete pavement that is broken, damaged, or defective, or does not meet requirements of this Section.

B. Drill test cores where directed by Architect when necessary to determine magnitude of cracks or defective areas.
   1. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to pavement with epoxy adhesive.

C. Protect concrete from damage.
   1. Exclude traffic from pavement for at least 14 days after placement.
   2. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur. for each additional 50 cubic yard.

D. Sweep concrete pavement and wash free of stains, discolorations, dirt and other foreign material just prior to final inspection.

END OF SECTION 32 1313
SECTION 32 1723

PAVEMENT MARKINGS

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Parking restriping.
      a. Includes markings and accessibility symbols, for accessible spaces as indicated.
   2. Fire lane “No Parking.”
   3. Curb marking and red curbs.

B. Related Sections:
   1. Section 09 9100: Painting
   2. Section 32 1216: Asphalt Paving
   3. Section 32 1313: Concrete Paving
   4. Section 32 1726: Tactile Warning Surfacing

1.02 REFERENCES


1.03 SUBMITTALS

A. Product Data: Manufacturer’s product data on traffic paint products and material.

B. Shop Drawings: Indicating location, extent, color, and texture of markings.

C. Samples: Color samples of paint products.

1.04 PROJECT CONDITIONS

A. Do not install markings when adverse weather conditions are forecasted.

1.05 REGULATORY REQUIREMENTS

A. Accessible Parking Spaces Serving Particular Building or Facility:
   1. When serving more than one accessible entrance, locate on shortest accessible route to entrance or multiple accessible entrances per CBC Section 11B-208.3.1
   2. Provide minimum number of required accessible parking spaces in accordance with CBC Section 11B-208.2
   3. Provide a least one van-accessible parking space for every six, or fraction thereof, of accessible parking spaces in accordance with CBC 11B-208.2.4
   4. Provide accessible parking spaces and access aisles comply with CBC Section 11B-502
      a. Dimension parking spaces to centerline of marked lines as follows:
1) Mark parking spaces and access aisles according to CBC Figures 11B-502.2, 11B-502.3 and 11B-502.3.3
2) Provide surfaces complying with CBC Section 11B-11B-302 and at same level with slopes not steeper than 1:48 in any direction per CBC Section 11B-502.4

5. Parking Space Dimensions:
   a. Parking Spaces: 9 feet by 18 feet minimum.
   b. Van Accessible Spaces: 12 feet by 18 feet minimum, with adjacent access aisle of 5 feet by 18 feet minimum.
   c. Place access aisles on either side of parking spaces, except locate on passenger side for van parking spaces.

6. Parking Space and Access Aisle Markings:
   a. Mark access aisles with blue painted borderline around their perimeter.
   b. Mark area within blue borderlines with hatched lines maximum of 36 inches on center with color contrasting to that of aisle surface.
      1) White on asphalt paving.
      2) Blue on concrete paving.
   c. Access aisle markings may extend beyond minimum required length per CBC Section 11B-502.3.3.
   d. Mark access aisles so as not to overlap vehicular way per CBC Section 11B-502.3.4.
   e. Provide vertical clearance of 8 feet-2 inches minimum for accessible parking spaces, access aisles, and vehicular routes serving them per CBC Section 11B-502.5.

PART 2 – PRODUCTS

2.01 MATERIALS

   A. Paint: Water emulsion-based Dura-Strip paint as manufactured by TMT-Pathway, or approved equal.

PART 3 – EXECUTION

3.01 PAVEMENT MARKINGS

   A. Application of Paint:
      1. Prior to application of paint, allow pavement to properly cure.
         a. Clean and prepare in accordance with paint manufacturer's written recommendations.
      2. Provide mechanical equipment to install paint in a uniform, straight or curved pattern, without holidays and other defects.
      3. Do not permit traffic until paint has completely cured.
      4. Install 2 coats in thickness recommended by manufacturer.

   B. Marking Width and Color: Unless indicated otherwise, marking width and color are as follows:

      | Width | Color |
      |-------|-------|
      | 4 inches | White |
      | 4 inches | Blue  |

      1. Parking stall lines
         a. General
         b. Accessible
      2. Traffic markings
3. Striping:
   a. General 4 inches Yellow
   b. Accessible 4 inches Blue
4. International Symbol of Accessibility 2 inches White on blue background

3.02 PROTECTION
   A. Protect Work until Substantial Completion.

3.03 CLEANUP
   A. Remove and legally dispose of rubbish, debris, and waste materials off Project Site.

END OF SECTION 32 1723
SECTION 32 1726
TACTILE WARNING SURFACING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Cast In Place Detectable/Tactile Warning Surface Tiles (truncated domes) where indicated.

B. Related Sections:
   1. Section 32 1313: Concrete Paving
   2. Section 32 1723: Pavement Markings.

1.02 REFERENCES


B. ASTM International (ASTM):
   2. ASTM C 293 – Standard Test Method for Flexural Strength of Concrete (Using Simple Beam With Center-Point Loading)

C. Federal Standard (FS):

1.03 QUALITY ASSURANCE

A. Provide cast in place detectable/tactile warning surface tiles and accessories as produced by single manufacturer with minimum of three years experience in
manufacturing of cast in place detectable/tactile warning surface tiles.

B. Installer's Qualifications: Engage experienced installer certified in writing by detectable/tactile warning surface tile manufacturer as qualified for installation, who has successfully completed tile installations similar in material, design, and extent to that indicated for Project.
1. Manufacturer's supervisor shall be present at initial pour.

1.04 SUBMITTALS

A. Product Data: Manufacturer's literature describing products, installation procedures and routine maintenance.

B. Shop Drawings: For products specified showing fabrication details, composite structural system, tile surface profile, and sound on cane contact amplification feature.
1. Include plans of tile placement including joints, and material to be used as well as outlining installation materials and procedure
2. Tile pattern shall be designed and shown between existing expansion joints with tile rib dimension used for cut size of panels.

C. Samples for Verification Purposes: Minimum of three samples, as Project Site mock-ups, of full cast in place detectable/tactile warning surface tiles of kind proposed for use.

D. Material Test Reports: From qualified accredited independent testing laboratory indicating that materials proposed for use are in compliance with requirements and meet properties indicated.
1. Test reports shall be conducted on cast in place detectable/tactile warning surface tiles as certified by qualified independent testing laboratory.
2. Do not include manufacturer’s MSDS sheets with this submittal.

E. Maintenance Instructions: Copies of manufacturer's specified maintenance practices for cast in place detectable/tactile warning surface tiles

1.05 PROJECT CONDITIONS

A. Environmental Conditions and Protection: Maintain minimum temperature of 40 degrees F in spaces to receive tiles for at least 24 hours prior to installations, during installation, and for not less than 24 hours after installation.
1. Store tile material in spaces where they will be installed for at least 24 hours before beginning installation.
2. Subsequently, maintain minimum temperature of 40 degrees F in areas where Work is completed.

B. Use of water for Work, cleaning, or dust control, shall be contained and controlled and shall not be allowed to come into contact with public.
1. Provide barricades or screens to protect public.

C. Disposal of liquids or other materials of possible contamination shall be made in accordance with federal state and local laws and ordinances.

D. Cleaning materials shall have code acceptable low VOC solvent content and low flammability if used on Site.
E. Contractor shall coordinate phasing and flagging personnel operations as specified in Division 01.

1.06 DELIVERY, STORAGE AND HANDLING

A. Tiles shall be suitably packaged or crated to prevent damage in shipment or handling.
   1. Finished surfaces shall be protected by sturdy wrappings, and tile type shall be identified by part number.

B. Tiles shall be delivered to location at Project Site for storage prior to installation.

1.07 REGULATORY REQUIREMENTS

A. Tactile Warning Surfacing:
   1. Provide tactile warning surfaces which comply with CBC Section 11B-705.1
   2. Surfacing Color: 33538 “Yellow” conforming to FS 595B.
      a. Except for locations at curb ramps, islands, or cut-through medians where color used shall contrast visually with that of adjacent walking surfaces.
      b. Either light-on-dark, or dark-on-light in accordance with CBC Section 11B-705.1.1.3 and 11B-705.1.1.5.
   3. Surfacing shall differ from adjoining surfaces in resiliency or sound-on-cane contact in accordance with CBC Section 11B-705.1.1.4.

1.08 WARRANTY

A. Provide manufacturer's minimum 5 year warranty in writing for period of five years from date of final completion complying with DSA Bulletin 10/31/02, revised 04/09/08.
   1. Warranty includes defective work, breakage, deformation, fading and chalking of finishes, and loosening of tiles.

PART 2 – PRODUCTS

2.01 MANUFACTURERS/PRODUCTS

A. Provide detectable warning surface tile by one of following:
   1. Engineered Plastics, Inc. (Armor-Tile)
   2. ADA Solutions, Inc.
   3. Armorcast Products

B. Basis-of-Design Product: Vitrified Polymer Composite (VPC) Cast in Place Detectable/Tactile Warning Surface Tiles specified are based on Armor-Tile as manufactured by Engineered Plastics Inc.
   1. Existing engineered and field tested products which are subject to compliance with requirements, may be incorporated in Work and shall meet or exceed specified test criteria and characteristics.

2.02 MATERIALS

A. Tiles: Made of homogeneous vitrified polymer composite (VPC) material with ultraviolet stabilized coating, to minimize color wear
   1. Provide with slip-resistant surface, incorporating “truncated domes” of same material.
2. Nominal thickness of detectable warning tile shall be 1/8 inch, exclusive of height of truncated domes.
3. Provide tiles complying with applicable requirements of CBC, Chapter 11B.

B. Vitrified Polymer Composite (VPC) cast in place detectable/tactile warning surface tiles shall be epoxy polymer composition with ultra violet coating employing aluminum oxide particles in truncated domes, conforming to following:
   1. Compressive Strength, ASTM D 695: Not to be less than 18,000 psi.
   2. Tensile Strength, ASTM D 638: Not to be less than 10,000 psi.
   3. Flexural Strength, ASTM C 293 or D 790: Not to be less than 24,000 psi.
   4. Water Absorption, ASTM D 570: Not to exceed 0.35 percent.
   5. Slip Resistance: 0.9 minimum for the combined wet/dry static co-efficient of friction when tested by ASTM C 1028
   6. Chemical Stain Resistance, ASTM D 543 or D 1038: To withstand without discoloration or staining -1 percent hydrochloric acid, urine, calcium chloride, stamp pad ink, gum and red aerosol paint.
   8. Accelerated Weathering, ASTM G 155: For 3000 hours shall exhibit following result-Delta E, <4.5: No deterioration, fading or chalking of surface of tile.
   9. Accelerated Aging and Freeze Thaw Test, ASTM D 1037 or C1026: Show no evidence of cracking, delamination, warpage, checking, blistering, color change, loosening of tiles, or other defects.
   10. Salt and Spray Performance of Tile, ASTM B 117: Not to show deterioration or other defects after 200 hours of exposure.

C. Pattern/Dimension: Pattern and dimensions of detectable warning surface tile shall incorporate an "in-line" dome pattern of truncated domes 0.2 inch in height, 0.9 inch diameter at base and 0.45 inch diameter at top of dome.
   1. Domes should be spaced no greater than 2.35 inches from center to center.
   2. Field area of detectable warning surface should consist of raised points no greater than 0.045 inches, to create a slip-resistant surface for wheelchair safety.

D. Color: Unless otherwise indicated, detectable warning surface tiles shall be Federal Color No. 33538 “Yellow”
   1. Color shall be integral with detectable warning device tiles and shall not be surface applied.
   2. Paints or other surface coatings shall not be used.

E. Sealants: Sealant shall be gray epoxy, two-component sealant, as manufactured by Sika, Bostik or approved equal.
   1. Sealant: As supplied by manufacturer.

PART 3 – EXECUTION

3.01 INSTALLATION

A. During concrete pouring and tile installation procedures, ensure adequate safety guidelines are in place and are in accordance with applicable industry and government standards.

B. Prior to placement of cast in place detectable/tactile warning surface tiles, review manufacturer’s shop drawings and layout drawing prepared by installation contractor to resolve issues related to pattern repeat, tile cuts, expansion joints, control joints,
curves, end returns and surface interferences.
1. Refer discrepancies to Architect.
C. Physical characteristics of concrete shall be consistent with Section 321313 specifications while maintaining a slump range of 4-7 to permit solid placement of cast in place detectable/tactile warning surface tiles.
   1. Overly wet mix will cause tiles to float, therefore suitable weights such as concrete blocks or sandbags (25 lb) shall be placed on each tile.

D. Concrete pouring and finishing operations require typical mason’s tools, however, 4’ long level with electronic slope readout, 25 lb. weights, and large non-marring rubber mallet are specific to installation of cast in place detectable/tactile warning surface tiles.
   1. Vibrating mechanism may be employed.
      a. Fix vibrating unit to soft wood base at least 1 foot square

E. Concrete shall be poured and finished true and smooth to required dimensions and slope prior to tile placement.
   1. Immediately after pouring concrete, use electronic level to check that required slope is achieved
   2. Place tile square and true to curb edge in accordance with approved shop drawings.
   3. Tiles shall be tamped or vibrated into fresh concrete to ensure that field level of tile is flush to adjacent concrete surface.
      a. Do not attempt to accomplish embedment process by stepping on tiles as this may cause uneven setting which can result in air voids under tile surface
   4. Shop drawings indicate that tile field level (base of truncated dome) is flush to adjacent surfaces to permit proper water drainage and eliminate tripping hazards between adjacent finishes.
      a. Tolerance for elevation differences between tile and adjacent surface is 1/16 inch.

F. Immediately after tile placement, tile elevation is to be checked to adjacent concrete.
   1. Tile elevation shall be set consistent with shop drawings to permit water drainage to curb as design dictates.
   2. Ensure field surface of tile is flush with surrounding concrete and back of curb so that no ponding of possible on tile at back side of curb

G. While concrete is workable, use 3/8 inch edging tool to create finished edge of concrete.
   1. Use steel trowel to finish concrete around tile perimeter, flush to field level of Tile.

H. During and after tile installation and concrete curing stage, do not allow walking, leaning, or external forces placed on tile to rock tile, causing void between underside of tile and concrete.

I. Following tile placement, review installation tolerances to shop drawings and adjust tile before concrete sets.
   1. Suitable weights of 25 lb. shall be placed on each tile and additional weights at tile to tile assemblies as necessary to ensure solid contact of tile underside to concrete.

J. Following curing of concrete, remove protective plastic wrap from tile face by cutting plastic with sharp knife tight to concrete/tile interface.
   1. Where concrete bleeding occurs between tiles, soft brass wire brush will clean residue without damage to tile surface.
K. Individual tiles may be bolted together with 1/4 inch bolts or equivalent hardware to help ensure adjacent tiles are flush to each other during installation process.
   1. Place tape or sealant on underside of bolted edge to prevent concrete from rising up between tiles during installation
      a. Replace protective plastic wrap peeled back to facilitate bolting or cutting by taping to ensure tile surface remains free of concrete during installation process
   2. Replace sound-amplifying plates on underside of tile dislodged during handling or cutting and secure with construction adhesive
      a. Air gap created between plates and bottom of tile is important in preserving sound on audible properties of tiles.
   3. Applications of sealant shall be level to adjacent surface and straight line formed to tile edge.
      a. Mask off tile faces with duct tape to ensure clean definition of sealant to adjacent surfaces.

L. Pavement Markings: Refer to Section 32 1723 for coordination of pavement markings with tactile warning surface locations.

3.02 CLEANING AND PROTECTING

A. Protect panels against damage during construction period to comply with tactile tile manufacturer’s specification.

B. Protect tiles against damage from rolling loads following installation by covering with plywood or hardwood.

C. Clean tactile tiles not more than four days prior to date scheduled for inspection intended to establish date of substantial completion in each area of project.
   1. Clean tactile tile by method specified by tile manufacturer.

D. Comply with manufacturer’s maintenance manual for cleaning and maintaining tile Surface.
   1. Perform recommended annual inspections for safety and tile integrity

E. Remove and legally dispose of rubbish, debris, and waste materials off Project Site.

F. Protect Work until Substantial Completion.

END OF SECTION 32 1726
SECTION 32 3113

CHAIN LINK FENCE AND GATES

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Poly Vinyl Chloride (PVC) coated chain link fencing and gates as shown.
      a. Including PVC color coated galvanized steel framework, gate hardware, and related accessories.

B. Related Sections:
   1. Section 03 3000: Cast-in-Place Concrete; concrete for fence post footings.
   2. Section 09 9600: High Performance Coatings; shop and field painting of chain link fence components.

1.02 REFERENCES

A. ASTM International (ASTM):
   1. ASTM A 36 – Standard Specification for Carbon Structural Steel
   2. ASTM A 780 – Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
   4. ASTM F 567 – Standard Practice for Installation of Chain-Link Fence
   5. ASTM F 626 – Standard Specification for Fence Fittings
   6. ASTM F 668 – Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain Link Fence Fabric
   10. ASTM F1664 Standard Specification for Polyvinyl Chloride (PVC) and Other Conforming Organic Polymer-Coated Steel Tension Wire Used With Chain Link Fence

B. Chain Link Fence Manufacturer's Institute (CLFMI):
   1. CLFMI Product Manual
   2. WLG2445 – Chain Link Fence Wind Load Guide for the Selection of Line Posts and Line Post Spacing

C. Federal Specifications (FS):
   1. RR-F-191/3E - Fencing, Wire and Post, Metal (Chain-Link Fence Posts, Top Rails and Braces) (Detail Specification)
1.03 QUALITY ASSURANCE

A. Comply with CLFMI standards.

B. Provide chain link fence and gates as produced by single manufacturer including necessary erection accessories, fittings, and fastenings.

C. Manufacturer Qualifications: Company having manufacturing facilities in United States with 5 years experience specializing in manufacturing of chain link fence products.

D. Fence Contractor Qualifications: Contractor having 5 years experience installing similar projects in accordance with ASTM F 567.

E. Tolerances: ASTM current specification and tolerances apply and supersede conflicting tolerance.

1.04 SUBMITTALS

A. Product Data: Manufacturer’s data, specifications, and installation instructions for chain link fence and gates.

B. Shop drawings: Layout of fences and gates with dimensions, details, and finishes of components, accessories, and post foundations.

C. Samples: Materials (e.g., fabric, wires, color, and accessories).

PART 2 – PRODUCTS

2.01 MANUFACTURER

A. Basis-of-Design: Design of PVC color coated chain link fence and gates is based on products as manufactured by Master Halco, Inc., Orange CA.

B. Subject to compliance with specified requirements, comparable products may be submitted by alternate manufacturers in accordance with requirements for product substitutions specified in Section 01 6000 and following:
   1. Submit items listed in “Submittals” Article and as specified in Section 01 3300, for evaluation of proposed system.
   2. Complete project shop drawings for similar project may be submitted for evaluation purposes, however shop drawings specific to this Project will be required from successful bidder.
   3. Tests shall have been made for identical systems within ranges of specified performance criteria.
   4. Copy of manufacturer's finish and material warranty.

2.02 CHAIN LINK FENCE FABRIC

A. Poly Vinyl Chloride (PVC) color coated steel chain link fabric per ASTM F 668, Class 2b fused and adhered to metallic coated steel wire.
   2. Mesh: 1 inch
   3. Heights: As indicated.
   4. Selvage: Knuckled top and bottom.
5. Color of Chain Link Fabric: Black, per ASTM F934

2.03 POSTS AND RAILS

A. Posts:
   1. Steel Pipe Type I: ASTM F1043 Group 1A, ASTM F1083 standard weight Schedule 40 hot-dip galvanized pipe having zinc coating of 1.8 oz/ft² on outside and 1.8 oz/ft² on inside surface.
      a. Exterior of pipe to have ASTM F 1043 PVC thermally fused color coating of 10 mils minimum thickness.
      b. Regular Grade: Minimum steel yield strength of 30,000 psi.
   2. Intermediate posts for fabric heights:
      a. 6 feet and less: 1.9 inch O.D., 2.72 lbs. per ft.
      b. Over 6 feet: 2.375 inch O.D., 3.65 lbs. per ft.
   3. End Pull and Corner Posts for fabric heights:
      a. 6 feet and less: 2.375 inch O.D., 3.65 lbs. per ft.
      b. Over 6 feet: 2.875 inch O.D., 5.79 lbs. per ft.
   4. Gate Posts (Nominal width of gate, single or one leaf of double):
      a. 13 feet and less: 2.875 inch O.D., 5.79 lbs. per ft.

B. Top and Brace Rails: FS RR-F-191/3, Type II, Class 1.
   1. Size: 1.660 inch O.D., 1.83 lb. per ft.

2.04 FITTINGS

A. Fittings:
   1. PVC thermally fused color coated having minimum thickness of 0.006 inch per ASTM F 626.
      a. PVC color to match fabric and framework.
      b. Moveable parts, nuts and bolts to be field coated with PVC liquid touch up after installation.

B. Post Caps:
   1. ASTM F 626 galvanized pressed steel, malleable iron, or aluminum alloy weather tight closure cap for tubular posts.
      a. Provide one cap for each post.
      b. When top rail is specified, provide line post loop tops to secure top rail.

C. Rail Ends:
   1. Galvanized pressed steel per ASTM F 626, for connection of rails to post using brace band.

D. Top Rail Sleeves:
   1. 7 inches galvanized steel sleeve per ASTM F 626.

E. Wire Ties:
   1. 9 gauge (0.148 inch) galvanized steel wire for attachment of fabric to line posts and rails.
   2. Pre-formed hog ring ties to be 9 gauge (0.148 inch) galvanized steel or aluminum for attachment of fabric to tension wire.
   3. Tie wire and hog rings PVC coated and in compliance with ASTM F 626.
F. Brace and Tension (Stretcher Bar) Bands:
1. ASTM F 626 galvanized 12 gauge (0.105 inch) pressed steel by 3/4 inch, formed to minimum 300 degree profile curvature for post attachment.
2. Secure bands using minimum 5/16 inch galvanized carriage bolt and nut.

G. Tension (Stretcher) Galvanized Steel Bars:
1. One piece lengths equal to 2 inches less than full height of fabric with minimum cross-section of 3/16 inch x 3/4 inch per ASTM F 626.
2. Provide tension (stretcher) bars where chain link fabric is secured to terminal post.

H. Truss Rod Assembly:
1. Galvanized steel, minimum 5/16 inch diameter truss rod with pressed steel tightener, in accordance with ASTM F 626

2.05 TENSION WIRE

A. Tension Wire:
1. Poly Vinyl Chloride (PVC) coated metallic coated steel tension wire per ASTM F 1664.
2. 7 gauge steel core wire, 0.177 inch, PVC coating class and color to match chain link fabric

2.06 GATES

A. General:
1. Fabricate gate perimeter frames of tubular members.
2. Provide additional horizontal and vertical members to assure proper operation of gate, and for attachment of fabric, hardware, and accessories.
3. Space so frame members are not more than 8 feet apart.
4. Fabricate gate frames from galvanized pipe, 1.90 inch O.D., 2.72 lb per ft.
5. PVC color coated, Grade 1 pipe, ASTM F 1083.

B. Fabrication:
1. Assemble gate frames by welding with special malleable or pressed steel fittings and rivets for rigid connections.
2. Use same fabric as used for fence.
3. Install fabric with stretcher bars at vertical edges as minimum.
4. Attach hardware with rivets or by other means which will provide security against removal and breakage.
5. Provide diagonal cross-bracing consisting of 3/8 inch diameter adjustable length truss rods on gates where required to provide frame rigidity without sag or twist.

C. Gate Hardware:
1. Hinges:
   a. Pressed or forged steel, or malleable iron, to suit gate size; non-lift-off type, offset to permit 180 degree opening.
   b. Provide 1-1/2 pair of hinges for each leaf over 6 feet in nominal height.
   c. Self-Closing Hinge Set:
      1) Mammoth 180 Self-Closing Hinge Set – Model M180BL by Hoover Fence Company, or approved equal.
      2) Color: Black
2. Latches:
   a. Capable of retaining gate in closed position
   b. Provide forked type or plunger-bar type to permit operation from either side of gate.
      1) Provide padlock eye as integral part of latch.
      2) Padlock provided by Owner.
   c. Provide exit device on gates, where indicated and as specified in Section 08 7100.
   a. Black finish.

2.07 MISCELLANEOUS MATERIALS

A. Concrete Footings: Comply with requirements of Section 03 3000.

   1. Provide one of following or grout specifically recommended by manufacturer for types of applications indicated.
      a. Masterflow 713 Plus; Master Builders Div., BASF Building Systems
      b. Five Star Grout; Five Star Products, Inc.
      c. SikaGrout 212; Sika Corporation.

2.08 SOURCE QUALITY CONTROL

A. Obtain chain link system, framework, fabric, fittings, gates, and accessories from single source to ensure system integrity.

2.09 GALVANIZING

A. Provide galvanized finish on steel framework and appurtenances, with not less than following weight of zinc per square foot:
   1. Pipe: 1.8 oz. complying with ASTM A 120.
   2. Hardware and Accessories: Comply with Table I of ASTM A 153.
   3. Fabric: 2.0 oz. complying with Class II of ASTM A 121.

B. Galvanizing Repair Paint: SSPC-Paint 20, with dry film containing minimum of 94 percent zinc dust by weight.

2.10 POST SETTING MATERIALS

A. Concrete: Refer to Structural Drawings and Section 03 3000 for fence post and footing requirements.

PART 3 – EXECUTION

3.01 INSPECTION

A. Installer must examine conditions under which fence and gates are to be installed and notify Contractor in writing of conditions detrimental to proper and timely completion of Work.
   1. Do not proceed with Work until unsatisfactory conditions have been corrected in manner acceptable to installer.
3.02 INSTALLATION

A. General: Install fence to comply with ASTM F 567.
   1. Do not begin installation and erection before final grading is completed, unless otherwise permitted.

B. Posts:
   1. Install posts at maximum 10 feet on centers unless otherwise indicated.
   2. Set posts in concrete footings as indicated.
      a. Maintain footings 1 inch clear of property lines or as indicated.
      b. Unless otherwise indicated, extend concrete footings 2 inches above grade and trowel to crown to shed water.
   3. For posts indicated to be set in sleeves, fill space between post and sleeve solid with non-metallic, non-shrink grout, mixed and placed to comply with grout manufacturer's directions.
   4. Set posts so that top of eye or ornament is level with top of fabric, with twist and selvage above rail.

C. Fabric:
   1. Install fabric on security side of posts unless otherwise indicated.
   2. Set bottom of fabric to clear ground or paving by 1/2 inch.
      a. Fence heights given are to top of fabric.
      a. Hook tie at both ends with 9 gage wire
      b. Wrap tie around fabric at both ends, not less than two turns with 11 gage wire.
      c. Hooked ties with links not permitted.
   4. Secure fabric to top rail with 14 gage ties not more than 18 inches on center, wrapped not less than two turns.
   5. Secure tie ends with not less than two full twists
      a. Turn ends so as not to be a hazard.

D. Rails:
   1. Top Rail: Provide top rail for fencing.
   2. Brace Rails: Provide horizontal brace rails adjacent to terminal, angle, gate and corner posts, for fencing 6 feet high or higher.
      a. Secure brace rails to posts with rail end fittings and rail end bands.
   3. Center Rail: Provide center rail at mid-height for fencing over 10 feet high.
      a. Secure to posts with rail end fittings and rail end bands.

E. Tension Wire and Tension Bars: Provide bottom tension wire throughout.
   1. Secure tension wire to fabric with 14 gage wire at 18 inches on center, double wrapped.
   2. Secure fabric at end, corner, angle and gate posts with tension bars extending full height of fence, attached to posts with bands spaced at 14 inches maximum.

F. Installing Gates:
   1. Install gates plumb, level, and secure for full opening without interference.
   2. Install ground-set items in concrete for anchorage in accordance with fence manufacturer's recommendations as approved by Architect.
   3. Lubricate and adjust hardware for smooth operation.
3.03 REPAIR

A.  Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 32 3113
SECTION 32 8400
LANDSCAPE IRRIGATION SYSTEM

PART 1 – GENERAL

1.01 SUMMARY

A. Provide all labor and materials, transportation, and services necessary to furnish and install Irrigation Systems, as shown on the Drawings and described herein.

B. It is the intent of the Drawings and Specifications to provide an irrigation system ready for the Owner's use. Any items not specifically shown in the Drawings or called for in the Specification but normally required to conform to such intent are to be considered as part of the work.

C. Maintain entire irrigation system for a period of 120 days upon completion of all punchlist items.

D. Supply accurate as-builts for the District upon completion of project (See Section 1.04 B).

1.02 RELATED SECTIONS

A. Section 32 9300: Landscape Planting

1.03 QUALITY ASSURANCE

A. Permits and Fees: It shall be the responsibility of the Contractor to apply for and arrange for all County, Water District and Utility Services and permits required for the completed school project. Upon request, the Owner will pay associated fees for said services and permits. The Contractor is responsible for all costs of temporary services.

B. The Contractor shall possess all insurance, licenses, and permits required to perform the work of this contract, including a C-27 State Contractors License.

C. Manufacturer's Directions: Manufacturer's directions and detailed drawings shall be followed in all cases where the manufacturers of articles used in this contract furnish directions covering points not shown in the Drawings and specifications.

D. Ordinances and Regulations: All local, municipal and state laws, and rules and regulations governing or relating to any portion of this work are hereby incorporated into and made a part of these Specifications, and their provisions shall be carried out by the Contractor. Anything contained in these Specifications shall not be construed to conflict with any of the above rules and regulations or requirements of the same. However, when these Specifications and Drawings call for or describe materials, workmanship, or construction of a better quality, higher standard, or larger size than is required by the above rules and regulations, the provisions of these Specifications and Drawings shall take precedence.
E. Superintendent:
1. A superintendent satisfactory to the Owner’s Representative shall be present on the site at all times during progress of the work.
2. The Superintendent shall not be changed except with the consent of the Owner’s Representative.
3. The Superintendent shall be authorized to represent the Contractor.

F. Explanation of Drawings:
1. Due to the scale of Drawings, it is not possible to indicate all offsets, fittings, sleeves, etc., which may be required. The Contractor shall carefully investigate the structural and finished conditions affecting all of his work and plan his work accordingly, furnishing such fittings, etc., as may be required to meet such conditions. Drawings are generally diagrammatic and indicative of the work to be installed. The work shall be installed in such a manner as to avoid conflicts between irrigation systems, planting, and architectural features.
2. The word “Architect” as used herein shall refer to the Owner’s Authorized Representative.
3. All work called for on the Drawings by notes or details shall be furnished and installed whether or not specifically mentioned in the Specifications.
4. The Contractor shall not willfully install the irrigation system as shown on the Drawings when it is obvious in the field that obstructions, grade differences or discrepancies in area dimensions exist that might not have been considered in engineering. Such obstructions or differences should be brought to the attention of the Architect and Landscape Architect. Any discrepancies shall be documented in writing. In the event this notification is not performed, the Irrigation Contractor shall assume full responsibility for any revision necessary.
5. Work of this Section, which is allied with the work of other Trades, shall be coordinated as necessary.

G. Applicable Standards: Current published standards, Specifications, tests or recommended methods of trade, industry or governmental organizations apply to work of this Section where cited by abbreviations noted below:

Underwriters Laboratories (UL)
American Society of Testing and Materials (ASTM)
National Sanitation Foundation (NSF)
American National Standard Institute (ANSI)
American Standards Association (ASA)

1.04 SUBMITTALS

A. Material List: (Coordinate and submit simultaneously with Landscape Planting Submittal, Section 02931, Part 1.04)
1. The Contractor shall furnish the articles, equipment, materials, or processes specified by name in the Drawings and Specifications. No substitution will be allowed without prior written approval by the Owner’s Authorized Representative.
2. Complete material(s) list, five (5) copies, shall be submitted to the Architect for his approval prior to performing any work. Material list shall include the manufacturer, model number, and description of all materials and equipment to be used.

Materials and supplier information for Submittal shall reflect project...
plans. The items listed below are not reflective of this project.

THE FOLLOWING IS A GUIDE ONLY TO PROPER SUBMITTAL FORMAT. IT DOES NOT NECESSARILY REFLECT MATERIALS SPECIFIED

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Manufacturer</th>
<th>Model No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Backflow Preventer</td>
<td>Febco</td>
<td>825Y</td>
</tr>
<tr>
<td>2</td>
<td>Automatic Controller</td>
<td>Rainmaster</td>
<td>Evolutions Series</td>
</tr>
<tr>
<td>3</td>
<td>Gate Valve</td>
<td>Nibco</td>
<td>T-113</td>
</tr>
</tbody>
</table>

Irrigation submittal must be specific and complete. All items must be listed and should include solvent/primer, wire, wire connectors, valve boxes, etc.

NOTE: Copies of manufacturer’s literature (catalog cuts) are required as part of submittal information for Inspector and Owner use.

3. The Contractor may submit substitutions for equipment and materials listed on the Irrigation Drawings by following procedures as outlined in Part 1.05 of these Irrigation Specifications.

4. Equipment or materials installed or furnished without prior approval of the Architect or Landscape Architect may be rejected. The Contractor may be required to remove such materials, (to be determined by the Architect or Landscape Architect) from the site at the Contractor’s own expense.

5. Approval of any item, alternate or substitute indicates only that the product or products apparently meet the requirements of the Drawings and Specifications on the basis of the information or samples submitted.

6. Manufacturer’s warranties shall not relieve the Contractor of their liability under the guarantee. Such warranties shall only supplement the guarantee.

B. Record and As-Built Drawings:

1. The Contractor shall provide and keep up to date a complete “as-built” record set of prints which shall be corrected daily and show every change from the original Drawings and Specifications and the exact “as-built” locations, sizes, and kinds of equipment. Prints for the purpose of "as-builts" may be obtained from the Architect at cost. This set of Drawings shall be kept on the site and shall be used only as a record set.

2. These Drawings shall also serve as work progress sheets and shall be the basis for measurement and payment for work completed. These Drawings shall be available at all times for site reviews and shall be kept in a location designated by the Architect.

Should the record print as-built progress sheets not be available for review or not up to date at the time of any site reviews by the Architect and or Landscape
Architect (refer to Section 1.08), it will be assumed no work has been completed. If this occurs, the Contractor will be assessed the cost of that site visit at the current billing rate of the Architect/ Landscape Architect. No other inspections shall take place prior to payment of that assessment.

3. The Contractor shall make neat and legible notations on the as-built progress sheets daily as the work proceeds, showing the work as actually installed. For example, should a piece of equipment be installed in a location that does not match the plan, the Contractor must indicate that equipment has been relocated in a graphic manner so as to match the original symbols as indicated in the Irrigation legend. The relocated equipment and dimensions will then be transferred to the original as-built plan at the proper time.

4. Before the date of the final site review, the Contractor shall transfer all information from the “as-built” print(s) to a clean print procured from the Architect. All work shall be done in ink and applied to the paper by a pen made expressly for use on this material. The dimensions shall be made so as to be easily readable even on the final controller chart (See Section 1.04C). The original “as-built” plan shall be submitted to the Landscape Architect for approval prior to the making of controller chart. The Contractor shall be responsible for keeping the final “as-built” plan clean, (free of dirt, smudges, extraneous marks, etc. Along with providing the Owner with the hard copy “as-built” plans the Contractor shall also be responsible for scanning full size “as-built(s)” plan(s) to a CD. Scan shall be of a quality to produce a readable similar size print. Contractor shall provide two (2) CD’s, one (1) for the Owner and one (1) for the Landscape Architect.

5. The Contractor shall document the location of all existing irrigation, (valves, boxes, all above ground equipment and pipe where visible) and utilities pertinent to the existing or proposed irrigation system on the as-built plans. Existing lateral line and head location does not need to be documented.

6. The Contractor shall dimension from two permanent points of reference, building corners, sidewalks, or road intersections, etc., the location of the following items:
   a. Connection to existing water lines.
   b. Isolation valves.
   c. Quick coupler valves.
   d. Remote control valves.
   e. Routing and/or directional turns of sprinkler pressure lines (dimension maximum 100-feet along routing).
   f. Routing of control wiring.
   g. Other related equipment as directed by the Architect.

7. On or before the date of the final site review, the Contractor shall deliver the corrected and completed “as-built” prints to the Architect. Delivery of the prints will not relieve the Contractor of the responsibility of furnishing required information that may be omitted from the prints.

C. Controller Charts:
1. The Landscape Architect shall approve as-built drawings before controller charts are prepared.
2. Provide one (1) controller chart for each controller supplied.
3. The chart shall show the area controlled by the automatic controller and shall be the maximum size, which the controller door will allow.

4. The chart is to be a reduced drawing of the actual as-built system, of a maximum size that will fit inside controller housing, double sided if required for readability. Contractor may propose a different format to the Landscape Architect for the controller chart to enhance readability. This format must be approved by the Landscape Architect.

5. The chart shall be a blackline print and a different color shall be used to indicate the area of coverage for each station, using pastel or transparent colors.

6. When completed and approved, the chart shall be hermetically sealed between two pieces of plastic, each piece being minimum 20 mils thick.

7. These charts shall be completed and approved by the Landscape Architect prior to final acceptance of the irrigation system.

8. The Contractor shall be responsible for revising the existing irrigation chart. If there are extensive changes they shall be responsible for producing a new one. Both original and new controller chart shall be delivered to the Owner.

D. Operation and Maintenance Manuals:
1. Prepare and deliver to the Architect within 10 calendar days prior to completion of construction, two (2) hard-cover three-ring binders containing the following information:
   a. An index sheet stating Contractor’s address and telephone number, list of equipment with name and addresses of local manufacturer’s representative.
   b. Catalog and part sheets on every material and equipment installed under this contract.
   c. Guarantee statement. See Section 1.09.
   d. Complete operating and maintenance instruction on all major equipment specified in plans.

2. In addition to the above-mentioned maintenance manuals, provide the Owner’s maintenance personnel with instructions for the operation of all major equipment and show evidence in writing to the Architect and Landscape Architect at the conclusion of the project that this service has been rendered.

E. Equipment to Be Furnished:
1. Supply as part of this contract the following tools:
   a. One (1) quick-coupler key and matching hose swivel and globe valve for every five (5), or fraction thereof, valves installed.
   b. Two (2) keys for opening valve boxes.

2. The above-mentioned equipment shall be turned over to the Owner at the conclusion of the project. Before final acceptance can occur, evidence that the Owner has received material must be shown to the Architect and Landscape Architect.

1.05 SUBSTITUTIONS

A. If the Irrigation Contractor chooses to substitute any equipment or materials for those equipment or materials listed on the Irrigation Drawings and Specifications, he may do so by providing the following information to the Architect and Landscape Architect for written approval:
1. Provide a statement indicating the reason for making the substitution. Use a
separate sheet of paper for each item to be substituted.  
2. Provide descriptive catalog literature, performance charts and flow charts for each item to be substituted illustrating that alternate item meets or exceeds Specifications of original item.  
3. Provide the amount of cost savings if the substituted item is approved.

B. Contractor shall be responsible for the total performance of such substitution to equal or surpass the original in every respect.

C. If the substitution proves to be unsatisfactory in the opinion of the Architect/ Landscape Architect, Contractor shall remove such work and replace it with originally specified item (including installation) as part of the work of this section.

D. Architect/ Landscape Architect shall have the sole responsibility for accepting or rejecting any substituted item as an approved equal to equipment and materials listed on the Irrigation Drawings and Specifications.

E. Refer to Substitution Approval Request Form in the Appendix, Exhibit 1, at the end of this specification. Form must be completed by Contractor and accompany all requests for substitutions.

1. Coordinate with requirements for substitutions in Section 01 1600.

1.06 PRODUCT DELIVERY

A. Delivery: Deliver materials in manufacturer’s original unopened containers, with each container identified with manufacturer’s name, brand or type. Deliver pipe in a manner that allows sections to lay flat along its full length.

B. Storage:
   1. Store materials at a location directed by the Owner’s Representative.
   2. Store pipe flat along its entire length.
   3. Store materials in an orderly manner. Avoid interference with other construction activities.

C. Protection:
   1. Protect all materials to prevent intrusion of dirt and moisture.
   2. Protect PVC pipe/ other PVC materials from sunlight.
   3. Protect the installed work and materials of other trades.

1.07 PROJECT CONDITIONS

A. Contractor(s) shall acquaint themselves with all site conditions and exercise extreme care in excavating and working near existing utilities. Call Underground Service Alert (800-422-4133) two (2) days prior to any excavation.

B. Should Contractor find any utilities during his inspections or excavations that are not shown on the plans, Contractor shall promptly notify Landscape Architect and Superintendent in writing for instructions as to further action. Failure to do so will make Contractor liable for any damage thereto arising from his operations subsequent to discovery of such utilities not shown on plans. These utilities shall be noted on the as-built plans.
C. Where existing irrigation to be protected in place exists within the scope of work area, the Contractor shall be responsible for walking the site with the Owner or their authorized representative to verify the condition, (operational integrity) of the existing irrigation and landscape. The condition of the existing irrigation system to be protected shall be documented and the opinions of its condition shall be agreed upon by the Contractor, the Owner and the General Contractor. Digital photographs showing conditions of existing above ground irrigation equipment shall be used to supplement the report. The contractor shall be responsible for any irrigation component that is directly dependent upon the portion of the system within the scope of work area.

D. The Contractor shall measure and document the available static and dynamic pressure at the designated point of connection. Exact location of point of measurement shall be documented. Multiple measurements shall be taken and reported. Pressure readings shall be submitted to District and Landscape Architect during the pre-construction meeting. Refer to Section 1.08 A1

1.08 INSPECTIONS

A. All observations herein specified shall be made by the Architect/ Landscape Architect. The Contractor shall request observations at least 48 hours in advance. Failure to notify the Landscape Architect will make Contractor responsible for any deficiencies that might arise. Coordinate trips with Section 32 9300. Site visits will be required (at a minimum) on the following parts of the work:
   1. Pre-construction Conference, verification of available pressure to irrigation system at point of connection.
   2. Pressure supply line routing, installation and testing. Planter dimension verification and irrigation head layout.
   3. Irrigation Coverage Test and/or plant material location as required.
   4. Site review to release to maintenance.
   5. Final site review and acceptance
      a. The Contractor shall operate each system in its entirety for the Architect/ Landscape Architect at time of final observation. Any system deemed not acceptable by the Architect/ Landscape Architect or not in compliance with these Specifications and Drawings, shall be reworked to the complete satisfaction of the Architect.
      b. The Contractor shall show evidence to the Architect/ Landscape Architect that the Owner has received all accessories, charts, record drawings, and equipment as required (See Section 1.04) before final observation can occur.

B. Contractor shall be responsible for scheduling any other inspections required by other agencies and coordinate Landscape Architect’s involvement as necessary.

C. When observations have been conducted by other than the Architect/ Landscape Architect, show evidence in writing of when and by whom these observations were made. Contractor shall send Architect/ Landscape Architect copies of all meeting/inspection documentation.
D. No site observations will commence without as-built drawings. In the event the Contractor calls for a site visit without as-built drawings, without completing previously noted corrections, or without preparing the system for said visit, he shall be responsible for reimbursing the Architect/Landscape Architect at his current billing rates per hour, portal to portal, (plus transportation costs) for inconvenience. No further site visits will be scheduled until this charge has been paid and received.

E. If in the Architect’s/ Landscape Architect’s opinion the work scheduled for inspections is not ready, the Contractor shall reimburse the Landscape Architect for his time, prior to any further inspections.

1.09 DOCUMENTATION

A. The contractor shall be responsible for documenting installation of specific underground equipment. Documentation shall be done with digital photographs. All digital photographs shall be copied on CD’s. Contractor shall forward copies of CD’s to Owner’s authorized representative and Landscape Architect. Where necessary, the Contractor shall use a ruler or yardstick to provide relative distance/size where required. This shall be done to facilitate future repairs, construction and to verify construction compliance. Failure to document the minimum as listed below may result in the Contractor being responsible for excavation so that documentation can be done.
   1. Installation of mainline piping showing depth.
   2. Installation of sleeving to show location where it passes under paving and through walls.
   3. Any piping where lines cross other utility lines.
   4. Any other areas that are called to be documented on the plans.

1.10 GUARANTEE

A. Guarantee for the sprinkler irrigation system shall be made in accordance with the following form. The general conditions and supplementary conditions of these Specifications shall be filed with the Owner or his representative prior to acceptance of the irrigation system. Standard one-year guarantee shall include:
   1. Filling and repairing depressions and replacing plantings due to settlement of irrigation trenches for one year following acceptance of Project.

B. A copy of the guarantee form shall be included in the operations and maintenance manual.

C. Guarantee shall be retyped onto the Contractor’s letterhead and contain the following information:
GUARANTEE FOR SPRINKLER IRRIGATION SYSTEM

We hereby guarantee that the sprinkler irrigation system we have furnished and installed is free from defects in materials and workmanship, and the work has been completed in accordance with the Drawings and Specifications, ordinary wear and tear and unusual abuse or neglect expected.

We agree to repair or replace any defects in material or workmanship, which may develop during the period of one year from the date of acceptance and also to such defects at no additional cost to the Owner. We shall make such repairs or replacements within a reasonable time, as determined by the Owner, after receipt of written notice from Owner, we authorize the Owner to proceed to have said repairs or replacements made at our expense and we will pay the costs and charges therefore upon demand.

PROJECT: __________________________________________________________________________

CONTRACTOR: _______________________________________________________________________

ADDRESS: __________________________________________________________________________

PHONE NO: _____________________BY: ________________________________________________

DATE OF ACCEPTANCE: _____________BY: _____________________________________________

PART 2 – PRODUCTS

2.01 MATERIALS

A. General: Use only new materials of brands and types noted on Drawings, specified herein, or approved equals.

2.02 PIPE AND FITTINGS

A. Domestic Water – Pressure Mainline Piping

1. Pressure mainline piping, sizes 2-inch, 2.5-inch and 3-inch shall be PVC class 315 solvent weld type or (as a Contractor option) rubber gasket type, unless otherwise noted on drawing. Pressure mainline piping, sizes 4-inch through 8-inch shall be PVC class 200 gasketed.

2. Pressure mainline fittings, sizes 2-inch, 2.5-inch and 3-inch shall be PVC schedule 40 solvent weld type or (as a Contractor option) rubber gasket type, unless otherwise noted on drawings. Pressure mainline fittings, sizes 4-inch and larger shall be gasketed ductile iron. All gasketed fittings must be thrust blocked or utilize joint restraints.

3. Pressure mainline piping and fittings, sizes 1.5-inch and smaller shall be solvent weld Schedule 40 PVC.

B. Domestic Water – Lateral Non-Pressure Piping

1. Non-pressure lateral line piping, sizes 2-inch, 2.5-inch and 3-inch shall be PVC
class 315 solvent weld type or (as a Contractor option) rubber gasket type, unless otherwise noted on drawing. Lateral line piping, sizes 4-inch through 8-inch shall be PVC class 200 gasketed.

2. Non-pressure lateral line fittings, sizes 2-inch, 2.5-inch and 3-inch shall be schedule 40 PVC solvent weld type or (as a Contractor option) rubber gasket type, unless otherwise noted on drawings. Lateral line fittings, sizes 4-inch and larger shall be gasketed ductile iron. All gasketed fittings must be thrust blocked or utilize joint restraints.

3. Non-pressure lateral line fittings, sizes 1.5-inch and smaller shall be solvent weld Schedule 40 PVC.

C. Copper Pipe and Fittings:
   1. Pipe shall be Type K, hard tempered.
   2. Fittings shall be wrought copper, solder joint type.
   3. Joints shall be soldered with silver solder, 45% silver, 15% copper, 16% zinc, 24% cadmium and solidus at 1125°F, liquidus at 1145°F.

D. Brass Pipe and Fittings:
   1. Brass pipe shall be 58% red brass (ASTM B43), Schedule 40 screwed pipe.
   2. Fittings shall be medium brass, screwed 125-pound class.

E. Galvanized Pipe and Fittings:
   1. Pipe shall be galvanized steel (ASTM A53); Schedule 40 galvanized, mild steel screwed pipe.
   2. Fittings shall be screwed beaded malleable iron, or #125 cast iron; flanged.
   3. Unions (2-inch and smaller) shall be ground joint pattern.
   4. Unions (Larger than 2-inch) shall be flanged-type, packed with 1/16-inch thick asbestos fiber gaskets.

F. All PVC pipe and fittings shall conform to specific requirements as follows:
   1. PVC (Solvent Weld)
      a. Pipe shall be manufactured from virgin polyvinyl chloride compound in accordance with ASTM D 1785, cell classification 12454B, hydrostatic design stress rating not less than 2000 PSI.
      b. Fittings (solvent weld or thread) shall be standard weight, schedule 40, side gated, injection molded PVC complying with ASTM D 2466, cell classification 13454B, including threads when required.
   2. PVC nipples shall be schedule 80 with molded threads.
   3. All PVC pipe must bear the following markings:
      a. Manufacturer’s name
      b. Nominal pipe sizes
      c. Schedule or class
      d. Pressure rating in AST
      e. NSF approval
      f. Date of extrusion
   4. Solvent cement and primer for PVC solvent-weld pipe and fittings shall be of type and installation method prescribed by the pipe manufacturer.
   5. Lettering shall be facing up on all underground PVC. The OSA Inspector will verify.

G. Sleeving:
   1. Sleeving for irrigation piping shall be schedule 40 PVC for 3-inch diameter and
smaller (for piping to be sleeved, sizes 1.5-inch and smaller) Class 200 for 4-inch to 8-inch (for piping to be sleeved, sizes 2-inch to 4-inch). Sleeving size for 12-inch and larger (for piping to be sleeved, sizes 6-inch and larger) shall be galvanized corrugated steel or HDPE pipe.

2. Seal ends of pipe sleeve with expandable foam. Seal to ensure that there is no intrusion of insects, pests, dirt or water.

H. Conduit:
1. Conduit for low voltage cable shall be PVC schedule 40 PVC for sizes, 3-inch and smaller and PVC class 200 for sizes, 4-inch and larger.
2. Sweep ells, schedule 40 PVC, 90 and 45 degree.

2.03 ELECTRICAL (HIGH VOLTAGE) (None specified this project)
2.04 ELECTRICAL (LOW-VOLTAGE)

A. Connections between controller and remote control valves shall be made with direct burial copper AWG-UF, 600-Volt wire, insulation thickness 3/64-inch, utilizing low-density high molecular weight polyethylene insulation.

B. Splices, where permitted, shall be waterproofed using 3M Direct bury splice kit DBR/Y-6 or approved equivalent and housed in a splice/ pull box. Boxes for other irrigation use may be utilized for this purpose. Make only one splice with each connector sealing pack.

C. In no case shall wire size be less than #14 “UF” 600-Volt underground wiring. Common wire(s) to be white in color with a color stripe that matches that controllers active RCV wires and sized, (minimum #10) to accommodate the maximum allowed simultaneous operation for each controller. Each controller used on site shall have a single dedicated color for all RCV wires serviced by that controller.
   1. Master valve wire shall be a unique color.
   2. Extra remote control valve wires specified for each controller shall be of a unique color to distinguish them from active wires of other controllers and other extra wires for other controllers.
   3. Where wires are extended or spliced, the same color and gauge wire shall be used.

D. Electrical sealer putty for sealing conduit in splice/ pull boxes shall be Duct Sealing Compound #1003 manufactured by Sealers, Inc. or approved equivalent.
   1. Sealing compound shall be asbestos free and non-corrosive.
   2. Permanently soft, non-toxic
   3. Non-irritant: No irrigation to eyes or skin as listed in CFR, Title 16 “Appraisal of the safety of chemicals in food, drugs and cosmetics.
   4. Material to have dielectric strength of approximately 110 volts per mil, (ASTM D149-64)

E. Tracer Tape shall be Christy’s Detectable Tape.
   1. For use on potable mainline that does not have remote control valve wiring associated with pipe, and piping is deeper than 18 inches, use Christy’s TA-DT-02-B-PW. Where piping is deeper than 18 inches, use Christy’s TA-DT-03-B-PW.
F. Non-Detectable warning tape shall be Christy’s Non-Detectable warning tape.
   1. For use on conduit housing low-voltage wires. Use Christy’s TA-ND-02-R-E.
      Contractor shall note color of tape used, on as-built plans.

2.05 AUTOMATIC CONTROLLER (None specified this project)

2.06 BACKFLOW PREVENTION UNITS (None specified this project)

2.07 PUMP ASSEMBLY AND COMPONENTS (None specified this project)

2.08 OPTIONAL PUMP ASSEMBLY FEATURES (None specified this project)

2.09 FERTILIZER INJECTOR (None specified this project)

2.10 VALVES

A. Isolation valves, remote control valves, quick couplers, manual control valves, and
   hose bibbs shall be of the type and manufacturer stated on Drawings.

B. Gate valves, sizes 3-inch and smaller (unless otherwise noted on Drawings) Provide
   Nibco Series T-113 Threaded Class 125 Bronze Gate Valve. Valve shall be ASTM
   B62 brass body, 150 pound saturated steam rated; with screwed joints; non-rising
   stem; screwed bonnet, solid disc. Provide with hand wheel.

C. Quick coupling valves shall be one-piece type brass body, 150 pound class, with 1-
   inch female threads opening at base, permitting operation with a special connecting
   device (coupler) designed for this purpose. Refer to reclaimed water notes for
   permissible quick coupler assemblies and required markings.
   1. Coupler threads shall be lug type.
   2. Hinge cover shall be rubber-like vinyl cover.

D. Anti-drain valves shall be those manufactured by Valcon Automatic Irrigation
   Equipment Co., or equal.

2.11 VALVE BOXES

A. Valve boxes shall be fabricated from a durable plastic material resistant to weather,
   sunlight and chemical action of soils.

B. Valve box extensions shall be by the same manufacturer as the valve box.

C. Gate valve boxes shall be round plastic boxes with flex lock covers, CARSON or
   approved equal.

D. Remote control valve boxes shall be rectangular plastic boxes, CARSON or
   approved equal, with hinged covers with flex lock. Refer to RCV detail in
   construction documents for required clearances for RCV assembly within box. Size
   box accordingly.

E. Concrete boxes shall be used where box must be installed in concrete or AC paving
   or as specified in shrub planter areas on plans. Install reinforced concrete box with
   lockable cast iron lid or reinforced concrete lid. Refer to plan for lid requirements.
   Install Christy or approved equivalent. Refer to plans/ details for type of lid required.
Where cast iron, diamond plate, or reinforced concrete lids are used to house remote control valves plastic valve tags must be used to identify valve stationing on all valves inside concrete valve box.

H. Minimum 2-inch square or round anodized aluminum tags shall be used to designate valve station valve identification on concrete or cast iron valve box lids. Use blue color tags for domestic water. Epoxy tags to valve box lid using approved metal to metal epoxy.

2.12 SPRINKLER HEADS

A. All sprinkler heads shall be of the same size, type, and deliver the same rate of precipitation with the diameter (or radius) of throw, pressure, and discharge as shown on the Drawings and/or as specified herein.

B. Spray heads shall have a screw adjustment.

C. Riser units shall be fabricated in accordance with the installation details.

D. Riser nipples for all sprinkler heads shall be the same size as the riser opening in the sprinkler body.

E. All sprinkler heads of the same type shall be by the same manufacturer.

2.13 MOISTURE SENSING DEVICES (None specified this project)

2.14 FLOW SENSORS (None specified this project)

2.15 WEATHER STATION (None specified this project)

2.16 PLASTIC IDENTIFICATION TAGS.

A. For remote control valves serviced by domestic water, provide Christy’s 2.25”x2.75” yellow standard valve I.D. tag hot-stamped in black with valve designation 1.125” high, model ID.STD.Y1

1. Tags shall be manufactured from polyurethane Behr Desopan.

2. Attached neck and reinforced hole are capable of withstanding 180lbs of pull of resistance.

3. Contractor shall order tags with range of controller capacity. All unused tags shall be forwarded to owner with turnover items at completion of project.

PART 3 – EXECUTION

3.01 WATER SUPPLY

A. Sprinkler irrigation system shall be connected to water supply points of connection as indicated on the Drawings.

B. Connections shall be made at approximate locations as shown on Drawings. Contractor is responsible for minor changes caused by actual site conditions. Document exact location of POC on as-built plans.
3.02 PIPE

A. General
1. All irrigation pipe and fittings shall be installed in complete accord with manufacturer instructions for it.
2. Line Clearance: All lines shall have a minimum clearance of 6-inches from each other and from lines of other trades. Parallel lines shall not be installed directly over one another.
3. Contractor shall notify Architect/ Landscape Architect subsequent to main line installation for approval (See Section 1.08).

B. Underground Pipe
1. Trenching:
   a. Excavate trenches to required depths. Follow approved layout for each system.
   b. Trench bottom shall be flat to ensure piping is supported continuously on an even grade.
   c. Where lines occur under paved areas, consider dimension to be below the sub-grade.
   d. Provide minimum coverage under finish grade as follows:
      1) Pressure supply lines, sizes 2.5-inch and smaller shall be buried 18 inches below finish grade.
      2) Pressure supply lines domestic and recycled, sizes 3-inch and larger shall be buried 24 inches below finish grade.
      3) Non-pressure lines, sizes 3-inch and smaller shall be buried 12 inches below finish grade.
      4) Non-pressure lines, sizes 4-inch and larger shall be 18 inches below finish grade.
      5) Control wire shall be 18/24-inches.
   e. Contractor shall notify Architect/ Landscape Architect prior to backfilling for Pressure Test (See Section 1.08).
   f. Trenching depth needs to be to the top of the pipe. Example: 2-inch PVC to be set at 12 inches deep needs a 14-inch deep trench.
   g. Flood all trenches when backfilling.
   h. Mark all sleeving that goes under sidewalks, etc., with arrow chiseled on sidewalks or curb as applicable.
2. Backfilling:
   a. Buried pipe in trenches shall be center loaded only until all required tests are performed. Trenches shall be carefully backfilled with the excavated materials approved for backfilling, consisting of earth, loam, sandy clay, sand, or other approved materials, free from large clods of earth or stones. Backfill shall be mechanically compacted in landscaped areas to a dry density equal to adjacent undisturbed soil in planting areas. Backfill will conform to adjacent grades without dips, sunken areas, humps or other surface irregularities.
b. A fine granular material backfill will be initially placed on all lines. No foreign matter larger than .5-inch in size will be permitted in the initial backfill.

c. Flooding of trenches will be permitted only with approval of the Architect/Landscape Architect.

d. If settlement occurs and subsequent adjustments in pipe, valves, sprinkler heads, lawn or planting, or other construction are necessary, the Contractor shall make all required adjustments without cost to the Owner.

3. Trenching and Backfill under Paving:

a. Trenches located under areas where paving, asphaltic concrete or concrete will be installed shall be backfilled with sand (a layer 6 inches below the pipe and 3 inches above the pipe), and compacted in layers to 95% compaction using manual or mechanical tamping devices. Trenches for piping shall be compacted to equal the compaction of the existing adjacent undisturbed soil and shall be left in a firm unyielding condition. All trenches shall be left flush with the adjoining grade. The Sprinkler Irrigation Contractor shall set in place, cap, and pressure test all piping under paving prior to the paving work.

4. There is no new work utilizing transite, Asbestos Cement Pipe (AC pipe). Any existing transite pipe called on plans to be abandoned, cut, tapped, etc. or if there are any unavoidable breaks in the existing charged line, the Contractor shall comply with all applicable Federal, State, Local, EPA, and OSHA regulations pertaining to exposure to and handling, containment, transport, and disposal of asbestos material. If the bidding Contractor is not licensed in the State of California to perform these services, the Contractor shall retain the services of a licensed Asbestos Abatement Sub-Contractor to perform said services. Further, the Contractor/ Sub-Contractor must utilize the services of a commercial hauler registered to transport asbestos with the State of California. The Contractor/ Sub-Contractor must dispose of any asbestos waste material generated at a solid waste facility authorized for asbestos waste disposal. The contractor per OSHA requirements must train field personnel in the identification of asbestos containing material. The Contractor must submit the following items with the bid:

a. Name and license number of the Asbestos-Abatement Contractor that will be responsible for the work described above.

b. References (including the Owner’s name, address and Telephone number) for at least five comparable projects performed by the Asbestos-Abatement Contractor.

c. A work plan describing work procedures, equipment to be used, transportation procedures and final disposal facility for asbestos material.

d. A health and safety plan which includes air-monitoring procedures as required by OSHA.

e. Measurement and Payment Asbestos-Cement Pipe Taps – The asbestos-cement pipe taps shall be measured on a lump sum basis and shall be at the contract unit price shown in the Bid Schedule, which shall be full compensation for furnishing all labor, equipment, materials, and incidentals, required for a complete tap/ cut into existing asbestos cement pipe including final cleanup and disposal of any generated asbestos waste material. No mobilization and demobilization costs will be paid.
f. Emergency Asbestos Cement Pipe Removal for damaged or disturbed pipe – Asbestos pipe removal shall be measured in linear feet along the centerline of the pipe, including fittings. Payment for asbestos cement pipe removal shall be at the Contractor unit price shown in the Bid Schedule. This price shall be full compensation of furnishing all labor, equipment, materials and incidentals required for a complete removal and final cleanup. Mobilization and demobilization for emergency asbestos cement pipe removal and payment for mobilization and demobilization shall be at the contract unit price shown on the Bid Schedule for each incident, which shall be full compensation for transporting all labor, equipment, materials, and incidentals required for removal of asbestos material including transporting asbestos waste material to an authorized disposal facility.

C. Grades and Draining:
   1. Finish grade shall be adjusted to sheet flow water away from valve boxes. Contractor shall not install valve and valve boxes within established swales or low points.

D. Copper Pipe and Fittings:
   1. Install in accordance with manufacturer’s latest printed instructions.

E. On Grade PVC and Galvanized Pipe:
   1. Install per details on plan.

F. Brass Pipe and Fittings:
   1. Cut brass piping by power hacksaw, circular cutting machine using an abrasive wheel, or hand hacksaw. Cut no piping with metallic wheel cutter of any description. Ream and remove rough edges or burrs so smooth and unobstructed flow is obtained.
   2. Carefully and smoothly place on male thread only. Tighten screwed joints with tongs or wrenches. Caulking is not permitted.

G. Galvanized Pipe and Fittings:
   1. Do not bend or spring pipe. Make all offsets or changes in direction with fittings. Cut threads with sharp, clean dies to conform to ASA Specification B2. Assemble pipes free from dirt and scale. Ream and deburr. Make up joints by applying oil base compound to male threads only. Remove excessive compound after makeup.

H. Assemblies:
   1. Routing of sprinkler irrigation lines as indicated on the Drawings is diagrammatic. Install lines (and various assemblies) in such a manner as to conform to the details per plans.
   2. Install NO multiple assemblies in plastic lines. Provide each assembly with its outlet.
   3. Install all assemblies specified herein in accordance with respective details. In the absence of detail Drawings or Specifications pertaining to specific items required to complete work, perform such work in accordance with best standard practice, with prior approval from Architect.
4. PVC pipe and fittings shall be thoroughly cleaned of dirt, dust and moisture before installation. Installation and solvent welding methods shall be as recommended by the pipe and fitting manufacturer.

5. On PVC to metal connections, the Contractor shall work the metal connections first. Teflon tape or approved equal shall be used on all threaded PVC to PVC, and on all threaded PVC to metal joints. Light wrench pressure is all that is required. Where threaded PVC connections are required, use threaded PVC adapters into which the pipe may be welded.

M. Sleeving:
   1. All sleeves set in place under paving shall extend 12 inches minimum beyond such paving and be capped hand tight. No in-line fittings, including couplings will be permitted under surfaces to be paved, except where the length of the line under the paving is 20 feet or where shown on the Drawings, i.e., parking lots, etc.

3.03 ELECTRICAL SUPPLY (None specified this project)

3.04 PILOT WIRES (None specified this project)

3.05 LOW-VOLTAGE ELECTRICAL

A. Control Wiring:
   1. Wiring:
      a. Install control wires with sprinkler mains and laterals in common trenches wherever possible. Lay under pipeline. Bundled wires shall be held together with flexible non-adhesive tape every 10 feet minimum. This bundle shall be tied to the bottom of the mainline every 10 feet minimum with the same flexible non-adhesive tape. Provide expansion curl every 100 feet on runs of more than 100 feet in length. Provide looped slack at valves and changes in direction of 90 degrees and snake wires in trench to allow for contraction of wires.
      b. Where valve wires must be run and there is no mainline in the same trench, wires must be encased in PVC schedule 40 conduit. Conduit size shall be as required to house number of wires. Warning tape shall be used atop conduit. Use Christy TA-ND-02-R-E Non detectable tape along entire length of conduit.
      c. Refer to plans for exact number and location of required extra wires to be run from controller to field. There shall be a minimum (2) wires routed from each controller along longest run, (furthest RCV) for each respective controller. These extra wires shall be routed up into dedicated pull box and tagged as extra wires.
      d. Furnish different color control cable for each controller. Each common cable shall be white with a color strip to match the color of control cable it serves. Spare cables shall be a color different from any control cable.
   2. Splices:
      a. Control wire splices at remote control valves to be crimped and sealed with specified splicing materials. Line splices will be allowed only on runs of more than 500 feet. Line splices to be waterproofed and sealed with Snap-Tite sealer. Line splices are to be installed in splice boxes and their locations noted on as-built plans.
B. Tracer tape, detectable and non-detectable shall be placed atop pipe to be marked. Tape shall be continuous.

3.06 AUTOMATIC CONTROLLER (None specified this project)

3.07 BACKFLOW PREVENTER (None specified this project)

3.08 PUMP ASSEMBLY (None specified this project)

3.09 FERTILIZER INJECTOR (None specified this project)

3.10 VALVES

A. Isolation valves, quick couplers, pressure reducing valves, etc:
   1. Install per detail and where indicated on plans.

B. Remote Control Valve:
   1. Install each control valve in separate valve box where shown and as detailed. Group boxes together where practical. Place no closer than 12 inches to buildings and walls. Provide 4-inch minimum clearance between valve and valve box lid.

C. Anti-Drain Valves:
   1. Install per manufacturer’s recommendations where indicated on plans or where needed.

3.11 VALVE BOXES

A. All buried valves and equipment shall be installed with a proper box.

B. Set valve boxes over valve so all parts of valve can be reached for service.

C. Heat brand valve station on cover of box. Letters/numbers shall be 2" in height.

D. Affix anodized aluminum valve tags to cast iron lids or composite/concrete lids with approved epoxy. Follow manufacturer’s direction for installation.

E. Fill area underneath box with a minimum of 1.5 cubic feet of pea gravel before box is installed.

F. Valve boxes shall be set 1 inch above finish grade in turf areas and 2 inches above finish grade in shrub planter areas. Mulch layer shall be flush with top of box. Grade soil around box to allow for required full depth of mulch. Grade around box shall allow for water to drain away from box.

G. Identification tags shall be attached to each remote control valve, showing number that corresponds with controller sequence.

H. Maintain 4-inch minimum clearance between bottom of valve box lid and top of valve stem.

3.12 IRRIGATION HEADS
A. Install all irrigation heads as designated on the Drawings and in accordance with their respective detail.

B. Spacing of heads shall not exceed the maximum indicated on the Drawings. In no case shall the spacing exceed the maximum recommended by the manufacturer.

3.13 MOISTURE SENSING DEVICES (None specified this project)

3.14 FLOW SENSORS (None specified this project)

3.15 WEATHER STATION (None specified this project)

3.16 FIELD QUALITY CONTROL

A. Adjustment of the System:
   1. The Contractor shall adjust all sprinkler heads and valves for optimum performance and to prevent as much as possible any over-spray onto walks and roadways. No spray is permitted on buildings.
   2. If it is determined that minor adjustments in the irrigation equipment will provide proper and more adequate coverage, the Contractor shall make such adjustments prior to planting. Adjustments may include changes in nozzle sizes or degrees of arc, as required.
   3. All sprinkler heads shall be set perpendicular to finished grades unless otherwise designated on the plans and at height and distance from walks, buildings, etc, as noted.

B. Contractor is responsible for protecting all existing landscaping. Any existing landscaping removed shall be properly replaced, unless approved in writing by Architect.

C. Testing of Irrigation System:
   1. Test all pressure lines under hydrostatic pressure of 150 PSI, and prove watertight. Test lateral, (non-pressurized) lines as directed on plans in the same manner as main lines.
   2. Testing of pressure (and non-pressurized lateral lines if specified) main lines shall occur prior to installation of remote control valves, quick couplers or any other equipment that might prevent a proper test from being performed.
   3. All piping under paved areas shall be tested under hydrostatic pressure of 150 PSI, and proved watertight, prior to paving.
   4. Sustain pressure in lines for not less than 2 hours. If leaks develop, replace joints and repeat test until entire system is proven watertight.
   5. All hydrostatic tests shall be made only in the presence of the Architect/ Landscape Architect, or other duly authorized representative of the Owner. (Refer to Section 1.08.) No pipe shall be completely backfilled until it has been inspected, tested and approved in writing.
   6. Furnish necessary force pump and all other test equipment.
   7. When the sprinkler irrigation system is completed, perform a coverage test in the presence of the Architect/ Landscape Architect, to determine if the water coverage for planting areas is complete and adequate. Furnish all materials and perform all work required to correct any inadequacies of coverage due to deviations from plans, or where the system has been willfully installed as indicated on the Drawings when it is obviously inadequate.
without bringing this to the attention of the Architect/ Landscape Architect. This test shall be accomplished before any ground cover is planted. (Refer to Section 1.08.)

8. Upon completion of each phase of work, entire system shall be tested and adjusted to meet site requirements.

9. Low-voltage wiring under paving shall be tested for continuity, prior to paving.

3.17 CLEANUP

A. Clean-up shall be performed as each portion of the work progresses. Refuse and excess dirt shall be removed from the site, all walks and paving shall be broomed or washed down, and any damage sustained to the work of others shall be repaired and work returned to its original condition.

3.18 OPERATING INSTRUCTIONS

A. Contractor shall be required to train Owner’s maintenance personnel in proper operation of all major equipment. Provide written evidence of the person or persons so trained to the Architect.

3.19 MAINTENANCE

A. Inspection of valves, hose bibbs and other pressurized above ground connections shall be performed on a minimum weekly basis throughout maintenance period.

B. Inspection of irrigation heads to correct alignment, clear lateral lines adjust spray patterns, clean screens, and repair damaged heads shall be performed before commencement of maintenance period and prior to final acceptance (end of maintenance period).

C. Contractor shall be responsible for interrupting irrigation program to eliminate watering during a rainstorm.

D. Contractor shall, on a weekly basis, inspect system for damage. Any problems shall be brought to the attention of the Owner and rectified immediately.

END OF SECTION 32 8400
EXHIBIT 1

SUBSTITUTION APPROVAL REQUEST FORM

Contractor requests for substitutions will be considered upon receipt of this completed Substitution Approval Request Form and all required supporting documentation. Substitutions made without completion of this form and the Landscape Architect’s approval will be considered defective work.

Project

The contractor proposes the following substitutions in accordance with the requirements of the Contract Documents:

<table>
<thead>
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<th>Scope of Substitution</th>
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<td>Specification Reference</td>
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<td>Drawing Reference</td>
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<tr>
<td>Reasons for Proposed Substitutions</td>
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<td>Impact on Project Schedule</td>
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<tr>
<td>Impact on Guarantees and Warranties</td>
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<tr>
<td>Coordination Required w/ Adjacent Materials and Related Systems</td>
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<td>Deviations from Specified Requirements</td>
</tr>
</tbody>
</table>

Attachments _____ yes _____ no (Attach supporting documentation sufficient for the Landscape Architect to evaluate substitution. Substitution request forms submitted without adequate documentation will be returned without review).
SECTION 32 9300

LANDSCAPE PLANTING

PART 1 – GENERAL

1.01 SUMMARY

A. The work includes all services, labor, materials, transportation and equipment necessary to perform the work indicated on the Drawings.

B. It is the intent of the Drawings and Specifications to provide planting with plants in vigorous growth, ready for Owners use. Any items not specifically shown in the Drawings or called for in the Specifications but normally required to conform to such intent are to be considered as part of the work.

C. Maintain entire landscape for 120 days, upon completion of all punch-list items.

1.02 RELATED SECTIONS

A. Section 32 8400: Landscape Irrigation System

1.03 QUALITY ASSURANCE

A. The term ‘Architect’ herein refers to the Owner’s authorized representative.

B. Requirements of Regulatory Agencies:
   1. Comply with Federal, State and local laws and regulations pertaining to all work included in this section.

C. Qualifications:
   1. Pest Control Applicator: Trained and State licensed for application of weed control chemicals.
   2. The Contractor shall possess all insurance, licenses and permits required to perform the work of this contract including a C-27 State Contractor’s License.

D. Tests:
   1. Imported and On-site Soils: Soil structure, infiltration rate and standard agricultural suitability analysis of existing site soil to be included. Test shall include laboratory recommendations for soil amendment for turf areas as well as backfill mix for shrubs and trees and any amendments/ methods to mitigate any existing soil problems that may exist on the site. Contractor shall provide project plant list to Laboratory for their use to provide suitable backfill mix/amendments for specific species of plants as required. Plant list shall be forwarded to Lab prior to the lab taking soil samples. Laboratory conducting test shall take representative samples, (minimum 6) from site. Coordinate soil sample locations with planting plans. Soil samples should reflect turf, shrub/ground cover locations. Contractor shall not take and submit samples to Laboratory. The Contractor shall make arrangements for laboratory representative to enter site to collect samples. The location of each sample shall be documented on the planting plan sheets, (as-buils) by the laboratory and signed by the authorized Laboratory representative collecting samples.
The Owner’s authorized representative shall accompany Laboratory Sample collection. A copy of this/these signed planting sheets exhibiting location of samples taken shall be provided to the Laboratory and Landscape Architect for their records. Contact Wallace Laboratories to coordinate soil sample collection and analysis, telephone (310) 615-0116. info@wlabs.com. www.wlabs.com

2. Contractor is responsible for all soil collection and testing fees. Contractor shall not collect soil samples.

3. Tree pit percolation testing:
   a. Due to the potential of standing water in the tree pits, the Contractor is to perform a tree pit percolation test for all trees larger than 15 gallon in each tree pit prior to planting the tree. Fill the tree pit to the top with water. If the water has not drained by more than 95 percent within 24 hours, do not plant the tree and bring this slow drainage condition to the immediate attention of the Owner’s Authorized Representative. The Contractor may be required to either dig a substitute planting pit or to install a drainage sump in the existing planting pit. Substitute planting pits are the responsibility of the Contractor in this bid.
   b. Contractor shall contact Soils Laboratory for recommendations regarding mitigation for non-percolating soils. Contractor shall follow direction of Soils Laboratory to ensure proper drainage for all tree planting pits.

E. Applicable Standards:

1.04 SUBMITTALS

A. Material(s) List: (Coordinate and submit simultaneously with Landscape Irrigation Submittal, Section 02811, Part 1.04)
   1. The Contractor shall furnish the plant material, articles, planting appurtenances, products, materials, or processes specified by name in the Drawings and Specifications. No substitution will be allowed without prior written approval by the Owner’s Authorized Representative.
   2. Complete material(s) list, five (5) copies, shall be submitted to the Architect for his approval prior to performing any work. Material(s) list shall include representative photographs of trees and written specifications of all tree and shrub species. Contractor shall also list supplier for which material is supplied.

Plants identified as “selected specimen” shall be approved and tagged individually at place of growth by Landscape Architect. For distant material, photographs and size specifications will be used as preliminary review, with final approval and acceptance on site.

All shrubs and ground covers shall be photographed or 3 representative photos taken to exhibit average size, spread, height, fullness, etc. These photos shall be used to compare to plant material that arrives on site. If plant material does not exhibit the same qualities as those in representational photos, Landscape Architect has the right to refuse plant material.

All plant material is to be tagged and reserved at place of growth six (6) months in advance of installation. Failure to ensure plant material availability may require Contractor to provide larger sizes at no additional expense.
Materials and supplier information for Submittal shall reflect project plans. The items listed below are not reflective of this project.

THE FOLLOWING IS A GUIDE ONLY TO PROPER SUBMITTAL FORMAT. IT DOES NOT NECESSARILY REFLECT SPECIFIED MATERIAL.

### TREES

<table>
<thead>
<tr>
<th>Qty</th>
<th>Item</th>
<th>Size</th>
<th>Spec</th>
<th>Supplier</th>
</tr>
</thead>
<tbody>
<tr>
<td>128</td>
<td>Platanus</td>
<td>24&quot; Box</td>
<td>10'-12'x 4'</td>
<td>Valley Crest</td>
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<tr>
<td></td>
<td>acerifolia</td>
<td></td>
<td>2&quot; caliper</td>
<td></td>
</tr>
<tr>
<td></td>
<td>‘Bloodgood’</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Cinnamomum</td>
<td>48&quot; Box</td>
<td>15'-17'</td>
<td>Nursery</td>
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<tr>
<td></td>
<td>camphora</td>
<td></td>
<td>X 10'-12'</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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### SHRUBS

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<tr>
<td></td>
<td>japonicum</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>‘Texanum’</td>
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<tr>
<td>720</td>
<td>Rhaphiolepis</td>
<td>5 gal</td>
<td>24&quot;x 24&quot;</td>
<td>Norman’s Nursery</td>
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<tr>
<td></td>
<td>indica</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>‘Springtime’</td>
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</table>

### PLANTING APPURTENANCES

<table>
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<tr>
<td>Mulch</td>
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<td>Root Barriers</td>
<td>Deep Root</td>
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<tr>
<td>Fertilizers</td>
<td>Gro-Power</td>
</tr>
<tr>
<td>Pre-emergent Herbicide</td>
<td>Elanco Surftan</td>
</tr>
<tr>
<td>Etc</td>
<td>Etc</td>
</tr>
</tbody>
</table>

Planting Submittal must be specific and complete. All items must be listed and should include supporting information such as, tree ties, stakes, soil amendment, etc.

**NOTE:** Copies of manufacturer’s literature (catalog cuts) are required as part of submittal information for Inspector and School District use.

3. The Contractor may submit substitutions for plant material and material listed on the Planting Drawings by following procedures as outlined in Part 1.05 of these Landscape Planting Specifications.
B. Submit to Architect/ Landscape Architect, two (2) copies of test results reflecting specification conformance (Section 2.01) for approval/review prior to placing imported soils, backfill mix and fertilizer on the project site. This should be coordinated and submitted simultaneously with Landscape Planting and Landscape Irrigation Submittal.

C. Submit to Architect/ Landscape Architect, 1 copy of signed planting plan(s) showing locations of soil sample collection locations.

D. Certificates of Inspection required by law for transportation shall accompany invoice for each shipment of plants. File copies of certificates with Architect/ Landscape Architect after acceptance of material. Inspection Certificates by Federal or State governments at place of growth do not preclude rejection of plants at project site.

E. Submit to Architect/ Landscape Architect, two (2) copies of written guarantee prior to final acceptance (See Section 1.09.)

F. Submit to Owner’s Representative/Inspector, two (2) copies of purchase/delivery receipt for fertilizers delivered to site.

G. Submit to Owner’s Representative/Inspector, two (2) copies of MSDS statements for all pesticides used on project.

H. Submit to Owner’s Representative/ Inspector and Architect, copies of all signed delivery tags for delivery of amendments for turf playfield. Contractor shall provide calculated square footage of area to be amended as well as calculated amount of amendment to be incorporated into soil. Contractor shall verify required amount installed.

I. Contractor shall submit 5lb sample of decomposed granite to Landscape Architect for approval.

J. Contractor shall submit .5 cubic foot sample of shredded bark mulch to Landscape Architect for approval.

K. Contractor shall submit digital photographs of work in progress verifying work done as per specifications. Work to be verified shall include:
   1. Planter pit size for trees and shrubs.
   2. Verification of percolation tests for trees.
   3. Installation of augured holes for tree pits.
   4. As per direction per Owner’s Authorized Representative during pre-construction meeting or during progress of project.

1.05 SUBSTITUTIONS

A. Substitutions will not be permitted without the Architect’s/ Landscape Architect’s written approval.

B. If a specified plant species or variety is not obtainable or if size is not up to industry standards, Contractor may submit a proposal to provide the nearest equivalent size or variety to the Architect/ Landscape Architect for their consideration.

C. If approval is granted for substitution, adjustment in Contract will be made in accordance with the Contract Conditions.
1.06 PRODUCT DELIVERY

A. Delivery: Deliver all materials in manufacturer’s original unopened containers. Containers are to be clearly labeled container with weight, analysis and manufacturer’s name and brand applicable.

B. Storage:
   1. Secure Owner’s permission to store plant materials on the project site.
   2. Store all materials in an orderly manner and locate so as to avoid interfering with other construction activities.

C. Protection:
   1. Protect all plants from damage by sun, wind, rain and freezing at all times prior to planting. Maintain watering of plants on a regular schedule.
   2. Store fertilizers above ground and protect from moisture absorption with approved covering.
   3. Protect the installed work and materials of other trades.

1.07 PROJECT CONDITIONS

A. Verify all dimensions and planting area conditions prior to proceeding with work.

B. Notify the Landscape Architect immediately if any discrepancies exist between the Drawings, the Specifications and actual site conditions.

C. Do not perform work in any area that is unsuitable for successful plant material establishment until all such conditions have been corrected and approved by the Landscape Architect.

D. Examine surfaces for conditions that will adversely affect execution permanence and quality of work.

E. Contractor shall walk site prior to work to establish condition of existing landscape. Walk shall include General Contractor, Owner’s Authorized Representative. The Contractor shall document existing conditions of landscape with written report and digital photographs.

F. During site walk, Contractor shall also determine with General Contractor and Owner’s Authorized Representative location of all temporary fencing, staging/storage areas and exact limits of work and areas that may be outside of original scope of work that must be maintained by Contractor due to site fencing requirements.

G. Contractor shall determine with General Contractor and Owner’s Authorized Representative to what extent and what method of temporary fencing shall be acceptable to cordon off establishing landscape as required.

1.08 INSPECTIONS

A. All observations herein specified shall be made by the Architect/ Landscape Architect. The Contractor shall request observations at least 48 hours in advance. Failure to notify the Landscape Architect will make Contractor responsible for any deficiencies that might arise. Coordinate trips with Landscape Irrigation System, Section 02811. Site visits will be required on the following parts of the work:
1. Pre-Construction Meeting.
2. Review of trees and shrubs spotted for planting, prior to excavating holes; and finish grading, prior to planting lawn and ground cover.
3. Pre-Maintenance: When planting, irrigation and all other indicated or specified work has been completed.
4. Final Observation: At completion of maintenance period.

B. Contractor shall personally accompany the Architect/ Landscape Architect on each of the above-required inspections.

C. If, in the Architect’s/ Landscape Architect’s opinion, the work scheduled for inspection is not ready, the Contractor shall reimburse the Landscape Architect, at his/ her hourly rate, for the time spent portal to portal. No site visits will be scheduled until these fees have been paid.

D. Contractor shall be responsible for scheduling any other inspections required by any other agencies and coordinating Architects/ Landscape Architect involvement as necessary.

E. Nursery Inspections. Plants shall be subject to inspection and acceptance at place of growth and upon delivery to the site, for quality, size and variety. Such acceptance shall not impair the right of inspection and rejection at a later time or during progress of work, for size, condition or rootball, and latent defects or injuries. Immediately remove rejected plans from the site. All trees shall be inspected by Owner’s Authorized Representative prior to delivery.

1.09 GUARANTEE

A. Guarantee for all items specified in this section shall be made in accordance with the following form. The general conditions and supplementary conditions of these Specifications shall be filed with the Owner or his representative prior to final acceptance. The guarantee form shall be retyped onto the Contractor’s letterhead and contain the following information:

GUARANTEE FOR LANDSCAPE MATERIALS

We hereby guarantee that all landscaping materials we have furnished and installed are free from defects in materials and workmanship, pests, diseases, and the work has been completed in accordance with the Drawings and Specifications.

We agree to repair or replace any defects in material or workmanship, which may develop during the period of one year from the date of acceptance, and also to such defects at no additional cost to the Owner. We shall make such repairs or replacements within a reasonable time, as determined by the Owner, after receipt of written notice from Owner, we authorize the Owner to proceed to have said repairs or replacements made at our expense and we will pay the costs and charges therefore upon demand. We guarantee to make replacements immediately as project site conditions will permit.

PROJECT: ____________________________________________________________

CONTRACTOR: ______________________________________________________

ADDRESS: __________________________________________________________

LANDSCAPE PLANTING
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B. The guarantee to the Owner shall be that all trees, shrubs and plant materials will maintain vigorous and healthy growth for the following specified guarantee periods:
   1. Less than 15-gallon size: 90 days.
   2. 15 gallon or larger: 1 year.

C. The guarantee for each period shall begin on date of final acceptance of work by the Owner (after successful completion of the specified maintenance period).

D. Guarantee to replace all dead and dying plants and all plants not reflecting vigorous growth.

E. Plants that are to be replaced shall be of the same variety and size (minimum) originally planted. If landscape has matured since original installation, replacement plant size shall match in size to originally installed plants of similar size plus added growth during maturity. Included will be all materials pertaining to installation of replacement plants, including:
   1. Soil preparation, planting and fertilization, staking or guying involved in replacement, shall conform to original specifications, including guarantees.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. Topsoil:
   1. On-site Soil: Use existing on-site soil, which has been stockpiled and identified for use as topsoil for planting purposes, to the maximum extent possible.
   2. Use only topsoil materials, which have been approved by the soil laboratory.

B. Imported Soil: Coordinate with Civil Engineer’s Plan for stockpiled topsoil.
   1. Provide sandy texture material from an approved source. Stockpile in an approved area and use materials, which do not exceed the following limits:
      a. Silt plus Clay Content: 15 percent by weight.
      b. Boron Context: 1 part per million maximum as measured on the saturation extract.
      c. Sodium Absorption Ratio (SAR): 3.0 millimhos per centimeter at 25 degrees C.
   2. Agricultural suitability analysis of imported soil shall be verified prior to delivery. See Section 1.04.

C. Existing soil to be amended: Inspect existing soil and provide all amendments needed to conform to recommendations by soil laboratory. See Section 1.03 D.

2.02 FERTILIZERS AND SOIL CONDITIONERS

Schedule to be finalized upon completion of soil analysis, see Section 1.03 D. For bidding purposes use the following (final selection of soil conditioners, chemical and organic amendments and fertilizers shall be per soil analysis recommendations):
A. Soil Conditioners:
   1. Material shall be fine textured, with 80% minimum passing a No. 8 screen, and
      95% minimum passing a No. 4 screen.
      
      Salinity: Not to exceed 3.5 millimhos per centimeter at 25 degrees C., as
      measured by saturation extract conductivity.
      
      Organic Amendment: Provide one of the following:
      a. Nitrolized/mineralized Redwood sawdust (0.5% actual Nitrogen).
      b. Nitrolized/mineralized Fir sawdust (0.8% actual nitrogen).
      c. Nitrolized/mineralized Fir bark (1-% actual nitrogen).
   2. Agricultural Gypsum: Standard commercial quality manufactured for use as a
      soil amendment as per soils report obtained upon completion of rough grading.
      Gypsum shall be agricultural grade with 90% minimum calcium sulfate.
   3. Sand shall be fine, clean and natural, free from deleterious material, weed
      seed, clay balls, or rock with a minimum 95% passing a #4 sieve and maximum
      of 10% passing a #1 sieve.
   4. Dolomite lime shall be agricultural grade with 35% minimum magnesium
      carbonate and 49% minimum calcium carbonate with 100% passing a #65
      sieve.
   5. Soil Sulfur: Application rate per soils report.

B. Fertilizer: Available from Gro-Power, Inc., telephone number (909) 393-3744.
   1. Gro-Power Plus (5-3-1)
   2. Gro-Power Controlled Release (12-8-8)
   3. Gro-Power Hi Nitrogen (14-4-9)
   4. Gro-Power planting tablets (12-8-8)

2.03 PLANT MATERIALS

A. Species and Size: Provide as indicated on “Plant Legend” on Drawings.

B. Tag all plant materials with name and size in accordance with American Association
   of Nurserymen’s “Standards of Practice”.

C. All plants shall be healthy, well developed representations of their species or
   varieties, free from disfigurements, pests, diseases, and with well developed branch
   and root systems.
   1. Container stock shall have grown in containers for at least six (6) months, but
      not over two (2) years.
   2. Plants shall have been grown under environmental conditions comparable to
      those of the project site, except as otherwise specifically approved by Architect.
   3. Plants in containers shall not be root-bound.
   4. Remove rejected plants from the site immediately and replace with acceptable
      materials.

D. Seeds (None specified this project)

E. Stolons (None specified this project)

F. Sod (None specified this project)
2.04 HYDROSEED MATERIALS (None specified this project)

2.05 MISCELLANEOUS MATERIALS

A. Tree Staking:
   1. Lodgepole Pine (pointed on one end): Stain entire length with green shingle stain. Provide 2-inch diameter by 10-inch long for 24-inch box, 15- and 5-gallon trees. Use 2-inch diameter by 12-feet long for 36-inch box and 48-inch box trees (Refer to tree planting details).
   2. Tree Ties: For lodgepole pine double stakes use ‘Wonder Ties’ or equal.

B. Herbicides: Commercial quality pre/post-emergent type as approved by a licensed Pest Control Advisor for use with species of plants specified on the Planting Plans.

C. Tree-guying (if called for on Drawings) (None specified this project)

D. Root Barriers:
   1. Provide model UB 24-2 panels by Deep-Root Manufacturer. Refer to tree planting details.

E. Redwood Headerboards (None specified this project)

F. Recycled Plastic Headerboards (None specified this project)

G. Concrete Mowbands:
   1. Refer to detail within these plans for construction and finish.

H. Erosion Control Fabric (2:1 slopes or greater, use where specified only) (None specified this project)

G. Brick Dust for Baseball and Softball Field Infields (None specified this project)

H. Decomposed Granite (DG) (None specified this project)

I. Shredded Bark Mulch (None specified this project)

J. General Planter Mix, (Organic amendment):
   1. Provide AG Organics, Inc. AG-140 Premium Forest Compost or approved equal, available from AG Organics, Inc. Telephone (951) 780-2280 / FAX (951) 780-2287. info@agsoil.com.
   2. Planter mix shall meet criteria of CHPS (Collaborative for High Performance Schools) by being 100% recycled wood products.

PART 3 - EXECUTION

3.01 GRADING

A. Existing sod field shall be removed.
   1. Operation shall be performed after all existing rotor heads, valve boxes and any other equipment at grade have been removed from turf field. Salvageable items, (deemed as so by the District) shall be cleaned and delivered to the District, palletized. Other equipment not to be removed and protected in place shall be sufficiently marked so that they can be avoided during the removal operation.
Any equipment damaged or destroyed by the operation shall be replaced in kind with no cost to the District.

2. Contractor shall utilize sod cutter to remove sod, (or other approved method). All material shall be collected and removed from site and dumped in a legal manner.

3. Contractor shall employ measures to control dust and debris from drifting off-site.

4. Subsequent to sod removal, soil shall be tilled and amended per specifications.

B. Remove and dispose of soil in planting areas that contain deleterious substances such as oil, plaster, concrete, wood, gasoline, paint, or solvents. Remove soil to a minimum depth of 6 inches, or to the level of dryness in affected areas.

C. Control all airborne dust caused by grading operations using water tankers and sprinklers.

D. Do not work soil when moisture content is so great that excessive compaction will occur, or when soil is so dry that dust will form or clods will not break up. Water shall be applied if necessary to provide ideal moisture content for filling and for planting as herein specified.

E. Preliminary grading shall be done in such a manner as to anticipate the finish grading. Excess soil shall be removed or redistributed before the application of fertilizer and mulch. Where soil is to be replaced by plants and mulch, allowance shall be made so that when finish grading has begun, there shall be no deficiency in the specified depth of mulched-planted beds.

F. Contractor shall check the site for weed growth prior to grading or disturbance of the soil in planting areas. These areas shall receive an application of contact herbicide per manufacturer’s recommendations.

G. Finish grading shall consist of bringing all ground areas to uniform slopes, meeting grades of installed curbs, paving, etc. and drainage at a 2% slope unless otherwise indicated on the Drawings. Ground shall be 2 inches below walks, curbs and headers in ground cover and shrub areas and 1-inch below it in lawn areas. Accurate flow lines shall be set by instrument to catch basins or other points of drainage flow. Mounding of finish grade shall be done as directed by the Architect/ Landscape Architect.

H. Prior to beginning finish grading, loosen soil in planting areas to a depth of 8 inches. This shall be accomplished by ripping area in two opposing directions. Provide verification of work per Section 1.04 K.

I. Allow for addition of soil conditioners in establishing finish grades.

J. Make minor grade adjustments, as directed by Architect/ Landscape Architect.

K. Warp grades as necessary to prevent accumulation of water at locations where designed drainage meets an obstruction

L. Finish-grade all planting areas to a smooth and even condition. Make sure that no water pockets or irregularities remain.
M. Remove all foreign materials. Remove clods and rocks larger than 1.5-inches diameter in any direction from soils within 3 inches of the finish grades to required elevations so that after conditioning and planting grade is .5 inch below tops of curbs and walks. Slope to drain toward adjacent drainage swales or catch basins.

N. Dethatching in turf areas (None specified this project)

O. Aeration in turf areas (None specified this project)

P. Removal of existing turf (None specified this project)

3.02 SOIL CONDITIONING (on-site soil)

A. Plant Areas (graded 3:1 or flatter): Grade to finish elevation, allowing for amendments, and then, incorporate the amendments uniformly into the top 4 inches to 6 inches for each 1,000 square feet of area. The amendments shall be per soil report obtained by the Landscape Contractor upon completion of grading. (See Section 1.03D.) For bidding purposes use:
   1. Organic Amendment: 4 cubic yards.
   2. Fertilizer: Gro-Power Plus - 200 lbs.
   3. Gypsum: 100 lbs.
   4. Soil Sulfur: 10 lbs.

B. Remove all rock and unbroken clods larger than 1- to 1.5-inches in any dimension brought to the surface.

3.03 WEED ERADICATION

The work described below is provided as an example of work involved for bidding purposes only. The eradication of weeds, (both selection of chemicals and methods) shall be as specified by a licensed pest control advisor/ applicator. All local codes, regulations, application methods and timing, notices, etc. required by local, regional, State and Federal authorities for the application of any chemicals used shall be followed. Contractor shall provide adequate protection, (as dictated by law) for all personnel in contact with any chemicals used. Protection of any other persons onsite during and after application shall also be the responsibility of the Contractor. Provide all warning signage and notices as required by law.

A. Weed Eradication Procedures: All planting areas as designated on the plans to receive ground cover, (includes mulch only areas and areas to receive decomposed granite) shall receive the following weed eradication procedures after the irrigation system has been installed and accepted and after all boxed trees have been installed and accepted, but prior to the installation of container trees, shrubs and groundcover.

B. Clean up work: Manually remove all existing vegetation and dispose of it off-site in a suitable and lawful manner.

C. Fertilizer: Fertilize all planting areas with Gro-Power at the rate of 30 pounds per 1,000 square feet and begin watering process.

D. Watering Process: Water all planting areas thoroughly and continuously for a period of three (3) weeks. The Owner’s Authorized Representative shall approve a specific watering duration and frequency program designed to germinate all residual weeds.
E. First Weed Spray: Discontinue watering process for two (2) days and then apply a contact weed killer at maximum label rate. The contractor shall apply the above agent to a planting area of approximately 1,000 square feet and then evaluate effective coverage of weed species involved. The contractor shall make application adjustment such as the inclusion of additional spreading agent or spraying techniques in order to maximize the effective use of the contact weed killer as specified above. No irrigation water shall be applied for a minimum of four (4) days following application of contact weed killer.

F. Watering Process: Water all planting areas thoroughly and continuously for a period of three (3) additional weeks. A shorter watering period may be permissible at the discretion of the Owner’s Authorized Representative if they so determine that germination of the balance of weed seeds is sufficient for an effective kill.

G. Second Weed Spray: Discontinue watering process for two (2) days and then apply a contact weed killer at maximum label rates. The Contractor shall apply the above agent to a planting area of approximately 1,000 square feet and then evaluate effective coverage of weed species involved. The Contractor shall make application adjustment such as the inclusion of additional spreading agent or spraying techniques in order to maximize the effective use of the contact weed killer as specified above. Allow a minimum of four (4) days without irrigation for effective, final weed kill.

H. Clean-up work: Manually clean and remove all weeds from the work area and continue planting process as noted and detailed.

3.04 PLANTING

A. Locate trees, palms and shrubs by scaling the dimensions indicated on Planting Drawings. Do not prune any plant material prior to delivery without specific approval by Architect.

B. Spot containers and obtain Landscape Architect’s approval prior to excavating pits. (See Section 1.08.)

C. Pit Excavations:
   1. All sides cut vertical.
   2. Diameter: Double the container or root ball size for 15-gallon and smaller plants. One and one-half times the diameter of containers 24-inch box and larger.
   3. Depth for plant material, 24-inch box and smaller: Same depth as container or root ball plus 1-inch.
   4. Depth for plant material, 36-inch box and larger: Same depth as container or root ball plus 1-inch.
   5. If planter pits are excavated using a power auger, break vertical sides with a balling bar or spade.
   6. Refer to planting plan detail for method of planting for native type shrubs and trees.
   7. Refer to planting plan details and notes for planting methods/requirements for palms.

D. If percolation test yield less than 95% drainage as noted in Section 1.03 D the Contractor shall perform the following, (for bid purposes only, soil laboratory recommendations shall be followed):
For 24-inch box trees, auger one (1) 8-inch diameter hole in corner of planting pit to a minimum depth of 4 feet beyond bottom of pit.

For 36-inch box trees, auger two (2) 8-inch diameter holes in opposite corners of the planting pit to a minimum depth of 4 feet beyond bottom of pit.

For 48-inch box trees and larger, auger four (4) 8-inch diameter holes in each corner of the planting pit to a minimum depth of 4 feet beyond the bottom of pit.

Depth of augured holes shall be enough to reach beyond the impermeable layer of soil and allow drainage. Each augured hole shall be filled with 3/4-inch coarse gravel. Refer to detail in plans for construction.

E. Do not install plant material that has cracked or broken balls of earth when removed from container.

F. Plant materials in a manner that after settlement, the crown of the plant bears the same relation to finish grade that it did to the surface in its original container.

G. Backfill tree and shrub pits with prepared mix per soil report obtained from the Soil Laboratory upon completion of rough grading. For bidding purposes use:
   1. Approved Soil: 6 parts by volume.
   2. Organic Amendment: 4 parts by volume.

   Add for each cubic yard: (For bidding purposes only. Refer to soils analysis recommendations - Section 1.03 D.)
   b. Iron Sulfate: 2 lbs.

H. All plants, which settle deeper than specified above, shall be raised to the correct level. After the plant has been placed, additional backfill shall be added to the hole to cover approximately 1/2 the height of the root ball. At this stage, water shall be added to the top of the partly filled hole to thoroughly saturate the root ball and adjacent soil.
   1. After the water has completely drained, planting tablets shall be placed as indicated below:
      3 tablets per 1-gallon container
      8 tablets per 5-gallon container
      15 tablets per 15-gallon container
      16 tablets per 20-inch- to 24-inch box
   2. Larger Sizes: For each .5-inch caliper measured 14 inches above soil level, use 3 to 4 tablets.
   3. The remainder of the hole shall then be backfilled.
   4. Planting tablets shall be set with each plant on the top of the root ball while the plants are still in their containers so the required number of tablets to be used in each hole can be easily verified.
   5. Refer to plan details and notes regarding fertilizer requirements for native type shrubs and trees.
   6. Refer to plan details and notes regarding fertilizer requirements for palms.

I. Form shallow basin around edge of plant pit.
3.05 STOLONS (None specified this project)

3.06 HYDROSEEDING (None specified this project)

3.07 SODDING (None specified this project)

3.08 MISCELLANEOUS ITEMS

A. Tree Staking:
   1. Lodge Pole Stakes: Install per detail. All trees, 36-inch and smaller, shall be double staked unless otherwise stated on plans.

B. Tree Guying (None specified this project)

C. Root Barriers: Install per Details within drawings and Deep Root Manufacturer’s Details and Specifications.

D. Erosion Control Fabric other than jute mesh (None specified this project)

E. Redwood Headerboards (None specified this project)

F. ‘Benda Board’ Recycled plastic headerboard. (None specified this project)

G. Concrete Mow Bands:
   1. Refer to plans, notes and details.

H. Herbicides: Apply only under licensed pest control applicators recommendations and per manufacturer’s directions.

I. Brick Dust for Baseball and Softball Infields (None specified this project)

J. Decomposed Granite (DG):
   1. Prior to placing decomposed granite, shape, fill, grade and compact the sub-grade to sufficient compaction. Soils engineer report, (obtained by contractor) shall determine extent of compaction required.
   2. All forms, concrete, redwood header or other, (refer to plan for type) shall be installed to allow for proper depth of decomposed granite. Refer to detail and specification for installation of type of border for decomposed granite, if any.
   3. Place decomposed granite on prepared sub-grade, raking smooth with metal tine rake to attain desired grade. Install in maximum 2 inch deep lifts.
   4. Water heavily to achieve full penetration of mix. Watering is best accomplished using a garden hose with spray nozzle set to a coarse spray; pressure should not disturb leveled surface. Let watered mix stand 6 - 24 hours until surface water is no longer present; the mix should then be moist but not wet.
   5. While the mix is still thoroughly moist, roll with a heavy lawn roller (minimum 225 pounds and maximum 30 inch width), to achieve finish grade and initial compaction. Hand-tamp edges around poles, and other objects. Use a heavy (1 ton minimum) small rider, after having initially used the lawn roller, to obtain the desired final dense, smooth, uniform texture. Do not use whackers or vibratory rollers. Compact thoroughly areas around shrubs and trees. DG areas around new shrubs and trees, (within temporary watering basins) shall be lightly compacted.
K. Jute Mesh Installation (None specified this project)

L. Shredded Bark Mulch:
1. Refer to plan for depth of mulch required.
2. Mulch shall be kept clear of shrub stems and tree trunks.
3. Prepare finish grade adjacent to finish surfaces to allow for full depth of required mulch depth.

3.09 MAINTENANCE PERIOD

A. Maintenance period shall begin when all work indicated on Drawings and Specifications have been completed, inspected, and approved by the Architect/Landscape Architect. (Refer to Article 1.08 of this Section).
1. Maintenance work shall be performed as specified herein, and shall be continued for a period of 120 days.

B. Tree Pruning:
1. Prune trees selectively to provide the following characteristics:
   a. To allow development of permanent scaffold branches that are smaller in diameter than the trunk or branch to which they are attached, and which have a vertical spacing of 18 inches to 24 inches, with radial orientation and do not overlay one another.
   b. Eliminate narrow v-shaped branch forks, which lack strength.
   c. As necessary to maintain growth within space limitations.
   d. As necessary to maintain a natural appearance, and to balance the crown with roots.
2. Stripping of lower branches (“raising-up”) of young trees is not permitted. Retain lower branches in a “tipped back” or pinched condition, with as much foliage as possible to promote trunk growth (tapered trunk). Lower branches may be cut flush with the branch collar only after the tree is able to stand erect without staking or other support.
3. Perform primary pruning of deciduous trees during the dormant season. Prune damaged trees or those that constitute health or safety hazards promptly, without regard to season.
4. Make all pruning cuts of lateral branches or buds just above collar. “Stubbing” is not permitted.

C. Shrub Pruning:
1. Objectives of shrub pruning are as specified for trees.
2. Do not clip shrubs into balled or boxed forms except where required by the design and so identified on the Plant Legend.

D. Plant Supports:
1. Inspect stakes and guys to prevent girdling of trunks or branches. Make adjustments as necessary to prevent rubbing or injury of bark.
2. Remove stakes and guys as soon as plants no longer require their support.

E. Insect and Disease Control: Maintain effective controls using approved materials and application techniques.

F. Pest Control:
1. Provide all measures necessary to exterminate gophers and moles immediately when their presence is discovered.
2. Repair and restore surfaces to original condition.
G. Fertilizer: Provide applications of Gro-Power Plus at the rate of 20 lbs. per 1,000 square feet or at the rate recommended by the soil report at the following periods:
   1. Thirty (30) calendar days following beginning date of the maintenance period.
   2. Sixty (60) calendar days following beginning date of the maintenance period and every 30 calendar days thereafter until maintenance period if complete.

H. Plant Replacement: Refer to Section 1.09.

I. Groundcover:
   1. Apply specified pre-emergent herbicide to all broadleaf groundcover areas. Apply in accord with manufacturer’s instructions.
   2. Edge groundcover to keep in bounds; trim top growth as necessary to maintain an overall uniform appearance.
   3. Remove accumulated trash weekly.

J. Lawns (None specified this project)

K. Jute Mesh (None specified this project)

L. Decomposed Granite (DG):
   1. Finished surface shall be smooth and uniform with no evidence of shifting, slipping or cracking. Dried, compacted material shall be firm all the way through with no spongy areas.
   2. Significant irregularities shall be smoothed out prior to final acceptance of work. Smoothing shall be accomplished by re-wetting/saturating rough areas thoroughly, and then rolling the surface again with a heavy roller (1,000 to 1,500 pound powered walk-behind or small rider).
   3. Final thickness of completed area shall not vary more than .5-inch from the dimension indicated on plans. Measurements may be taken by means of test holes taken at random in the finished surface. Correct any variations in the thickness beyond the allowable .5-inch by repeating the procedures listed above.

3.10 FINAL ACCEPTANCE

A. Final approval and acceptance of the work will be given when the following conditions, as determined by the Architect, are met:
   1. At the completion of the 120-day maintenance period and when 90% coverage for hydroseed ground cover and 100% coverage for turf is obtained.
   2. After final inspection and acceptance by the Architect/ Landscape Architect.
   3. The Architect/ Landscape Architect reserves the option to extend the maintenance period beyond the 120 days specified if he/she determines that further maintenance is necessary to comply with requirements set by the contract documents.
   4. Approval and acceptance will be given in writing.

END OF SECTION 32 9300
SECTION 33 1116
SITE WATER UTILITY DISTRIBUTION PIPING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Pipe and fittings for site water lines including domestic water lines.
   2. Valves.

B. Related Sections:
   1. Section 31 2316 - Excavation: Excavating of trenches.

1.02 REFERENCES

A. ASTM International (ASTM):

B. American Water Works Association (AWWA):
   2. ANSI/AWWA C111/A21.11 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
   6. AWWA C510 – Double Check Valve Backflow-Prevention Assembly.
   7. AWWA C511 – Reduced-Pressure Principle Backflow-Prevention Assembly.
   8. AWWA C606 – Grooved and Shouldered Joints
   9. ANSI/AWWA C900/C900a – Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution.


D. Standard Plans for Public Works Construction (SPPWC), current edition

1.03 QUALITY ASSURANCE

A. Perform Work in accordance with utility company requirements.

1.04 SUBMITTALS

A. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.

B. Manufacturer’s Certificate: Certify that products meet or exceed specified requirements.

C. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
1.05 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

B. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store valves in shipping containers with labeling in place.

PART 2 – PRODUCTS

2.01 WATER PIPE

A. Ductile Iron Pipe: AWWA C151:
   2. Joints: AWWA C111, rubber gasket with rods.

B. PVC Pipe: AWWA C900 Class 200:
   1. Fittings: AWWA C111, cast iron.

C. Trace Wire: Magnetic detectable conductor, brightly colored plastic covering, imprinted with "Water Service " in large letters.

2.02 VALVES

A. Valves: Manufacturer's name and pressure rating marked on valve body.

B. Gate Valves 3 Inches and Over:
   1. AWWA C509, iron body, bronze trim, non-rising stem with square nut, single wedge, resilient seat, flanged ends, control rod, post indicator, valve key, and extension box.

C. Ball Valves Up To 2 Inches:
   1. Brass body, Teflon coated brass ball, rubber seats and stem seals, Tee stem pre-drilled for control rod, AWWA inlet end, compression outlet with electrical ground connector, with control rod, valve key, and extension box.
   2. Manufacturer: Ford, Jones, or Mueller.

D. Check Valves, Post Indicator Valves, and Backflow Preventers:
   1. Per Water Company Requirements.
   2. Double Check Detector Assemblies (DCDA) shall conform to AWWA C510.
      a. DCDA shall conform to LA County DHS Approved Backflow Prevention Devices.

2.03 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 31 2316.
B. Cover: As specified in Section 31 2316.

2.04 ACCESSORIES

A. Thrust Blocking: NFPA 24 A.10.8.2; Factor of Safety 1.5, Water Pressure 200 psi, and soil bearing 2,0000 pounds per square foot.

B. Backflow Preventer: Per Water Company and Fire Department Requirements.
   1. Zurn Wilkins Model 975XL Reduced Pressure Principle Assembly or approved equal.

C. Meter: Per Water Company Requirements.
   1. Badger Meter Recordall Disc Meters Model 70

D. Fire Department Connection (FDC):
   1. FDC shall have sign to indicate type of system, address served by FDC, and pumping if greater than 150 psi.
   2. Lettering shall be minimum 1 inch, color contrasting to background.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Verify that building service connection and municipal utility water main size, location, and invert are as indicated.

3.02 PREPARATION

A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare pipe connections to equipment with flanges or unions.

3.03 TRENCHING

A. Refer to Section 31 2316 for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Form and place concrete for pipe thrust restraints at each change of pipe direction. Place concrete to permit full access to pipe and pipe accessories.

D. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.04 INSTALLATION - PIPE

A. Maintain separation of water main from sewer piping in accordance with Temecula Water and Health Department code.

B. Group piping with other site piping work whenever practical.

C. Establish elevations of buried piping to ensure not less than 3 ft of cover.
D. Install grooved and shouldered pipe joints to AWWA C606.

E. Route pipe in straight line.

F. Install pipe to allow for expansion and contraction without stressing pipe or joints.

G. Slope water pipe and position drains at low points.

H. Install trace wire 12 inches above top of pipe; reading "Water Line Below" in large blue letters.

3.04 INSTALLATION – VALVES

A. Set valves on solid bearing.

B. Center and plumb valve box over valve. Set box cover flush with finished grade.

3.05 SERVICE CONNECTIONS

A. Provide water service to utility company requirements.

3.06 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Greenbook standard.

B. Pressure test water piping in accordance with Water Department standards.

C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

END OF SECTION 33 1116
SECTION 33 3111
SITE SANITARY UTILITY SEWERAGE PIPING

PART 1 – GENERAL

1.01 SUMMARY

A. Section Includes:
   1. Sanitary sewerage drainage piping, fittings, and accessories.
   2. Connection site sanitary drainage system to municipal sewers.

B. Related Sections:
   1. Section 31 2316: Excavation; excavating trenches.

1.02 REFERENCES

A. ASTM International (ASTM):


C. Standard Plans for Public Works Construction (SPPWC)

1.03 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation meeting one week prior to start of Work
   1. Require attendance by each affected installers.

B. Sequencing: Ensure that utility connections are achieved in orderly and expeditious manner.

1.04 SUBMITTALS

A. Product Data: Provide data indicating pipe, pipe accessories.

1.05 DEFINITIONS

A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

B. Manufacturer's Installation Instructions: Indicate special procedures required to install Products specified.

C. Project Record Documents:
   1. Record location of pipe runs, connections, cleanouts, and invert elevations.
   2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.
PART 2 – PRODUCTS

2.01 SEWER PIPE MATERIALS

A. Provide products that comply with applicable code(s).

B. Plastic Pipe: ASTM D 2729, Poly(Vinyl Chloride) (PVC) material; diameter as indicated.

C. 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.

D. Lubricant: Suitable for lubricating joint components; no deteriorating effects on gasket or pipe material, will not support growth of fungi or bacteria, and shall be of type recommended by gasket manufacturer.

2.02 PIPE ACCESSORIES

A. Trace Wire: Magnetic detectable conductor, brightly colored plastic covering, imprinted with "Sanitary Sewer Service " in large letters.

2.03 CLEANOUT MANHOLE

A. Manholes: In accordance with SSPWC requirements.

B. Lid and Frame: In accordance with SSPWC requirements.

C. Shaft Construction: Cast iron shaft of internal diameter as indicated with 4,000 psi concrete (Type II cement, 0.50 maximum Water/Cement) collar for cleanouts.

2.04 BEDDING AND COVER MATERIALS

A. Pipe Bedding Material: As specified in Section 31 2316.

B. Pipe Cover Material: As specified in Section 31 2316.

PART 3 – EXECUTION

3.01 GENERAL

A. Perform work in accordance with applicable code(s).

3.02 TRENCHING

A. Refer to Section 31 2316 for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.
3.03 INSTALLATION – PIPE

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on drawings.

B. Install pipe, fittings, and accessories in accordance with manufacturer’s instructions. Seal watertight.
   1. Plastic Pipe: Also comply with ASTM D 2321.

C. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

D. Install trace wire 6 inches above top of pipe; coordinate with Section 31 2316.

3.04 INSTALLATION – CLEANOUTS

A. Form bottom of excavation clean and smooth to correct elevation.

B. Form and place cast-in-place concrete base pad, with provision for sanitary sewer pipe end sections.

C. Establish elevations and pipe inverts for inlets and outlets as indicated.

D. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.05 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Greenbook standards.

3.06 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION 33 3111
SECTION 33 4111

SITE STORM UTILITY DRAINAGE PIPING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:
1. Storm drainage piping, fittings, and accessories.
2. Connection of drainage system to municipal sewers.
3. Catch basins
4. Trench drains
5. Plant area drains
6. Paved area drainage
7. Site surface drainage

B. Related Sections:
1. Section 31 2316: Excavation: excavating trenches.

1.02 REFERENCES

A. ASTM International (ASTM):

B. American Association of State Highway and Transportation Officials (AASHTO):


D. Standard Plans for Public Works Construction (SPPWC).


1.03 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate installation of storm drain with size, location and installation of service utilities.

B. Preinstallation Meeting: Conduct preinstallation meeting one week prior to start of Work of this section
1. Require attendance by affected installers.

C. Sequencing: Ensure that utility connections are achieved in orderly and expeditious manner.

1.04 SUBMITTALS

A. Product Data: Provide data indicating pipe, pipe accessories, and inlets.

C. Manufacturer's Certificates: Certify that products meet or exceed municipal requirements.

D. Manufacturer's Installation Instructions: Indicate special procedures required to install products specified.

E. Field Quality Control Submittals: Document results of field quality control testing.

F. Project Record Documents:
   1. Record location of pipe runs, connections, catch basins, cleanouts, manholes, and invert elevations.
      a. Comply with requirements of Section 01 7839.
   2. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.05 DEFINITIONS

A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

1.06 REGULATORY REQUIREMENTS

A. Conform to SSPWC code for materials and installation of Work.

PART 2 – PRODUCTS

2.01 STORM DRAIN PIPE MATERIALS

A. Provide products that comply with applicable codes.

B. Concrete Pipe: Reinforced, ASTM C 76, Class II with Wall type A; mesh reinforcement; bell and spigot end joints.

C. Reinforced Concrete Pipe Joint Device: ASTM C 443 rubber compression gasket joint.

D. Plastic Pipe: ASTM D 1785, Schedule 40, Poly Vinyl Chloride (PVC) material; diameter as indicated, bell and spigot style solvent sealed joint end.

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.

B. Trace Wire: Magnetic detectable conductor, clear plastic covering, imprinted with "Storm Drain" in large letters.
2.03 CATCH BASIN, CLEANOUT, AND AREA DRAIN COMPONENTS

A. Catch Basin:
   1. Size and type as indicated.
   2. Materials and installation in accordance with manufacturer’s specifications.
   3. Filter insert as indicated.

B. Area Drain:
   1. Size and type in accordance with Construction Drawings.
   2. Materials and installation in accordance with Manufacturer’s specifications.

C. Filter Insert:
   1. Model and size as indicated.
   2. Materials and installation in accordance with manufacturer’s specifications.

D. Precast Storm Filter Manhole:
   1. Model and size as indicated.
   2. Materials and installation in accordance with manufacturer’s specifications.

2.04 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 31 2316.

B. Cover: As specified in Section 31 2316.

PART 3 EXECUTION

3.01 TRENCHING

A. Refer to Section 31 2316 for additional trenching requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.02 INSTALLATION – PIPE

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated.

B. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

C. Connect to building storm drainage system, foundation drainage system, and utility/municipal sewer system.

D. Make connections through walls through sleeved openings, where provided.

E. Install continuous trace wire 12 inches above top of pipe; coordinate with Section 31 2316.

3.03 INSTALLATION – CATCH BASINS, TRENCH DRAINS, AND CLEANOUTS

A. Form bottom of excavation clean and smooth to correct elevation.
B. Form and place cast-in-place concrete base pad, with provision for sanitary sewer pipe end sections.

C. Level top surface of base pad; sleeve concrete shaft sections to receive storm sewer pipe sections.

D. Establish elevations and pipe inverts for inlets and outlets as indicated.

E. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.04 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with SSPWC standards.

3.05 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION 33 4111